

# PC WORLD

WWW.PCWORLD.COM

SEPTEMBER 1998 \$5.99



## PII-400 PC Prices Take a Nosedive

Brawny New Systems  
for Less Than \$2000



## Edit Your Own Videos

Tools to Turn Your  
Home Videotapes  
Into Works of Art



## LCD Monitors Go Mainstream

Sharpest Image:  
Flat-Panel Displays  
From \$699

SPECIAL ISSUE

# PROTECT YOUR PRIVACY ON THE NET

THE DANGER IS REAL.  
HERE'S HOW TO  
**FIGHT BACK**

- **Strategies** to Foil Hackers and Thieves
- **Software** to Block Scams and Spams
- **Tips** to Safeguard Your Credit Card





# YOU'RE LOOKING FOR THE #1 RANKED ULTRAPORTABLE\*

\*"The GoBook outperformed every other machine in our review by a sizable margin."

CNet, Editors' Choice, Best UltraPortable Reviewed, June '98



## GOBOOK - THE POWER OF A DESKTOP AT JUST 1.35" THIN & 4.4LBS\*

You don't get to recharge your batteries every four hours. You don't get to rest whenever you feel like it. Why should your notebook? Life on the road is no cakewalk and your notebook should be designed to endure the rigors of mobile life as well as you do. Introducing GoBook, just ranked among the top 5 power notebooks by PC World, Aug. '98. With an innovative modular battery design, lightning-fast performance, and an incredibly thin and light package, Micron's GoBook is the ultimate companion for those who stop at nothing to succeed - whether you're heading across town or across the Pacific.



### GoBook™ 266 Portable

- Intel Pentium processor with MMX technology 266MHz
- 32MB EDO RAM
- 2.1GB hard drive
- Bay battery
- 4.4lbs (w/floppy)\*
- 6.7lbs (w/opt./base battery & floppy)
- 512K L2 pipeline burst cache
- 12.1" SVGA display
- PCI bus with 128-bit graphics
- USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports
- S-Video Out; MPEG compatible
- CardBus/Zoomed Video ready
- 16-bit stereo/Wavetable sound
- Microphone, stereo line-in/out jacks
- 24X modular CD-ROM drive
- 2 Type II or 1 Type III PCMCIA slots
- 2-way infrared port
- Touchpad pointing device
- Norton Anti-Virus
- System Wizard Mobile Client™
- Microsoft Windows 98
- 5-year/1-year Micron limited warranty

**\$2,599**

**\$91/mo**  
Business Lease

### GoBook™ 233 Portable

- Intel Pentium II processor 233MHz
- 32MB EDO RAM
- 2.1GB hard drive
- Bay battery
- 4.4lbs (w/floppy)\*
- 6.7lbs (w/opt./base battery & floppy)
- 512K L2 pipeline burst cache
- 12.1" SVGA display
- PCI bus with 128-bit graphics
- USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports
- S-Video Out; MPEG compatible
- CardBus/Zoomed Video ready
- 16-bit stereo/Wavetable sound
- Microphone, stereo line-in/out jacks
- 24X modular CD-ROM drive
- 2 Type II or 1 Type III PCMCIA slots
- 2-way infrared port
- Touchpad pointing device
- Norton Anti-Virus
- System Wizard Mobile Client™
- Microsoft Windows 98
- 5-year/1-year Micron limited warranty
- Microsoft Office Small Business Edition

**\$3,099**

**\$108/mo**  
Business Lease

### GoBook™ 266 Portable

- Intel Pentium II processor 266MHz
- 32MB EDO RAM
- 2.1GB hard drive
- Bay battery
- 4.4lbs (w/floppy)\*
- 6.7lbs (w/opt./base battery & floppy)
- 512K L2 pipeline burst cache
- 12.1" SVGA display
- PCI bus with 128-bit graphics
- USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports
- S-Video Out; MPEG compatible
- CardBus/Zoomed Video ready
- 16-bit stereo/Wavetable sound
- Microphone, stereo line-in/out jacks
- 24X modular CD-ROM drive
- 2 Type II or 1 Type III PCMCIA slots
- 2-way infrared port
- Touchpad pointing device
- Norton Anti-Virus
- System Wizard Mobile Client™
- Microsoft Windows 98
- 5-year/1-year Micron limited warranty
- Microsoft Office Small Business Edition

**\$3,299**

**\$115/mo**  
Business Lease

ORDER ONLINE AT [www.micronpc.com/pwd](http://www.micronpc.com/pwd) OR CALL TOLL-FREE 888-224-4138

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# YOU'RE LOOKING FOR TRANSPORT TREK, THE BEST PORTABLE PC IN THE WORLD.\*

\*(PC WORLD, THAT IS)

## RANKED #1 BY PC WORLD

"The TransPort Trek is the fastest budget notebook we've run through our mill"

-PC World, Ranked #1 April '98"

4MB 3D graphics accelerator

Awesome Audio

• Stereo speakers  
• Wavetable/3D Surround Sound

2 Type II or 1 Type III  
PCI MCIA slots

Dedicated CD-ROM Drive Bay



Giant Display  
12.1" or 14.1"  
active matrix display

Removable Hard Drive Bay

Dedicated Floppy Drive Bay

Powered by the Intel Pentium II processor  
233MHz or 266MHz or the Intel Pentium  
processor with MMX technology  
233MHz or 266MHz

## TRANSPORT TREK - NOW WITH THE POWER OF THE INTEL PENTIUM II PROCESSOR

Geeks, experts and industry pundits all agree that Micron makes some of the world's best notebooks. We've won the coveted *PC Magazine* Editors' Choice Award for practically every notebook line we've ever released. And the new TransPort Trek is no exception. *PC World* just ranked the new TransPort Trek the #1 budget notebook available today. The TransPort Trek is one of the best desktop replacement notebooks you can buy. Call Micron today and get a TransPort Trek custom configured to your specific needs, direct from the factory at unbelievably low prices.



### TransPort® Trek™ Portable

- Intel Pentium® processor with MMX™ technology
- 233MHz
- 32MB EDO RAM
- 3.2GB hard drive
- 12.1" SVGA TFT display
- 512KB L2 pipeline burst cache
- PCI bus with 128-bit graphics accelerator
- USB, parallel, serial, VGA, PS/2, ports
- S-Video Out: MPEG compatible
- CardBus and Zoomed Video ready
- Wavetable/3D positional sound
- Microphone, stereo line-in/out jacks
- 2 Type II or 1 Type III PCMCIA slots
- 24x modular CD-ROM drive
- 2-way infrared port
- Touchpad pointing device
- Modular floppy drive
- Li-Ion battery
- Norton Anti-Virus
- System Wizard Mobile Client™
- Microsoft® Windows 98
- 5-year/1-year Micron limited warranty

(Trek system differs from photo)

**\$1,799**

**\$63/mo**  
Business Lease

### TransPort Trek² Portable

- Intel Pentium II processor 233MHz
- 14.1" SVGA TFT display
- 64MB EDO DRAM
- 3.2GB hard disk drive
- 440 BX chip set
- 512KB L2 pipeline burst cache
- 24x CD-ROM drive bay
- Hard Drive Bay
- Floppy Drive Bay
- Li-Ion Battery Bay
- 4MB 3D graphics accelerator
- Zoomed video capable
- Card bus ready
- Wavetable/3D positional sound
- S-Video Out: MPEG compatible
- Built-in stereo speakers & microphone
- 2 Type II or 1 Type III PCMCIA slots
- Microphone, stereo line-in/out jacks
- USB, parallel, serial, VGA, PS/2, ports
- Microsoft Windows 98
- System Wizard Mobile Client™
- Norton Anti-Virus
- 5-year/1-year Micron limited warranty
- Microsoft Office 97 Small Business Edition

**\$2,499**

**\$87/mo**  
Business Lease

### TransPort Trek² Portable

- Intel Pentium II processor 266MHz
- 14.1" SVGA TFT display
- 64MB EDO DRAM
- 3.2GB hard disk drive
- 440 BX chip set
- 512KB L2 pipeline burst cache
- 24x CD-ROM drive bay
- Hard Drive Bay
- Floppy Drive Bay
- Li-Ion Battery Bay
- 4MB 3D graphics accelerator
- Zoomed video capable
- Card bus ready
- Wavetable/3D positional sound
- S-Video Out: MPEG compatible
- Built-in stereo speakers & microphone
- 2 Type II or 1 Type III PCMCIA slots
- Microphone, stereo line-in/out jacks
- USB, parallel, serial, VGA, PS/2, ports
- Microsoft Windows 98
- System Wizard Mobile Client™
- Norton Anti-Virus
- 5-year/1-year Micron limited warranty
- Microsoft Office 97 Small Business Edition

**\$2,699**

**\$94/mo**  
Business Lease

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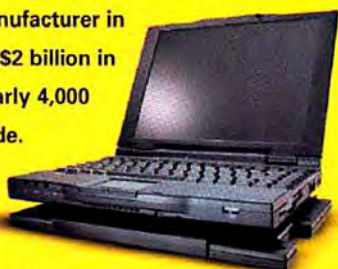


We don't build our systems for people who are easily impressed by flashy marketing. We build them for the people who do their homework.

Those who know the industry, read the reviews, and are willing to make decisions based on who makes and supports the best product at the right price.

And that's probably why Micron has become the 3rd largest direct PC manufacturer in the world with over \$2 billion in annual sales and nearly 4,000 employees worldwide.

So next time you're shopping around, compare Micron's price and performance to any in the industry.



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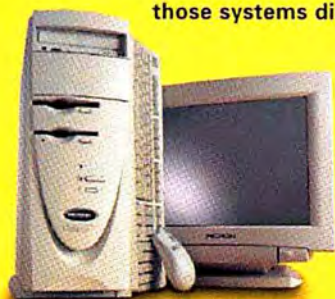
# MICRON KNOWS WHAT YOU'RE LOOKING FOR.

## (AND IT'S NOT A CATCHY HEADLINE)

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No cute mascot. No artsy photography. No clever tag line. We simply use the finest components to build a better product and sell those systems directly to the customer

for less money. Perhaps that's why *PCWeek* readers ranked Micron desktops #1 in customer satisfaction\*\*\* among all PC vendors.



After all, once you buy your system and plug it in, all of the hype and all of the clever marketing gimmicks that may have swayed your decision no longer matter. What you need is a box that works and stays working, superior tech support, and a price below what you expect to pay. And that's exactly what we offer.



Circle 139 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)

TO ORDER CALL TOLL-FREE  
**888-224-4138**



# YOU'RE LOOKING FOR NEW LOW PRICES ON POWERFUL DESKTOPS.

(Complete 300MHz Micron Systems Starting at Just \$1,249)

32X Variable CD-ROM drive  
Or upgrade to DVD-ROM drive\*\*\*

"Micron's Millennium 400 DVD edition was the fastest of all with a mind-bending PC Worldbench score of 210."

- PC World Online, "Best Buy," May '98

Lots of monitor options  
including the 17" Micron  
Monitor (15.9" display)



Awesome Sound!  
64 voice PCI Wavetable  
stereo sound speakers  
available with powered  
subwoofer



Expandable Storage  
100MB Iomega Zip  
drive available

Features new Intel®  
Pentium® II processor  
400MHz



350MHz and 400MHz systems  
feature the new Intel BX chip  
set with fast 100MHz bus

Micron is the best kept secret in the PC industry. PC World Magazine's recent (June, '98) ranking of Micron's Millennium Desktops\* as the #1 and #2 best home desktop systems money can buy only confirmed what industry experts and power users have known for years - that Micron desktops offer among the very best in price, performance and value. Micron™ desktops were also ranked #1 in customer satisfaction by the readers of the industry bible PCWeek™ as well as the readers of HomePC. Order today, direct from the factory, and take advantage of Micron's new, aggressive low pricing while custom configuring the PC of your dreams.



## Millennia® C300

- Intel® Celeron™ processor 300MHz
- 32MB SDRAM
- 4.3GB Ultra ATA hard drive
- 15" Micron 500Vx monitor (13.8" display)
- New MicroTower™ Case
- 82440EX chip set
- 512KB internal cache, 2MB Flash BIOS
- 3.5" floppy drive
- 32X max speed CD-ROM drive
- nVidia Riva 128, 4MB SGRAM 3D AGP graphics
- PCI 64-voice Wavetable sound
- Advent AV009 stereo speakers
- 3Com/U.S. Robotics 56K WinModem\*\*
- 104-key enhanced keyboard
- Microsoft® IntelliMouse®
- Microsoft Windows 98
- Microsoft Home Essentials with Microsoft Power Pak
- 5-year/3-year Micron Power™ limited warranty

**\$1,249**

**\$44/mo**  
Business Lease

## Millennia 350

- Intel Pentium II processor 350MHz
- 64MB 100MHz SDRAM
- 8.4GB Ultra ATA hard drive
- 17" Micron 700Vx monitor (15.9" display)
- New MicroTower Case
- 82440BX chip set
- 512KB internal cache, 2MB Flash BIOS
- 3.5" floppy drive
- 32X max speed CD-ROM drive
- nVidia Riva 128, 4MB SGRAM 3D AGP graphics
- PCI 64-voice Wavetable sound
- Advent AV009 stereo speakers
- 3Com/U.S. Robotics 56K WinModem\*\*
- 104-key enhanced keyboard
- Microsoft IntelliMouse
- Microsoft Windows 98
- Microsoft Home Essentials with Microsoft Power Pak
- 5-year/3-year Micron Power limited warranty

**\$1,799**

**\$63/mo**  
Business Lease

## Millennia 400

- Intel Pentium II processor 400MHz
- 64MB 100MHz SDRAM
- 8.4GB Ultra ATA hard drive
- 17" Micron 700Vx monitor (15.9" display)
- New MicroTower Case
- 82440BX chip set
- 512KB internal cache, 2MB Flash BIOS
- 3.5" floppy drive
- 32X max speed CD-ROM drive
- nVidia Riva 128, 4MB SGRAM 3D AGP graphics
- PCI 64-voice Wavetable sound
- Advent AV009 stereo speakers
- 3Com/U.S. Robotics 56K WinModem\*\*
- 104-key enhanced keyboard
- Microsoft IntelliMouse
- Microsoft Windows 98
- Microsoft Home Essentials with Microsoft Power Pak
- 5-year/3-year Micron Power limited warranty

**\$1,999**

**\$70/mo**  
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# Two heads are better than one.



†BJC-5000 comes standard with one BC-21e and one BC-23 ink cartridge. Additional ink cartridges must be purchased separately. \*Estimated street price. Dealer prices may vary. Output shown printed using optional Photo Kit, sold separately. "Bike Adventures" is a fictitious company. Any resemblance to other organizations is coincidental. ©1998 Canon Computer Systems, Inc. Canon and BJC are registered trademarks and Bubble Jet, PhotoRealism and "See What We Mean" are trademarks of Canon Inc. In Canada, call 1-800-263-1121.



Pretty smart. Look beneath the sleek, ergonomic exterior of Canon's BJC-5000 Color Bubble Jet™ printer, and you'll find our unique dual-cartridge system hard at work.

Now it's easy for you to configure your printer to fit any task you can possibly imagine. So, whatever you need—from brilliant, photo-realistic color, to text that's rich, dark and black, to a breath-

#### **Dual Printheads**

*let you mix and match various ink cartridges to fit your needs. So you get the ultimate in versatility, speed and quality.*

taking combination of both, to the stunning, true photo-quality images of our 7-color printing—this versatile performer gives you over 60 years of industry-leading savvy. In the form

of extraordinary speed, quality and flexibility. On demand.

Add in its 11" x 17" printing capabilities, along with our Canon Creative software, and you've got a mind-boggling multitude of creative printing options. All for around \$279\*.

Just call us at 1-800-OK-CANON or visit our Web site at [www.ccsi.canon.com/2heads](http://www.ccsi.canon.com/2heads) to find out more. Because inside every BJC-5000, you'll uncover a dynamic duo ready to bring out the best in your work. **See what we mean.™**

# Canon



#### **High-Speed, Enhanced Black**

*Two black ink cartridges† used together give you sharp, perfect text that zips out with impressive speed.*



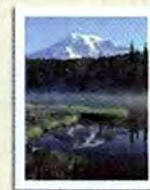
#### **Enhanced Black with Spot Color**

*One black and one color cartridge† work side by side to bring you sharp text and brilliant spot color in tandem.*



#### **High-Quality, High-Speed Color**

*Two color ink cartridges† add up to bright, photo-realistic color printing right when you need it.*



#### **Photo-Quality, 7-Color Printing**

*One Photo Ink and one color cartridge† in unison create our exclusive 7-color printing for true photo-quality images.*





TOP DOG.



TOP BANANA.

For a decade, MAG InnoVision has revolutionized the display industry by bringing you top-performance CRT-monitors. Now, we're proud to introduce the best in LCD monitors, with the LT500C (Active-Matrix) and LS500C (DSTN) pivoting displays.

**TOP-OF-THE-LINE INNOVATION.** With both the LT500C and the LS500C, MAG InnoVision brings you portrait and landscape viewing capabilities. You can easily switch from full view of your favorite web page, to displaying full width of an elaborate spreadsheet. The pure digital processing allows the monitor to display the information the computer originally intended to.



**TOP SAVINGS.** These 15.1" digital monitors deliver the performance and viewing area comparable to today's conventional 17" monitors. And, their sleek, ergonomic design occupies less than half the space, while utilizing one-third the power. These displays save room on your desk and in your budget. The MSRP is \$1399 for the LT500C and \$999 for the LS500C.

**TOP-NOTCH SERVICE.** Both monitors are backed by our award-winning customer service, featuring free, 24-hour Expert System technical support (via phone and internet). And, both are covered by our standard one-year limited warranty with 48-hour MAGIC Advance Replacement Service\* that minimizes downtime in the event that repair is ever needed.

So, now you know the top benefits of the LT500C and the LS500C . . . you'll always come out on top with MAG InnoVision.





TOP DRAWER.



TOP THIS.



THINGS HAVE NEVER BEEN BETTER.<sup>SM</sup>

MAG InnoVision, 20 Goodyear, Irvine, CA 92618 Call: 949-855-4930 or 800-827-3998  
Fax: 949-855-4535 Web Site: [www.maginnovision.com](http://www.maginnovision.com)

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\*Offer valid only in the U.S. and Canada. Replacement unit will be shipped the next business day after issuance of RMA number, subject to availability of shipping service to customer location. Customer must return defective monitor to MAG InnoVision using the replacement unit packaging within 15 days of receipt of replacement. Customer must supply credit card for value of replacement unit which will be charged if defective unit is not returned. Additional terms and conditions apply.



## SPECIAL ISSUE

## 95 PRIVACY IN THE INTERNET AGE

The wild, wild Web has made it alarmingly easy for anyone to ferret out the details of your personal and business life: social security number, sensitive e-mail messages, medical history, critical business and financial data, and more. This 41-page special report details how you are at risk—and what you can do about it.



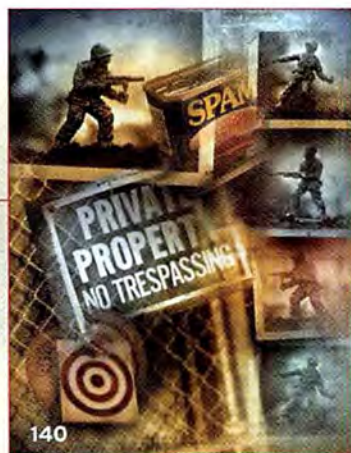
96

## 96 YOU ARE FOR SALE

**TRENDS** Telemarketers call your unlisted number. Employers paw over a copy of your doctor's notes. Banks and supermarkets compile a dossier of your spending habits. Your personal information is brokered by countless businesses and government agencies. Your right to privacy is under attack, and thanks to technology, the situation is getting worse.



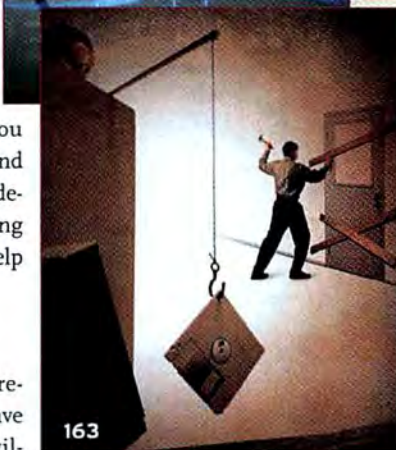
95



140

## 114 GOING PRIVATE

**HOW-TO** Want to keep your secrets? Start by changing where you go and what you do online. These easy-to-follow tips and tactics—for repelling e-mail snoops, deflecting unwanted spam, confounding password hackers, and more—will help you reclaim your privacy.



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## 163 INSIDE JOB

**BUSINESS ISSUES** The hype: Marauding hackers are waiting to bring down your business. The reality: Danger is often as close as the office next door.

## 173 BUYER BEWARE

**CONSUMER ISSUES** You can buy just about anything on the Web, but should you trust a faceless, online storefront with your credit-card number? Our advice: Proceed with caution.

## 140 THE DEFENDERS

**REVIEW** Even the most careful Web surfers sometimes leave themselves open to virtual villains—unless they use the right software to protect themselves. We've unlocked the best personal and corporate security programs to help keep all your data safe, from cookie killers to potent e-mail encryption programs.



Additional material available on PC World Online: [www.pcworld.com](http://www.pcworld.com)

## 187 TOP PRIVACY SITES

**BOOKMARK** Ready to do battle? Arm yourself with weapons from these Web sites in the war to preserve your privacy.



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## 54 DSL: COMING SLOWLY TO A PHONE NEAR YOU

Digital subscriber lines promise zippy 8-mbps Web access. But be prepared to deal with limited availability, technical gotchas, haphazard service, and hidden costs.

## 58 INTERNET SEALS MAY MISLEAD

Should online consumers trust safe-shopping seals? Most emblems, we found, don't guarantee a secure shopping experience.

## 60 HIGH-QUALITY LCD MONITORS SLIP UNDER \$700 MARK

Affordable flat-panel displays with sharper graphics take up less desk space than comparable CRTs.

## 66 IE 5 AIMS TO DISPLAY WEB PAGES THE WAY YOU WANT

An early look at IE 5 offers better loading of pages and control over the way Web sites appear.

## 68 INTEL GOES INSIDE WORK-STATIONS WITH NEW XEON CHIP

Xeon PCs offer workstation power at a reasonable price. But do you need one?

## 72 AOL LEARNS NEW TRICKS

From a Web-inspired interface to robust e-mail, the new version of AOL should please all but the most advanced users.

# NEW PRODUCTS

## 74 FreeSpeech 98, ViaVoice 98 voice recognition software

## 75 TigerDirect Tiger GT-333 budget desktop

## 76 Superfast CD-ROM drives: TrueX 40x40, portable CDPS-PX24; 5X-speed DDU220E/H DVD-ROM drive kit

## 80 SupraSonic II, Xircom RealPort modems

## 82 UnInstaller 5.1, ZipMagic98 utilities; System Commander for Windows 98

## 84 NEC SuperScript 870 printer; Sony Digital Mavica MVC-FD71 digital camera

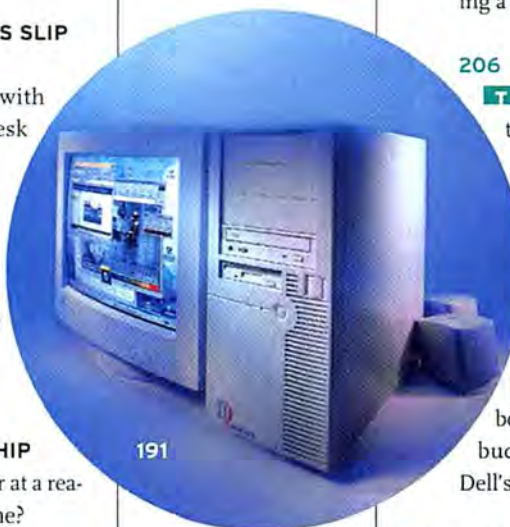
## 86 Norton AntiVirus 5.0; Business Plan Pro 3.0, Guerrilla Business planning software

## 90 Appian Duet graphics card; Microtek X6EL scanner; CD-Writer Plus 8100i

## 94 Homestead Web service; Design Shop Gold 98 Web authoring tool



74



191



60



54

## 191 PENTIUM II-400s CRASH THE \$2000 BARRIER

**TOP 100** Everyone from Compaq to Micron is slashing prices on loaded Pentium II-400s. Most impressive: two 400-MHz screamers for under \$2000.

## 194 POWER DESKTOPS

**TOP 20** Pentium II-400s continue to control the Best Buy list. What's new and hot? Quantex's QP6/400 SM-4x, sporting a 19-inch monitor, for just \$2449.

## 206 BUDGET DESKTOPS

**TOP 20** You'd be hard pressed to find PCs powered below 300 MHz here. Newcomers from Micro Express, Gateway, and Quantex snag Best Buys, and Top 20 picks run the gamut from Royal's \$999 PII-300 to TigerDirect's \$1999 PII-400.

## 214 NOTEBOOKS

**TOP 10** Two new light notebooks snag first and second place on the budget chart: Acer's Extensa 367D and Dell's Latitude CP M200SD.

## 220 HOME PCs

**TOP 10** PC makers now let you customize orders at local retailers, but nothing beats mail order for great prices. Check out Gateway's \$1999 G6-333h for power on a budget and HP's \$1098 Pavilion 3265 for novices who don't mind poky performance.

## 223 WORKGROUP PRINTERS

**TOP 10** HP and Epson hang on to the top, but for ultrafast printing, check out the 18-ppm-rated Lexmark Optra S 1855.

## 227 17-INCH MONITORS

**TOP 10** Bright colors and sharp text on Samsung's SyncMaster 700P Plus elevates this newcomer to Best Buy status.

## 229 GRAPHICS BOARDS

**TOP 10** Price cuts from Real 3D and STB keep these boards in the top spots.

## 231 INTERNAL MODEMS

**TOP 10** A price cut propels E-Tech's voice-enabled CyberBullet up three places.



## HERE'S HOW

### 256 WINDOWS TIPS



Fix year-2000 bugs in File Manager and DOS, monitor Windows system files.

### 261 ANSWER LINE



Win 95 memory caching, dissociate file and app, bypass the Windows password dialog box.

### 268 INTERNET TIPS



Teach Netscape Communicator and Internet Explorer to coexist, when to pick CompuServe over AOL.

### 274 WORD PROCESSING



Align graphics automatically in Word 97, add designer color to headlines in Word 97, WordPerfect 8, and Word Pro 97.

### 278 SPREADSHEETS

Reference the last cell in an Excel column, where to find year-2000 spreadsheet resources.

### 280 HARDWARE TIPS

Tweak your monitor to get the best display, revive a damaged floppy disk.

### 286 UPGRADE GUIDE

Install a tape drive for backups, step by step.



286

## @HOME

### 245 @HOME PRODUCTS

The right editing tools can make you the Spielberg of vacation videos.

### 248 KEEPING UP

Web sites and services for consumers.

### 250 HOME OFFICE



The cost of assembling a private online forum: zip.

## RESOURCES

- 14 HOW TO CONTACT PC WORLD
- 267 COMING UP
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- 311 EDITORIAL PRODUCT INDEX



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## DEPARTMENTS

- 19 **UP FRONT** Justifiable paranoia.
- 23 **LETTERS** Microsoft and monopoly: Readers agree to disagree.
- 35 **CONSUMER WATCH** Spam has everybody ticked off—even the feds.
- 43 **PCW ADVOCATE** DirecPC's Fair Access Policy could slow you down, consider laptop insurance for screen damage.
- 47 **GOT A PROBLEM?** Are two modems faster than one? Don't expect miracles.
- 51 **BUGS AND FIXES** Windows 98 bugs affect Explorer, laptops, peripherals.
- 316 **FULL DISCLOSURE** Are you willing to give up your privacy for a bargain? Most Americans are.



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## PCW ONLINE

### EXCLUSIVE PRODUCT PREVIEWS

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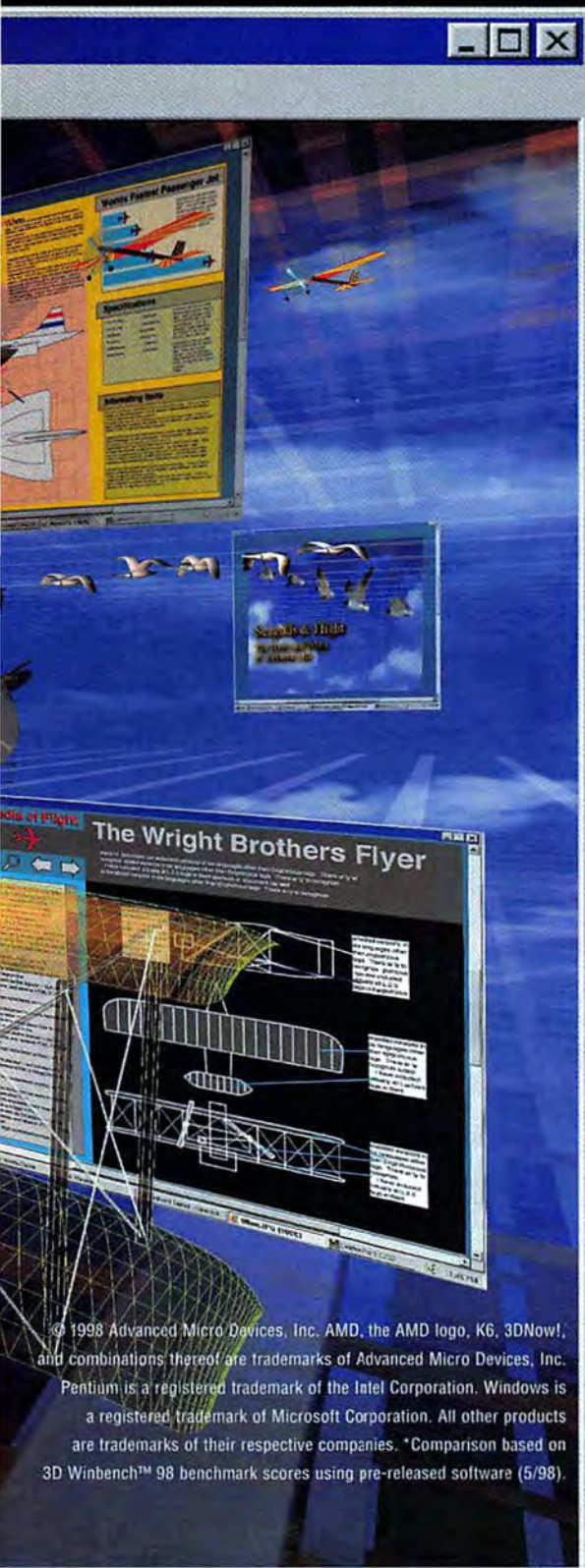
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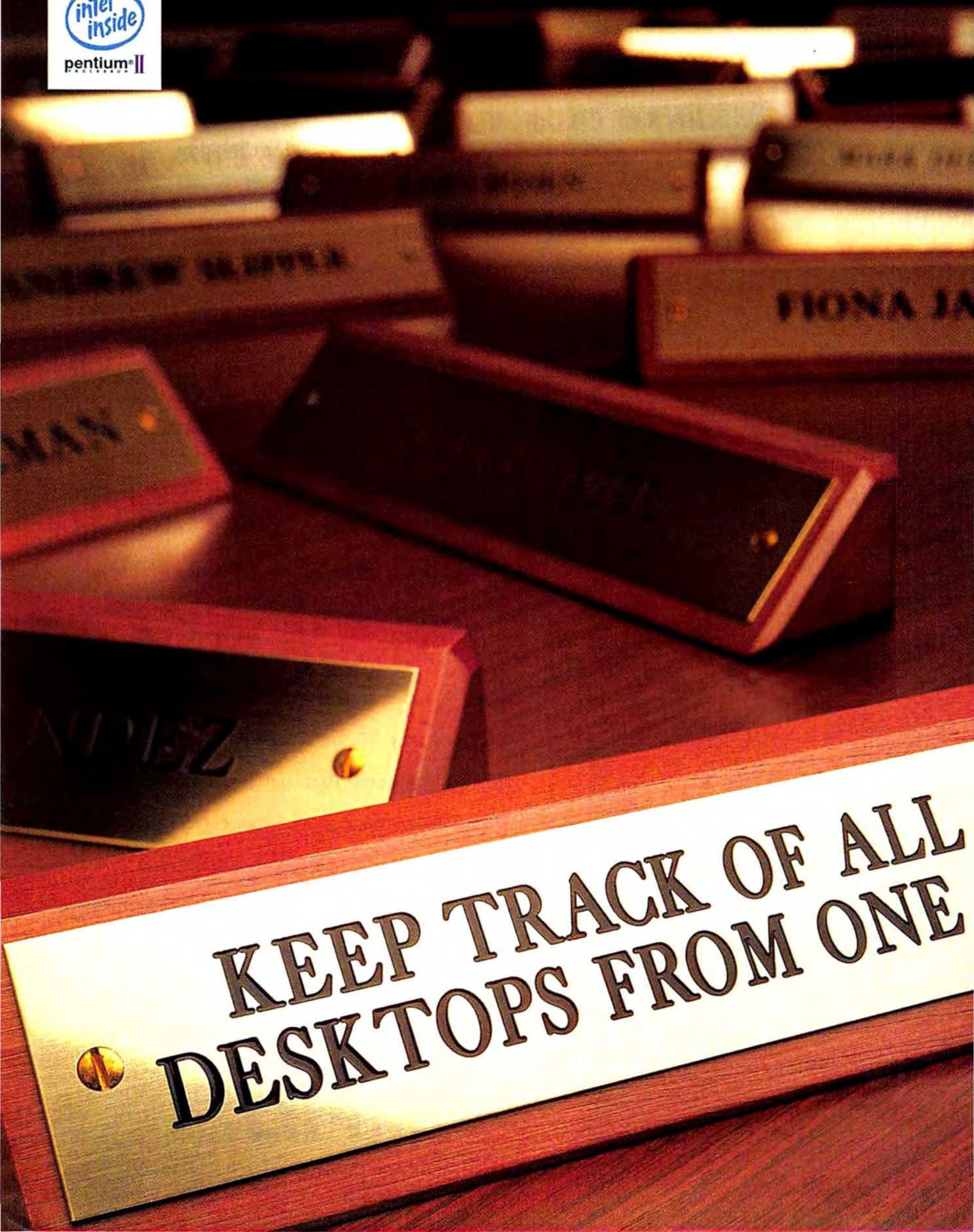
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# It Pays to Be Paranoid Online

WE'VE TURNED INTO A NATION of paranoids, justifiably so. Web sites surreptitiously gather information about where we go online and what we read. Massive databases sell information about us we don't share even with our families. Spam—fraudulent and otherwise—continues to skyrocket, clogging overtaxed networks. The number one deterrent to Internet commerce, polls say, is fear.

As privacy continues to dwindle, there's not much agreement about how to protect the little that remains. In the last two months, lawmakers, computer industry alliances, and consumer groups have proposed all kinds of laws and voluntary guidelines to protect consumers and businesses and make e-commerce safe. But as this issue goes to press, little has been resolved.

## MUCH TALK, LITTLE ACTION

■ In early June, the Federal Trade Commission released the results of its survey of Web sites. The commission found that 92 percent of commercial Web sites surveyed collect personal information, but only 14 percent let individuals know what they do with that information. Eighty-nine percent of children's sites surveyed collect personal information, but less than a quarter instruct kids to get their parents' permission before providing that information. In response, the FTC outlined legislative recommendations for children's sites, with more to come later this summer.

■ On June 22, a group of companies that sell products on the Web formed the Online Privacy Alliance, calling for more industry self-regulation in an effort to stop government legislation. Members of the group include America Online, Microsoft, Netscape, AT&T, and Equifax, the credit-report supplier. The group says it will develop privacy rules and announce its enforcement policy by mid-September.

■ On June 23, the Department of Commerce convened its Internet privacy summit. Both Commerce Secretary William Daley and Vice President Gore warned that the government would intervene unless the industry cleaned up its act.

■ On June 24 and 25, two new antispam bills were introduced in Congress, joining five other federal bills trying to outlaw or



As government and industry continue posturing about how to protect privacy, little has been resolved.

curb spam. One proposal would make it illegal for spammers to use fake e-mail addresses; prohibit using individuals' "remove" requests to create new mailing databases; and impose fines of \$10,000 or more on violators. Another would also make it illegal to use fake e-mail addresses and would authorize the Federal Communications Commission to create a national database of e-mail addresses for people who want to opt out of unsolicited mailings.

■ On July 14, a broad consortium of computer industry, telecommunications, and consumer organizations released to the FTC the results of its year-long study on unsolicited commercial e-mail. Consortium members include Internet service providers, America Online, AT&T, MCI, the ACLU, the Center for Democracy and Technology, the Direct Marketing Association, IBM, and Microsoft.

This group calls for a mix of industry self-regulation and government oversight. Among its proposed solutions: filters and additional tools to help individuals exercise greater control over incoming e-mail messages; regulations to prohibit the use of fake e-mail headers; efforts by e-mail providers to create opt-in and opt-out programs; and increased government efforts to eliminate e-mail fraud, with the FTC, the Justice Department, and state offices clarifying their jurisdiction by taking on test cases. The group also recommends that the industry study the costs of the e-mail system in order to more fairly allocate the costs of spam and find ways to ease the load that spam places on the global network.

■ Finally, also on July 14, the FTC released its "Dirty Dozen" list, identifying the 12 most common types of fraudulent e-mail, ranging from camouflaged pyramid schemes and chain letters to bogus investment opportunities and credit card scams.

## ONLY THE PARANOID SURVIVE

IN THE NEXT few months, government agencies and Congress will continue to at least debate bills. The industry will make at least a show of beefing up Web privacy policies. E-mail providers will make at least modest efforts to cut down on spam, if only because of the costs they incur. Short of pulling the e-mail plug and retreating to self-sufficient hideouts in the woods, we can only flood our legislators, e-mail providers, and Web sites with spam of our own, letting them know what measures we favor and what we won't tolerate. In the meantime, as the government and industry continue their posturing, it pays to be paranoid.

Cathryn Baskin is editor in chief of PC World.





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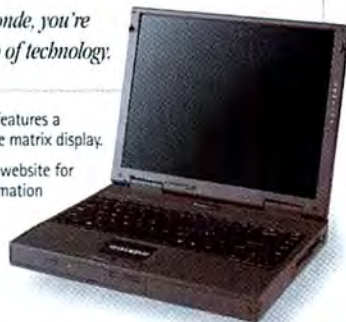
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## YOUR TAKE ON: Raspberries for Win 98 ♦ Mice for lefties ♦ Internet taxes

## ONE SIZE DOESN'T FIT ALL

YOUR JULY ISSUE'S "Best Products of 1998"—notably your choice of Best Input Device [the Logitech MouseMan+]—exemplifies the frustrations lefties face daily. All hands are not the same. For one out of eight of us, our preferred hand is the left.

You ask, "can anyone explain all the different shapes of ergonomic mice?" An ergonomic mouse is shaped like a hand. It has bumpy contours, comes in different sizes, and is engineered to reduce fatigue. While it may look strange and even ugly to some, it is designed for comfort. Most important, an ergonomic mouse manufacturer recognizes the difference between my larger-than-average left hand and my young daughter's small right hand.

The downside of an ergonomic mouse is that it is user-specific, so a multiuser PC may need multiple mice. A universal mouse may be a compromise, but at least

it is designed with all users in mind. Your "best input device" made neither assumption. Calling it the best is more than a stretch. It's an insult.

Wayne Resnick

Menlo Park, California

**Editor's response:** Your complaint about our choice of the MouseMan+ for a World Class award raises a valid point about the dearth of mice designed for lefties—which I, as a southpaw, well know. The choice of an input device is personal, so we encourage people to find what works for them. At the same time, we think Logitech has produced a versatile scrolling mouse that most users—including many lefties—should find comfortable. No sinister slight was intended. —Yardena Arar



## MIXED SIGNALS

ON PAGE 132 IN THE July issue ["Best Products of 1998"], under "Loser of the Year," you assert that Office 97 has "more bugs than a Florida swamp." On page 136 of the same article, however, you list Office 97 as "Best Application Suite." Which is correct?

John R. Wahn

Greenfield, Wisconsin

**Editor's response:**

They're both right. Office 97 was hardly a faultless product when it was released. For example, its file formats weren't always backward-compatible (a problem Microsoft has since fixed). But notwithstanding its imperfections, Office 97 was the Best Application Suite of the year. —Brad Grimes

## HOT BUTTON

## Microsoft's Monopoly: Pro and Con

IN HER JULY EDITORIAL ["DOJ to Microsoft: Give Us Choice!"] *Up Front!* Cathryn Baskin notes that the next versions of Office and NT 5.0 will add features now available from other companies' products. Then she says "In Microsoft's world, choice and innovation come from one company's products alone."

If other companies already have products out there, why is it anticompetitive for Microsoft to make its own versions? Isn't that what competition is about? And don't millions use Netscape, even though Internet Explorer comes free on new systems with Win 95?

Monty Gonzales, Stockton, California

CATHRYN BASKIN IS right about Microsoft. The Justice Department is protecting consumers from unrestrained monopoly. On my office wall is a Mike Luckovich cartoon in which Bill Gates holds a big mousetrap and says, "The government's picking on me for building a better mousetrap." Caught in the trap are competitors and consumers.

Daniel L. Schwartz, Honolulu, Hawaii

MS. BASKIN SEEMS not to understand how standards benefit the consumer. Windows is the standard for PC operating systems. Imagine what would happen if five operating systems had the same market share. To get full market exposure, software developers would have to develop five versions of each product, and consumers would pay for the higher development and distribution costs.

We should accept the current OS standard and get on with more important things.

Peter V. Robinson, Medina, Ohio

AS A MAJOR consumer in our free-market economy, the U.S. government should stop threatening Microsoft and instead spend its money in ways that further its policies.

Suppose the government started purchasing, say, Macintoshes loaded with Corel's WordPerfect Suite. This would send a very strong signal to Microsoft.

Mark Mathias

Sherman Oaks, California

## THANKS FOR HOW-TO

THANK YOU FOR Kirk Steers' *Hardware Tips* column ["Fix Intolerable Problems by Reformatting Your Drive," July]. I have read dozens of articles on reformatting hard drives; all of them say to get the DOS CD-ROM drivers on a floppy, but none tells how to do this—until now. Thank you!

Deborah Garcia, Ludington, Michigan

## A TAX-FREE NET?

IN THE DEBATE over Internet taxes ["A Tax-Free Net Forever? Not So Fast," *Top of the News*, June], no one has mentioned that forcing Internet and mail-order companies to collect sales taxes is rank protectionism for "Main Street" businesses.

While local businesses whine that Internet and mail-order companies don't have to collect sales taxes, they fail to mention that local businesses don't have to charge for shipping and handling. In my experience, this usually equalizes the costs.

Requiring Internet and mail-order businesses to collect sales taxes amounts to a tax increase on end users. Consumers should demand a ban on all such taxation.

Allen W. Snyder, Laurel, Maryland ▶





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## NO CHEERS FOR WINDOWS 98

IF I UPGRADE to Win 98 rather than NT ["Windows 98: Now or Never?" July], it will be after the first revision is released.

But I may not upgrade, because Explorer is such a terribly clunky file manager. I do multimedia work on one of my PCs and have about 14,000 files on it in several hundred directories. What does Win 98 offer me for file management? The new, improved "next" and "back" buttons! Win 98 is another case of Microsoft adding gravy to a plate with no potatoes on it.

*Mark Hepburn, Internet*

WHAT'S THE BIG FUSS about Windows 98? It's just a minor evolutionary step in the overall development of Windows software. I'm content to wait a couple of years for Microsoft to release Windows 1900!

*Kent M. Bridwell, Los Angeles*

AS AN EARLY purchaser of Windows 95, I got stuck with the buggiest version and

continue to suffer through crash after crash despite downloading the Microsoft service packs. Windows 98 is supposed to contain all the fixes I need to ensure my happiness—but if I suffer file corruption, I must reinstall Windows 95 (on 13 floppies), the service pack, and the Windows 98 upgrade to refresh my files. This is a needless hassle. Why can't the software verify my customer status via my product identification number and then install Windows 98? My computer store tech said he was hearing a lot of complaints about this problem and was advising customers to buy the entire Win 98 program (for \$189) to avoid the floppy disk/service pack headache.

*J. D. Hillman, Saratoga, California*

I NEVER THOUGHT I'd praise Windows 95, but Windows 98 has helped me see the light. After four days of battling error messages, I contacted Microsoft, and its techs led me through the installation

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(using some instructions not in the manual). After what seemed like a flawless install, I put in my CD writer, and boom!—there went the Registry. The Win 98 disc makes a wonderful coaster now.

*John Coburn, St. Catharines, Ontario*

*PC World welcomes your responses, ideas, and other letters to the editor. See page 14 for contact information.*

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## CORRECTIONS AND CLARIFICATIONS

JULY'S "Godzilla-Size Hard Drives" incorrectly said Windows NT reads from and writes to drives formatted in FAT32.

The correct URL for the Hewlett-Packard M-900 (August *Top 10 Monitors*) is [www.hp.com](http://www.hp.com). The August *Top 10 Graphics Boards* chart misidentified two vendors' phone numbers and URLs. The correct data is: Real3D, 800/393-7730, [www.real3d.com](http://www.real3d.com); Intel, 800/628-8686, [www.intel.com/graphics](http://www.intel.com/graphics).

In our July and August Top 20 Budget Desktops review of Gateway's G6-300b, we incorrectly stated that the system includes a free month of service with the gateway.net Internet service provider.

PC World regrets the errors.

### Black Widow

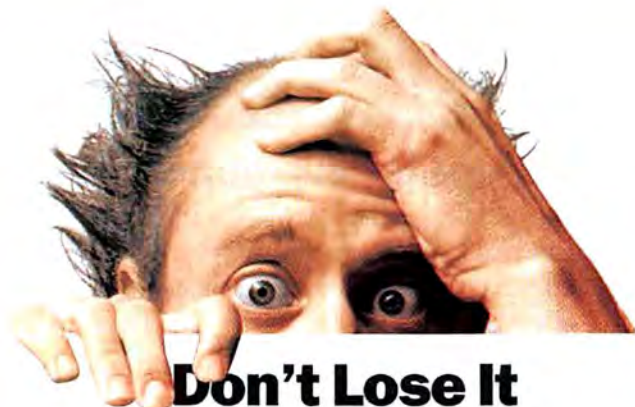
IN JULY'S "Pump Up Your Browser," we compared BlackWidow 3.61 from SoftByte Labs ([www.softbytelabs.com](http://www.softbytelabs.com)) to Anawave's

WebSnake 1.23 ([www.anawave.com/web-snake](http://www.anawave.com/web-snake)), evaluating the products as offline browsers. In that comparison we stated that BlackWidow took longer to download our sample Web site ([www.computerpress.org](http://www.computerpress.org)) than WebSnake.

We have since retested both products in their default settings, and while they took slightly less time to both scan the site and download files this time around, BlackWidow took about twice as long as WebSnake—as much as 25 minutes, 9 seconds compared with WebSnake's 12 minutes, 47 seconds. We used a Dell Pentium-133 system with 16MB of RAM and a 33.6-kbps modem in our testing, and we scanned and downloaded the [www.computerpress.org](http://www.computerpress.org) site at various times during the day. (Your results may vary depending on your computer's RAM, your modem and connection speeds, your location, and your ISP.)

BlackWidow 3.61 is an offline browser, a Web site mapper, and a "site ripper." Unlike WebSnake, which maps and downloads in one step, BlackWidow scans a site and then downloads the site's files in two separate steps. (Because BlackWidow can't download a site without scanning it first, we've included the scan time in the total download time.)

This two-step process lets you view the site's entire directory structure and then choose which files you want to download to your hard drive. However, most sites' directories include obscure file names like "award13winner1.html," and picking files from a directory tree is hard unless you know exactly what you're looking for. BlackWidow works best if you are downloading specific types of files, such as all JPEG images, on a site. ■



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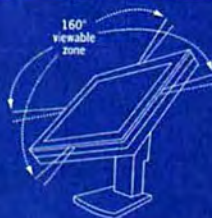
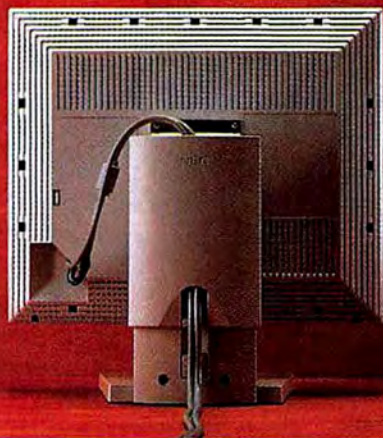
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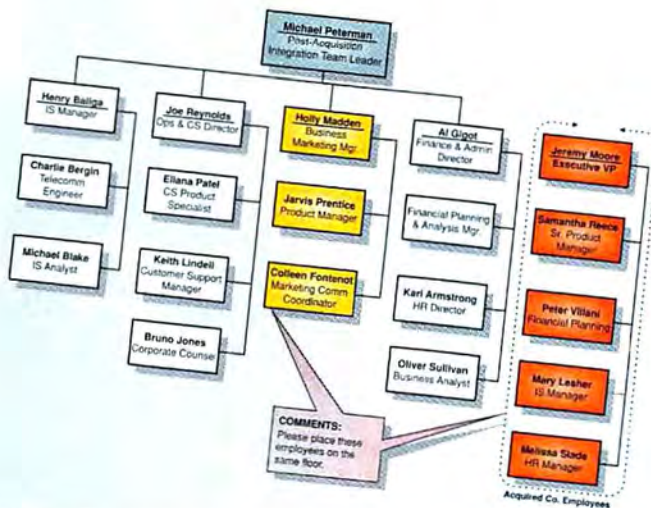
## Memorandum

**To:** Chris Murphy, Facilities Manager  
**From:** Mike Peterman, Post-Acquisition Team Leader  
**CC:** Holly Madden; Jarvice Prentice; Colleen Fontenot; Jeremy Moore  
**Date:** 07/27/98

**Re:** Acquisition Integration Plan

The following organizational chart shows how my new Post-Acquisition Team is structured. The acquired employees will be working closely with Holly's group. Please make sure there is space to keep the eight of them together on the same floor.

Thanks,  
MP



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IT STARTED AS A TRICKLE—an annoying solicitation that would appear in my in-box every now and then, mixed in with the memos from coworkers and lunch invitations from friends. Then, seemingly overnight, the trickle became a torrent. I found myself deleting five, six, sometimes a dozen messages a day from anonymous folks trying to sell green tea vitamin supplements or enticing me to invest in an alpaca ranch in South America.

Just about every man, woman, and child with an e-mail account has been the recipient of unsolicited commercial e-mail, commonly known as spam. The problem has reached such proportions that it's difficult to go anywhere these days without hearing someone bemoaning the steady barrage of electronic marketing pitches. And just about everybody—from Internet service providers to state and federal government officials to Internet activists—has joined the effort to put the brakes on what has rapidly become the scourge of the Internet.

A small but determined group of Netizens has been waging battle against e-mail marketers for years. They've collected lists of the most egregious offenders and posted them on newsgroups; they've lobbed mail bombs—e-mail messages that overwhelm a junk mailers' inbox; and they've created and distributed software designed to filter out unwanted mail (see "The Defenders," page 140).

Although the outcry against junk mailers has grown steadily louder, so far this mostly grassroots campaign has proved ineffective against the deluge of unsolicited e-mail.

Junk mail now accounts for an estimated 10 percent of all e-mail traffic, according to the Electronic Messaging Association. Spam fills our in-boxes and can slow Internet mail traffic to a crawl. It costs us time, as we're forced to either sort through the junk or figure out how to intercept it in transit. It costs us money: Consumers inevitably pay for the costs ISPs incur fighting the problem. Finally, junk e-mail violates every Internet user's privacy.

## THE POLITICOS STEP IN

AFTER MANY DELAYS, federal and state legislators have finally begun to take part in the battle against junk e-mail. This past spring, the U.S. Senate tacked an antispamming amendment onto a bill that prohibits certain practices by long-distance telephone companies. The

amendment, a compromise between New Jersey Democrat Robert Torricelli and Alaska Republican Frank Murkowski, would require that unsolicited commercial e-mail include the name, postal address, e-mail address, and phone number of the sender. It would also make junk e-mailers comply with all consumer requests to be removed from their lists. The Federal Trade Commission would be charged with investigating complaints against spammers, and authorized to fine violators up to \$15,000. A similar bill has been introduced in the House of Representatives.

The antispamming legislation has met with a mixed reaction—even from the loose coalition of groups fighting junk e-mail. The Center for Democracy and Technology, an online policy group in Washington, D.C., has called the



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## CONSUMER WATCH

Murkowski-Torricelli amendment a good first step. But others, including the Coalition Against Unsolicited Commercial E-Mail, have denounced the legislation as too soft on spammers. Instead, CAUCE supports a bill by Representative Chris Smith that would ban junk e-mail, much as junk faxes are now forbidden.

There's been a flurry of activity at the state level, too. Last spring, California's assembly passed a bill that lets an ISP sue anyone who sends unsolicited e-mail in violation of the ISP's stated policies. In addition, Kentucky, Nevada, New York, and Washington state have either adopted or are considering legislation that, like the Senate bill, would regulate junk e-mail. Thus far, only Maryland has enacted an outright ban.

As elected officials line up against spam, consumer protection agencies are, not surprisingly, also getting into the act. The FTC in particular has put thousands of suspect junk mailers—identified by the commission as potentially fraudulent—on notice, advising them to clean up or close down their operations. Marketers who've been warned include those offering or propagating pyramid schemes and chain letters, deceptive diet and medical solicitations, credit repair scams, and guaranteed credit card solicitations.

### STEMMING THE TIDE

LAWSUITS AND legislation are good first steps, but they tend to be reactive. They punish the most egregious transgressors, but do nothing to stop the seemingly relentless flow of junk e-mail clogging our in-boxes. Short of a total ban (which appears unlikely at the federal level), one of the most promising attempts at quelling the rising tide of spam comes from the source. ISPs and free e-mail services such as Juno and Hotmail are cracking down on the perpetrators among their subscribers and suing junk mailers who "forge" their addresses to avoid detection.

An increasing number of ISPs are adopting policies that ban the sending of unsolicited commercial e-mail and are expelling any violators. Others provide software tools for customers interested in weeding out junk mail. Some ►





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## CONSUMER WATCH

ISPs have recently gone one step further in their fight against spam by filtering clients' e-mail for them, discarding junk mail before it ever arrives in a customer's in-box. America Online, Concentric Network, Prodigy Internet, and Netcom have either started filtering customers' mail or plan to do so shortly.

Most ISPs filter spam based on the source—effective if the e-mail is coming from a known junk mailer—as well as by the quantity of messages received. A few, however, can also recognize and intercept spam based on message headers' similarity to previously filtered junk mail. Although some consumers cheer the move, the service puts ISPs in the sometimes uncomfortable position of deciding what's junk and what isn't.

### YOU CAN TAKE ACTION!

INDUSTRY PLAYERS and politicians are welcome foot soldiers in the battle against junk e-mail. But it's consumers who must continue to lead the charge. Here's what you can do to fight spam.

**Enlist your software.** E-mail programs like Eudora and Outlook Express let users designate certain types of messages to be deleted automatically (such as those including the phrase "get rich quick").

**Complain.** A site called Fight Spam on the Internet ([spam.abuse.net](http://spam.abuse.net)) includes an excellent tutorial on how to complain to an ISP about spam. While you're firing off e-mails, make sure you send one to the FTC at [uce@ftc.gov](mailto:uce@ftc.gov).

**Get involved.** Let your state and federal elected officials know where you stand on proposed legislation. For an update on what's happening politically, check out the John Marshall Law School Center for Information Technology and Privacy Law site ([hosti.jmls.edu/cyber/statutes/email](http://hosti.jmls.edu/cyber/statutes/email)).

The time to act is now. It's not enough anymore to just delete the junk and hope for the best.

*Got a spam solution? Write us about it at [consumervatch@pcworld.com](mailto:consumervatch@pcworld.com). PC World Contributing Editor Roberta Furger is the author of *Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution* (Warner Books, 1998). ■*





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**WE HELP WITH:** DirecPC slowdown ♦ Auction site woes ♦ Burning laptop

# Satellite Net Access Slows to a Crawl

"ANYTIME I download more than 40MB worth of files over the Net, DirecPC cuts my bandwidth to zip. I'm stuck with a \$300 birdbath," complains Mark Burgus of Stronghurst, Illinois.

Burgus is a victim of DirecPC's Fair Access Policy. Though DirecPC offers a high-bandwidth satellite Internet connection, the FAP slows down the service for people who gobble up too much bandwidth by unlawfully reselling the service to others.

However, the policy is affecting some heavy Internet users who use the service legitimately, such as newsgroup readers. Worse, those people affected by the FAP have found it difficult to get information from DirecPC on why their service has slowed, or when it might return to normal.

Dave Zatloukal, assistant vice president of DirecPC, disputes that service ever idles

to "zip." But he admits the company has not always made it clear to users when the FAP was a factor in service slowdowns. "We've seen that people have been caught up in the FAP and we're trying to figure out ways to address their needs," Zatloukal says.

As a result, the company now equips its customer care reps with information about which customers are being regulated by the FAP. By the time you read this, that information should also be available at the company's Web site ([www.direcpc.com](http://www.direcpc.com)) and by phone (800/347-3272). In addition, the new version of DirecPC offers a news service called Turbo Newscast that downloads newsgroups for users so they won't have to download those files themselves.

At press time, a class action lawsuit was filed against DirecPC in Maryland. If you are a DirecPC customer with a complaint related to the FAP, call 888/476-6529.

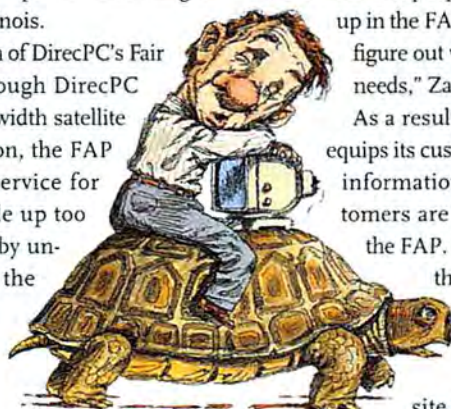


ILLUSTRATION: JOHN S. CUNEO

## THE FINE PRINT

### LAPTOP CASUALTY: CONSIDER THE INSURANCE OPTION



LIKE MOST laptop policies, Hitachi's notebook warranty states that repairs to your laptop are not covered if the damage is due to abuse. You probably don't *plan* to abuse your laptop. But what if you drop it while racing through the airport, and crack that LCD screen? According to Keith Bennett, director of customer service and support at Hitachi, replacing a laptop screen can cost from \$450 to \$1000. Ouch! If you travel a lot, own a laptop with an expensive screen, or are just plain clumsy, you might want to buy an enhancement to the warranty that covers screen damage—no matter how it happens. For \$199 a year, Hitachi will cover two screen replacements (and 50 percent of the replacement cost after two). Check out what your laptop maker offers.



Warranty is void if the failure of the product has resulted from (i) accident, misuse, abuse,

## Trouble at AuctionBoard?

I FEARED THE worst when several readers complained about AuctionBoard ([www.auctionboard.com](http://www.auctionboard.com)). These customers had paid for goods at the auction site but never received them. When I contacted the company, however, spokesperson Diana Wolf explained that one of AuctionBoard's main suppliers had gone out of business—suddenly.

"Our site handles the transaction, and then the distributor takes care of shipping the product. This particular distributor closed its doors with many orders outstanding," says Wolf. "As soon as we learned that these orders weren't going to be delivered, we notified all of our affected customers."

Customers were given the option of a refund or another product at the same price. If you purchased a product from the site but never received it, contact [customerservice@auctionboard.com](mailto:customerservice@auctionboard.com), or call 408/919-7428.

## Canon Turns Lemon Into Lemonade

IRA STOLLER OF Butler, New Jersey, writes with an instructive tale about a lemon computer. Think of his story as a benchmark for service, if not for reliability. "Shortly after I bought a Canon InnoVa laptop," writes Stoller, "the power supply burned up. Imagine my terror when smoke curled from my computer!"

"After that, two additional problems required me to replace the machine with another Canon laptop. So I was quaking when the warranty on the replacement machine expired. I was right to be afraid. Three months later, the system board failed. The PC wasn't worth fixing. I called Canon. After looking at my service record, the company authorized a full refund of the purchase price. It even refunded what I'd spent on a network modem and sales tax, and sent a prepaid shipping label!"

## GOTTEN A RAW DEAL?

Or a great one? Send PCW Advocate the details at [advocate@pcworld.com](mailto:advocate@pcworld.com). We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for PC World. ■



# Annual Report

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Millennium G200 8MB AGP

844

ATI Xpert@Work 8MB AGP

641

Diamond FireGL 1000 Pro 8MB AGP

549

\*Estimated Street Price. All tests were performed without independent verification by Ziff-Davis. Ziff-Davis makes no representations or warranties as to the result of the tests. WinBench, 3D WinBench and WinMark are trademarks of Ziff-Davis Inc. in the US and other countries. All tests performed on a Dell Dimension XPS R400 configured with a 400MHz Pentium II and 64MB of RAM. WinBench 98 Business run at 1280x1024x24bpp@75Hz. Matrox Millennium G200 configured with 8MB of SGRAM for the AGP bus and using driver revision 4.10. Diamond FireGL 1000 Pro configured with 8MB of SGRAM for the AGP bus and using driver revision 4.10.01.2348. ATI Xpert@Work configured with 8MB of SGRAM for the AGP bus and using driver revision 4.10.01.2312.

Circle 143 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)

# matrox



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# Are Two Modems Faster Than One?

**PROBLEM** You wonder whether using two modems will speed up your poky Internet connection.

**SOLUTION** Plan ahead, get everything you'll need beforehand, and don't expect miracles.



WHY, OH WHY, CAN'T WE all have high-speed access to the Internet? That question haunts Netizens as they wait for the latest browser software, video clip, or shareware utility to download. For Jim Anderson, a computer support technician who lives in Douglas, Massachusetts, the answer is simple—because he just can't.

"I live in a rural area where ISDN is still not available," Anderson laments. "ADSL [Asymmetrical Digital Subscriber Line] is in the trial stages, and when I call my local cable company to ask about high-speed access, the answer is, 'We're looking into it.'" Anderson con-

sidered a satellite connection, but satellites speed up the process in only one direction, requiring a regular modem to upload data.

So Anderson gave up on the newer connection technologies and tried accelerating his Web surfing by more modest means—his modem. Make that his modems. Using the right Internet service provider, the right software, and an extra phone line, Anderson hooked up two modems to his PC to enjoy faster Net access.

Though plenty of authorities—including *PC World* (see "Double Your Modems, Double Your Fun" in the September 1997 *Answer Line*)—have recommended this solution, getting two modems to work together seamlessly can be tricky. Keep the following points in mind if you decide to try using two modems to speed up your Internet connection.

## AND A ONE, AND A TWO

BEFORE YOU START, you need to have three things: reasonable expectations, a compatible PC, and some extra funds in your budget.

First, keep in mind that two modems—even if both are 56-kilobits-per-second models—are slower than such emerging technologies as ISDN, ADSL, and cable. *PC World* hasn't done extensive testing using two modems, but we've done enough to know that speed gains will vary depending on what you do on the Net, how good your phone line is, and other factors.

Anderson says he was willing to accept minimal performance gains. "I was looking for the working man's way to get better speed," he says, "not some premier system."

Second, make sure your system can support two modems. Many people who can't get two modems to work are using PCs incapable of handling an extra modem. If your system came with two serial ports and a PS/2 mouse port, you can easily plug in two external modems. But if there's only one serial port, or if one must be used for the mouse, you're in trouble.

Installing an internal modem won't work well either. Your computer sees an internal modem as another serial port; and though a PC can have up to four serial ports, you can't use ports 1 and 3 at the same time. Or ports 2 and 4. So you can't simultaneously use two modems and a mouse if the mouse is plugged into a serial port. Your only hope is to contact your system vendor and ask if you can add a dedicated PS/2 port.

Finally, though using two modems may seem like a "working man's" system, it costs extra. ►



Unless you already have a second phone line, you'll need a new one, usually with up-front and ongoing costs. But don't install the second line until all of the pieces you'll need are in place.

## YOU'RE ALMOST THERE

BY NOW YOU KNOW what to expect from two modems, you know your PC can handle them, and you've found out how much a second line costs. Continue taking baby steps as you set up your connection.

Make sure that your ISP is up to the job. Not only must the ISP support something called Multilink Point-to-Point Protocol, but it should also allow you to log on with two lines simultaneously.

Most large, national ISPs—including America Online and EarthLink—don't currently support a dual-modem connection. Luckily, however, some local ISPs do let you connect with two modems. Anderson's ISP, Complete Internet Access ([www.thecia.net](http://www.thecia.net)), is one of them.

Once you've found an ISP, you'll need a second modem. The two modems don't have to be the same speed, so depending on the boost you want, you can dust off that 28.8-kbps antique and run it with your 56-kbps modem. In fact, you're better off starting with a modem you have lying around just to test the connection.

You can buy products that combine two modems in one, but their performance may not justify their price (see "Modem Doublers Fall Far Short of Bold Claims" in April's *Top of the News*).

Finally, you need a version of Microsoft's Dial-Up Networking software that supports the ML-PPP. The OSR2 version of Windows 95 already does so, as does Windows 98. But users of older Windows 95 versions must go to Microsoft's Web site and get the Microsoft Dial-Up Networking 1.2 Upgrade. A Multilink tab will appear in the Properties window of your dial-up connection. From there you can change settings to use two modems.

## NO LUCK YET

SO HERE YOU ARE. You've done everything necessary to connect two modems to the Net—but it isn't working. Anderson says that when he first set up his dual-modem connection, both modems worked properly, but one kept hanging up almost as soon as it connected.

If you find yourself in the same boat, ask your ISP if you're dialing into the right numbers. Depending on how its servers are set up, you may need different access numbers. Several people we've talked to simply couldn't get their modems to work together, no matter what they tried. So what's the moral of the story? Getting a dual-modem connection might be nice, but it might not be for you.

*If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear about it. See page 14 for contact information. Brad Grimes is a senior associate editor for PC World.*

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Windows 98 bugs are biting ♦ Laptop upgraders beware ♦ Get devices working in 98

I N B R I E F

# Redmond, We Have a Problem

WINDOWS 98 is selling like crazy, but the list of known incompatibilities, glitches, and minor bugs grows daily. Microsoft reportedly won't release the first bug fixes for the operating system until September. As we went to press, however, a serious Explorer flaw capable of destroying your data cropped up (see *In Brief*), and it may force Microsoft to change its tune.

The company's Knowledgebase lists dozens of known Windows 98 problems and incompatibilities. Though some appear to be bugs in the OS, Microsoft attributes others to third-party applications or drivers that fail as a result of design changes in Win 98. According to Microsoft, troublesome programs include Norton Antivirus 4.0, Dr. Solomon's Antivirus, Network Associates' Nuts & Bolts, and Corel CD Creator 2.0.

## LAPTOPS NOT READY FOR WINDOWS 98

INCOMPATIBILITIES BETWEEN Win 98 and many models' power management and other BIOS features have prompted laptop manufacturers to post advisories against upgrading to the OS

## Beat the 98 Hardware Blues

FOR MANY WINDOWS 98 upgraders, bugs and software incompatibilities are the least of their worries. Many report that the new OS fails to identify and install drivers for hardware that worked fine under Win 95. According to Microsoft, the problem is at its worst with older hardware. Though Windows 98 comes with device drivers for thousands of modems, video boards, and the like, it can't include the latest driver for every product. If Windows 98 looks askance at a piece of hardware installed on your system (or can't seem to see it at all), open Windows' Device Manager (choose *Start•Settings•Control Panel•System*, then click the *Device Manager* tab); select the recalcitrant device, and click *Remove*; then reboot.

If that doesn't resolve the problem, contact the manufacturer for an updated driver. Most companies offer drivers through a Web site, but if you can't find what you're looking for, try Frank Condon's Windows 98 drivers page ([www.conitech.com/windows/win98.asp](http://www.conitech.com/windows/win98.asp)). Once you've downloaded the driver to your system (and extracted the files from the archive file), select the hardware device in Device Manager, click *Properties*, then the *Driver* tab, and click *Update Driver* to start the Update Device Driver Wizard.



## Windows 98's Nasty Explorer Bug

WINDOWS 98'S EXPLORER file manager can be hazardous to your files. Warning: Don't try these steps on folders that contain valuable data. To see the bug (reported by Tucson, Arizona, reader Tracy Mason), open Explorer and select a folder. Next, using your cursor keys, navigate to another folder, then press <Delete>. Select *No* in the resulting confirmation dialog box to cancel the folder deletion, then quickly repeat the navigation, deletion, and cancel steps. If you repeat the steps fast enough, Explorer will lose track of which folder you've selected for deletion, and instead ask you to confirm deletion of the last folder selected. Choosing *Yes* will delete the previously selected folder. As we went to press, Microsoft was unable to confirm or deny the existence of the bug.

before installing BIOS upgrade patches. As we went to press, manufacturers had reported conflicts in a number of models.

- **Compaq** offers a comprehensive list of Win 98 incompatibilities and work-arounds, organized by product (including desktop PCs) at [www.compaq.com/athome/win98/downloads.html](http://www.compaq.com/athome/win98/downloads.html).

- **Dell** recommends waiting to upgrade newer Latitude models until it releases a performance-enhancing "system patch" (check [www.dell.com/products/notebook/latitude/98upgrade.htm](http://www.dell.com/products/notebook/latitude/98upgrade.htm) for more information). Older models may not get the patch.

- **Gateway** suggests upgrading Solo 9100 systems set up with earlier BIOSes to version 8.41 ([www.gateway.com/home/support/hardware/9103](http://www.gateway.com/home/support/hardware/9103)) to fix a CardBus problem under Win 98. Microsoft also reports that Win 98's resume mode doesn't work right with the video chip set used in some Solo 2300 models.

- **IBM** says it will be releasing a patch for ThinkPad models to improve ACPI support in Windows 98 (see [www3.pc.ibm.com/techinfo/12e22.html](http://www3.pc.ibm.com/techinfo/12e22.html)).

- **Sony** offers thorough solutions to Win 98 upgrade problems with its portable and desktop computers, including links to driver updates, at [www.ita.sel.sony.com/support/pc/win98\\_2.html](http://www.ita.sel.sony.com/support/pc/win98_2.html).

- **Toshiba** recommends not upgrading many models before installing a forthcoming BIOS upgrade with better ACPI support (see [www.csd.toshiba.com/tais/csd/support/techsupport.html](http://www.csd.toshiba.com/tais/csd/support/techsupport.html)).



Files from this article are available on PC World Online at [www.fileworld.com](http://www.fileworld.com). Scott Spanbauer is a senior associate editor for PC World.

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## STORY #158:

# *The Bullet Hole*

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[ *"A slug had pierced the LifeBook's case."* ]

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# TOP OF THE NEWS

By Jeff Bertolucci

## DSL: Coming Slowly to a





**Digital subscriber line** service promises **blazing** Web **access**. Too bad you **can't** get it.

markets, while Ameritech and Southwestern Bell are proceeding more cautiously. Of all the telcos, U S West has been the most gung ho, marketing DSL to consumers in several Colorado cities. Other players, ranging from telecommunications giant GTE to

JUST IN




### Microsoft Office 2000

THAT'S THE official name for Microsoft's next version of Office, which is expected to ship by early 1999. New developments include a better clip-art gallery, a right-click thesaurus option that brings up synonyms for individual words, and an improved Outlook opening screen—Outlook Today—that shows your day at a glance (tasks, calendar, and journal). Office 2000 will be smart enough not only to detect missing and corrupted files but also to help you repair them. Finally, Office 2000 will be a truly international product; to add languages, you'll just buy add-ons. (Currently, you must purchase full-blown foreign language versions of Office).

### Subnote Alternative?

IN EARLY 1999, a new wave of Windows CE devices will provide an alternative to subnotebooks. These lightweight products in the \$1000 price range will be based on an upgrade to Win CE 2.0, code-named Jupiter. These products will likely include full-size keyboards and screens, and support for Universal Serial Bus peripherals and ethernet cards. Moreover, the Jupiter version of CE will let you work directly on Office documents in their ▶

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# Phone Near You

## B E T A



DIGITAL Subscriber Line, one of the hottest of the new high-bandwidth technologies, is having a tough time getting to market. When it does, it will deliver speeds up to 8 megabits per second over standard copper wires—fast enough to let you download the latest 15MB behemoth browser in seconds. Telephone companies and Internet service providers are rolling out DSL in selected markets across the country.

But don't junk your 56-kbps modem just yet. DSL technology is available only in limited areas, and many markets won't get it until 2000 or later. Even if you live in a DSL-enabled area, the service's technical limitations may keep it out of your home or office. And DSL won't be cheap: A connection could easily double or triple your monthly Internet bill.

The regional Baby Bells have been leading the DSL charge (see the "High Stakes, High Speeds" chart, page 56). Bell Atlantic, BellSouth, and Pacific Bell are all rolling out DSL throughout their respective

local ISPs, are also offering the service in markets across the United States. (For a current list of DSL deployments around the country, see [www.adsl.com/trial\\_matrix.html](http://www.adsl.com/trial_matrix.html).)

### ROCKY ROLLOUT

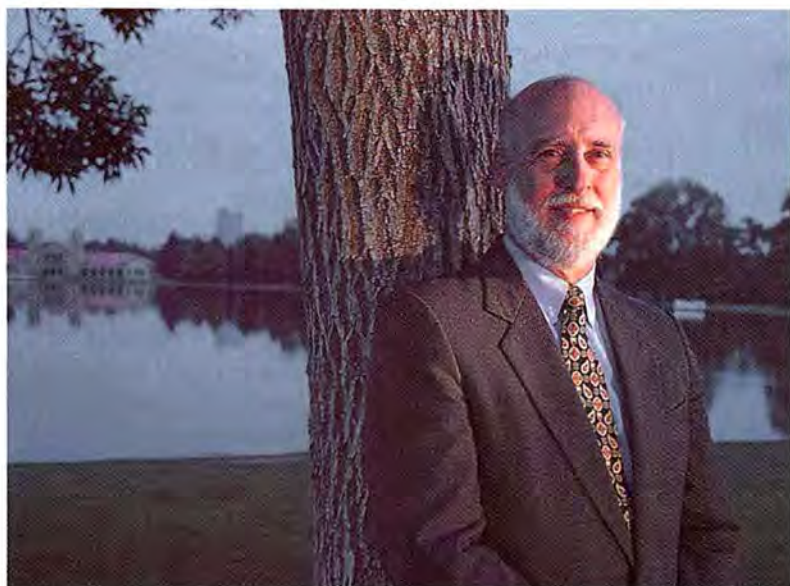
TO FIND OUT what the service is really like, we spoke with U S West subscribers in the Denver-Boulder area and attempted to get the service ourselves. The verdict? Although both installation and customer service can be haphazard, the high-speed connection is worth the trouble.

Brad Owen of Boulder, for example, signed up in early May and was told a technician would install the service on May 26. But when the day arrived, no one showed. Owen called the installation firm and waited 40 minutes before tech support told him he had to call U S West first. After two weeks of time-consuming calls, Owen finally had his DSL service up and running on June 11.

Meanwhile, Joe Clark, a computer-networking consultant in Den- ▶







**If you ask them a question that isn't on their script, they're done.**

JOE CLARK, U S WEST CUSTOMER

router), and \$85 for a tech to install it—a total of \$515. Individual providers may be willing to waive some fees as a marketing inducement, but even then, you should

expect to pay your telco at least \$100 for installation.

## GOING SLOW

IF DSL SERVICE IS SO great, why isn't it available everywhere right now?

For one thing, the telcos need to upgrade their hardware to handle high-speed data services. That's why I couldn't get DSL. I signed up for U S West's service in Denver; I was in the right exchange area, and my phone lines were up to snuff. U S West told me it'd have it installed by June 18. But on June 16 a salesperson called with bad news: My installation would be delayed until Sep-

ver, had no problems getting his DSL installed. But when he tried to transfer his domain name and e-mail accounts from his old ISP, the U S West customer service reps in Denver disappeared. "If you ask them a question that isn't on their script, they're done," Clark says. "They really tried hard to help, but they just didn't know much about the technology yet." Eventually he found a U S West representative in Phoenix who was able to resolve the problem.

But once Owen and Clark had their connections up and running, they were both happy. "I am delighted with the performance," Clark says. As well he should be: Downloading a 3.45MB file over Clark's 256-kbps DSL connection took an average of just over a minute; uploading it took just over 2. Over a 33.6-kbps modem, that same upload crawled at 37 minutes.

But that speed will cost you. U S West's 256-kbps line runs \$40 per month, and you'll have to pay another \$20 per month (at least) for Internet access from U S West or another ISP. Pacific Bell's Home Pack DSL service will set you back \$89 a month for a connection that runs at 384 kbps

voice and data simultaneously, you can ditch the second line and save about \$20 a month.

But don't pocket that \$20 just yet: You still have to pay for installation. U S West charges \$110 to connect the wires, \$25 to set up an ISP account with U S West.net, \$295 for the hardware (ethernet card and

## FAST NET ACCESS SERVICE AVAILABILITY

### High Stakes, High Speeds: Baby Bells Battle Cable Companies

	COMPANY	Available now <sup>1</sup>	Available by end of 1998 <sup>1</sup>
TELCO-ADSL	Ameritech 800/910-4369 www.ameritech.com	Michigan	no new markets announced
	Bell Atlantic 877/525-2375 www.bell-atl.com	limited trials	New Jersey, Pennsylvania, Washington D.C.
	BellSouth.net www.bellsouth.net	limited trials	Alabama, Florida, Georgia, Louisiana, North Carolina
	GTE 800/472-4565 www.gte.com	Indiana, North Carolina, Oregon, Washington	California, Florida, Hawaii, Illinois, Kentucky, Michigan, Missouri, Ohio, Pennsylvania, Texas, Virginia, Wisconsin
	Pacific Bell 888/884-2375 www.pacbell.com	California	no new markets announced
	Southwestern Bell 888/792-3751 www.swbell.com	Texas	no new markets announced
CABLE	U S West 888/634-2879 www.megaspeed.com	Arizona, Colorado, Idaho, Iowa, Minnesota, Montana, Nebraska, Oregon, Utah, Washington	no new markets announced
	@Home www.home.net	Arizona, California, Colorado, Connecticut, Florida, Illinois, Maryland, Michigan, Nebraska, New Jersey, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington	Delaware, Indiana
	RoadRunner www.rr.com	California, Florida, Hawaii, Maine, New York, Ohio, Tennessee, Texas	North Carolina, Oregon
	MediaOne www.mediaone.com	California, Florida, Georgia, Illinois, Massachusetts, Michigan, New Hampshire	Minnesota

<sup>1</sup> Selected markets in each state.



tember because the DSL hardware was already maxed out at my local central office (where the line from my house joins the greater phone network); additional hardware had to be ordered and installed. I canceled my order.

Even if your phone company has made the necessary upgrades, you may still be out of the DSL running. If, for example, your house is more than 18,000 feet—about 3.4 miles—from a central office, you can't get DSL. Because of this distance restriction, says Bell Atlantic spokesman Larry Plumb, only 60 to 70 percent of customers in DSL-ready areas can actually get the service. That figure could eventually rise to 80 percent, he says, but it's unlikely DSL will ever be ubiquitous.

Another reason for the slow rollout: conflicting standards. A number of technologies are grouped under the umbrella term xDSL, and different DSL providers are adopting different flavors. Asymmetric DSL (ADSL), which downloads at a higher speed than it uploads, is the most popular among telephone companies. Other variations include High Bit Rate DSL (HDSL); Rate Adaptive ADSL (RADSL), which adjusts data rates based on line conditions (this is what U S West is selling); Symmetric DSL (SDSL); and Very High Bit Rate DSL (VDSL), which promises downstream rates of 52.8 mbps over fiber.

Then there's Universal ADSL (also known as UADSL, ADSL Lite, or Splitterless ADSL), which could speed up the adoption—and reduce the price—of DSL technology. That's because it eliminates the need for extra hardware to

## What to Ask About DSL

**1 How fast is it—really?** DSL lines frequently sport different speeds for downloading and uploading data. Bell Atlantic's InfoSpeed 640K service, for instance, delivers 640 kbps downstream (from the Net to you) but only 90 kbps upstream (from you to the Net). If you regularly upload multi-megabyte files to a Web site or corporate network, you'll need a fast upstream connection.

**2 How much does it really cost?** Beware the hidden costs of DSL: Does the price your phone company quotes you include Internet access? If not, you'll have to shell out another \$20 to \$30 per month for a Net account. And what about installation? Fees can run several hundred dollars. If you already have a network card, ask for a discount. And ask what hap-

split the phone line into separate voice and data sections. "Customers will be able to go down to Computer City, buy an ADSL modem, and install it themselves," says Bell Atlantic's Plumb. UADSL maxes out at about 1.5 mbps—hence the name ADSL Lite—but that's still faster than most of the Net connections available to end users today. A standard for UADSL is expected by the end of the year, and Microsoft, Intel, Compaq, and the Baby Bells all support it—meaning it will likely be the DSL flavor of choice by next year.

The current lack of DSL standards has kept national ISPs



pens if you decide to cancel. Do you have to pay any penalties?

**3 What does the installation involve?** Chances are your PC needs extra hardware before it can make the DSL connection. Unless you specify otherwise, the phone company will send someone out to install this equipment for you. How long will that take? Can they guarantee they'll show up the day they're supposed to?

**4 Can I keep my ISP?** The answer, unfortunately, may be no. While your ISP is negotiating to get DSL wires from the local telco, that telco's salespeople are busy signing up the ISP's customers who want megabit downloads now. When ordering DSL from a phone company, ask the sales rep for a list of other ISPs offering the service.

like Earthlink and Mindspring from jumping on the DSL bandwagon. To establish DSL connections around the country, these ISPs must work with dozens of individual telephone providers, each of which may have implemented its DSL services differently—a technical nightmare. "It may not be worthwhile for us to sell it until there's a standard across the industry," says Mindspring public relations manager Ed Hansen. In this case, local ISPs have one big advantage over their larger competitors: Smaller ISPs only need to work with whatever DSL standard their local telcos have chosen. ►

native formats. Like other Windows CE devices, Jupiter sub-notebooks will boot instantly. They're expected to offer up to ten times the battery life of conventional notebooks.

### E-Mail Goes Postal

THE U.S. Postal Service is testing a system called PostECS that one day may let you send secured electronic documents over the Internet for a nominal fee. Here's how it works: Senders go to a PostECS Web site and upload the files they want to transmit. A message is then e-mailed to the recipient with instructions on how to retrieve the encrypted document. The anticipated price is \$2.50 for up to 2MB sent to one recipient, with additional charges for larger files and more recipients. PostECS is currently being tested in the United States, Canada, and France. The service could be ready in 1999.



### Tidbytes

**New Notebook CPU:** Rise Technology of Santa Clara, California, is developing a low-power, low-cost CPU for inexpensive notebooks. The new chip, dubbed the mP6, should debut in products late this year. **WordPerfect Suite 9 Bumped to Early 1999:** Originally scheduled to ship late this year, the delayed product aims for compatibility with competing office suites, says Corel's Annette MacDonald. Our guess: Corel may want to make sure WordPerfect 9 is on a par with Microsoft Office 2000.



## HIGH-SPEED OPTIONS FEATURES COMPARISON

## Four Express Lanes to the Internet

TECHNOLOGY	Downstream speed (from the Net to you)	Upstream speed (from you to the Net)	Typical monthly cost	Typical installation cost	Availability
Cable modem	4-30 mbps	56 kbps-1 mbps	\$40-\$50	\$150	limited
xDSL	256 kbps-8 mbps <sup>1</sup>	128 kbps-1.5 mbps	\$40-\$200 <sup>2</sup>	\$100-\$500	limited
ISDN	128 kbps	128 kbps	\$50	\$100-\$350	widespread
Satellite	400 kbps	56 kbps <sup>3</sup>	\$50	\$750	widespread

<sup>1</sup> Over standard copper wires.<sup>2</sup> Depending on bandwidth and supplier.<sup>3</sup> Modem required for upstream link.

The final reason for the xDSL delays is cultural. "It's just how the telcos operate," says Bill Rodey, vice chairman of the ADSL Forum, an industry organization helping companies implement the technology. "They're conservative companies that like to plan in excruciating detail." The upside, he says, is that consumers can expect the same reliability from ADSL as they do from regular phone service. The downside is that they'll have to wait for it.

## HIGH-SPEED OPTIONS

IF YOU WANT high-speed access to the Net, you don't have to wait for DSL.

Satellite service, for example, is available across the United States right now. But it's limited in upstream speed and expensive to set up. ISDN is widely available, provides separate voice and data channels, and delivers data at speeds of up to 128 kbps. But its reputation for being hard to set up has curbed its adoption. As

a result, some analysts predict the telcos will dump it as soon as DSL is up and running.

Cable modems also promise to deliver high-speed Internet access to the home. Current cable service costs about \$40 per month for speeds up to 30 mbps. But only 15 percent of cable systems in the United States are equipped to handle two-way communications; cable companies are spending a small fortune to perform the necessary up-

grades. In addition, in neighborhoods that have the wiring, bandwidth must be shared among all the local subscribers, potentially reducing those high speeds dramatically.

Which technology will win? "We think the market leader will be DSL," says Zona Research's Balderston. Dataquest senior analyst Lisa Pelgrim disagrees, asserting that "DSL and cable will coexist," with cable serving homes and DSL targeting telecommuters and small businesses.

But for most users, the question is moot. Neither cable nor DSL will be widely available until next year at the earliest. That means that unless your neighborhood has been wired for one of these fast-access technologies, you're stuck waiting—for Web pages to download over that poky old modem, and for faster options to hit your town.

—Jeff Bertolucci

## Attention, Internet Shoppers! Seals of Approval May Mislead You

## CONSUMER ALERT

SHOPPING ONLINE can be scary. Many people just don't feel comfortable spending money over the Internet. So Web vendors—in their attempts to reassure consumers—are adorning their sites with safe-shopping seals reminiscent of the Good Housekeeping Seal of Approval.

But do those colorful little emblems offer any real value to the consumers who rely on them or to the merchants who spend as much as \$5000 to display them?

To find out, *PC World* inter-

viewed or attempted to interview executives at ten companies that award the most frequently displayed seals. In addition, we spoke with dozens of businesspeople at Web sites that display these emblems. The findings are disturbing: Consumers can put their trust in a few of these Web site seals, but in many cases they aren't worth the pixels that they're painted with.

## SEALS TO LOOK FOR

A SEAL IS ONLY as good as the company awarding it. That company should thoroughly screen Web-based businesses

for legitimacy and questionable business practices. It should also provide a mechanism for resolving customer complaints. The seal of the Better Business Bureau—an organization that existed long before anyone heard of the Internet—offers more meaningful protection than the others we examined.

## Two Web Site Seals We Trust, One We Don't



Best of the bunch:  
Covers consumer  
disputes.



Sites must pass  
examination by an  
accountant.

GOOD SEALS indicate that the sites bearing them have been thoroughly screened.



Seal looks impressive but doesn't offer much consumer protection.



To obtain the BBBOnline seal, a business must be at least a year old, provide bank and customer references, and disclose the names and back-

grounds of company owners. It must pass a background check that looks for evidence of fraud or action by government regulators. The company must also participate in a

Better Business Bureau arbitration program for handling customer complaints. Web site owners we spoke to verified that BBB representatives had visited their offices as well as their Web sites. The BBB seal does not come cheap: It costs \$400 to \$500 for a small business, and up to \$5000 for large corporations. (Members of the BBB pay less: \$200 for small businesses, \$2000 for large ones.)

The WebTrust seal, awarded by CPAs licensed by the American Institute of Certified Public Accountants, is also worth looking for but doesn't quite measure up to the BBB standard. Qualifying sites must submit to an examination by a CPA, who checks the company's business and privacy policies every 90 days. The accountant makes sure the company is solvent, verifies how quickly products ship once orders are received, and ensures that the company abides by its stated privacy policies. Who pays for all this quality control? The Web sites. Since examinations can run thousands of dollars, even for small businesses, the cost adds up fast. Another downside: If a consumer has a complaint, WebTrust offers no mediation mechanism.

If you're concerned about privacy, look for a seal from Trust-e. The Trust-e seal means a Web site has posted a privacy statement telling shoppers

chants and offer scant or no recourse for resolving complaints. In the worst cases, seal vendors merely "register" Web businesses in an online direc-

tory, although the seals may lead consumers to believe otherwise.

Consider Multicheck Internet Business Registration Center, which charges \$46 for a database listing. The listing includes very basic information about Web merchants, such as a phone number, an address, and a description of the company and its wares. The merchants themselves supply this information, and Multicheck does not verify all of it,

at BizRate, MasterCard, Netcheck Commerce Bureau, PublicEye, Web Assurance Bureau, and WebWatchdog, all of which award seals. These six firms were more forthcoming about their policies than Multicheck, but they could not match the pro-consumer policies of BBBOnline, Trust-e, or WebTrust.

Netcheck verifies an applicant's ground address by sending the company a letter, but it does no other screening, says Thomas B. Abbott, company president. If consumers file significant complaints about a site, Netcheck will post a warning.

The upshot: If you're a consumer, be skeptical of any seal, unless it comes from one of

**Consumers can put their trust in a few of the Web site seals, but in many cases they aren't worth the pixels they're painted with.**

what personal information the site gathers. Trust-e investigates complaints about its member sites. A Trust-e seal costs \$249 for companies that have annual sales below \$1 million, and up to \$4999 for larger firms. The seal does not protect consumers from prob-

## ONLINE SEALS COMPARISON

### Buying Online? Trust the Better Business Bureau

AWARDING ORGANIZATION	Contact	Seal requirements	Cost of seal
 <b>Better Business Bureau Online</b>	<a href="http://www.bbbonline.org">www.bbbonline.org</a>	BBB checks Web site, references, and legal records.	\$400 to \$5000
 <b>Trust-e</b>	<a href="http://www.truste.org">www.truste.org</a>	Site posts privacy policies; Trust-e verifies.	\$249 to \$4999
 <b>American Institute of CPAs</b>	<a href="http://www.cpawebtrust.org">www.cpawebtrust.org</a>	CPA examines business and privacy practices periodically.	cost of audits (varies, but expensive)
<b>WebWatchdog</b>	<a href="http://www.webwatchdog.com">www.webwatchdog.com</a>	Site provides three business references, which WebWatchdog says it verifies.	\$12
<b>BizRate</b>	<a href="http://www.bizrate.com">www.bizrate.com</a>	Site must receive good ratings in BizRate surveys of customers.	free
<b>Web Assurance Bureau</b>	<a href="http://www.wabureau.com">www.wabureau.com</a>	Site passes ten-step audit; WAB would not provide complete details.	\$20 to \$175
<b>Netcheck Commerce Bureau</b>	<a href="http://www.netcheck.com">www.netcheck.com</a>	Site completes application, pays fee.	\$195
<b>MasterCard</b>	<a href="http://www.mastercard.com">www.mastercard.com</a>	Site accepts MasterCard, uses encryption.	free
<b>PublicEye</b>	<a href="http://www.thepubliceye.com">www.thepubliceye.com</a>	Site submits application; agrees to let PublicEye publish consumer comments on PublicEye site.	free
<b>Multicheck</b>	<a href="http://www.multicheck.com">www.multicheck.com</a>	Site completes application, pays fee.	\$46

 = recommended

lems related to the quality of products and services that are offered by online vendors.

#### SEALS TO IGNORE

SOME COMPANIES dispensing seals do little to screen out potentially unscrupulous mer-

chants and offer scant or no recourse for resolving complaints. In the worst cases, seal vendors merely "register" Web businesses in an online directory, although the seals may lead consumers to believe otherwise.

We also spoke to executives

the three sites recommended in this article. If you're a business, do your homework, so you can avoid forking out some serious money for a seal that does little more than clutter your Web site.

—Judy Heim ►



## Flat-Panel Displays Slip Under the \$700 Mark

IN THE WORLD of monitors, LCDs have long been the sexy superstars: thin, lightweight, and beautiful. But priced three or more times higher than conventional CRT monitors with similar viewing areas, LCDs have been far too expensive for most business users.

In the last few months, however, prices of LCD monitors have plummeted. Though 13- to 14-inch active-matrix models (which offer a viewable area comparable to that of a 15-inch CRT) remain big-ticket items, the number on that ticket is often less than \$1000. That's a far cry from the \$1500-plus figures of a few months ago. We looked at three low-priced 14-inch LCD monitors—ADI's \$699 MicroScan 5TN, Advan's \$849 AGM14T, and Princeton Graphic Systems' \$995 DPP500—as well as one 13-incher, Samsung's \$799 SyncMaster 320TFT. In most cases, the LCDs scored significantly higher than comparable CRTs in our tests.

Besides their look of space-age sophistication, these flat-

panel displays offer an appealingly small base size—from as little as 7 inches to 10.2 inches in depth. By comparison, a typical 15-inch CRT runs 15 inches in depth. Moreover, three of the four LCDs (all except the Advan) come with built-in speakers and microphones that conserve even more desk space and are perfectly adequate for general business use.

### SAVES REAL ESTATE

BECAUSE THEY can do more with less desktop space, LCDs appear most often in workplaces where people need to have three or four monitors on their desks. Wall Street is the prime example. Executive suites, where price is no object, make up another niche where earlier-generation LCDs have caught on despite their expense. The new low prices will now make these products attractive to anyone tight on desk space.

But liberating desk real estate is just one benefit. The LCDs' excellent clarity lets

them handle higher resolutions than comparable CRTs can. Higher resolutions allow you to pack more spreadsheet cells or lines of text onto your screen. In fact, the manufacturers recommend setting the resolution on these bright, crisp displays to 1024 by 768—the resolution at which we tested. (At lower resolutions, these LCD screens can become blurry.) We generally recommend against using the 1024 by 768 setting on 15-inch CRTs, which we typically test at a resolution of 800 by 600.

A jury of PC World staffers

tested the four LCDs alongside two top-performing 15-inch CRTs. We were generally impressed by the flat-panel monitors. Set to the same 1024 by 768 resolution, the Nokia 449XaPlus and the Mitsubishi DiamondScan 15VX CRT monitors couldn't match the LCDs' clarity with text and spreadsheets; three of the four LCDs also scored higher on graphics than the CRTs did. The top three LCDs racked up overall scores between 80.6 and 87.1 out of a possible 100; in our Top 10 Monitor tests, the very best CRTs score in the mid-80s, and anything above 75 is considered good.



TOP: ADVAN'S \$849

14.1-INCH AGM14T.

BOTTOM: Samsung's \$799

SyncMaster 320TFT.

### LCD MONITORS

### FEATURES COMPARISON

## Wafer-Thin Screens for Skinny Wallets

MONITOR	Street price	Screen size (inches)	Weight (pounds)	Depth (inches)	Built-in speakers and microphone/wall mountable	InfoNet number
ADI MicroScan 5TN 800/228-0530 www.adiusa.com	\$699	14.1	11.4	9.1	●/○	752
Advan AGM14T 888/786-1688 www.advancorp.com	\$849	14.1	9.9	7	○/● <sup>1</sup>	753
Princeton Graphic Systems DPP500 800/747-6249 www.pgr.com	\$995 <sup>2</sup>	14	10.3	10.2	●/○	754
Samsung SyncMaster 320TFT 800/933-4110 www.sosimple.com	\$799	13.3	14	7.7	●/●	755

● Yes ○ No

<sup>1</sup> Mechanical arm and wallplate available for \$299.

<sup>2</sup> Includes ATI Xpert-LCD AGP graphics card.

### BACK OF THE PACK

UNLIKE THE OTHER LCDs, the ADI MicroScan 5TN fared poorly on our graphics test and dropped to the back of the group. We discovered that the monitor could produce good images with both text and graphics, but only if we adjusted the brightness settings ►

PHOTOGRAPH: KEVIN CANDLAND





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CONNECTING PEOPLE

Pictured above is a Nokia 21" 445Xpro (20" VIS), the industry's first 121kHz monitor with 1800 x 1440 resolution, up to 80Hz refresh rate and .22mm horizontal dot pitch.  
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Circle 163 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)



## LCD MONITORS TEST RESULTS

## The Big Picture: Looking Good

	MONITOR	Monitor type	Overall score (out of 100)
1	Advan AGM14T	LCD	87.1
2	Princeton Graphic Systems DPP500	LCD	86.6
3	Samsung SyncMaster 320TFT	LCD	80.6
4	Nokia 449XaPlus	CRT	69.4
5	Mitsubishi DiamondScan 15VX	CRT	68.7
6	ADI MicroScan 5TN	LCD	60.9

**HOW WE TEST** LCDs and CRTs were arranged side by side and connected to PCs with comparable video cards. A jury rated the displays for graphics, text, and video performance, using typical business letters, a newsletter, spreadsheets, Web pages, scanned images, and an MPEG2 video stream. The highest possible score was 100.

manually when switching between the two types of files. Because most users would find this task annoying, we didn't adjust settings during testing. The setting we used when we began testing looked fine for text, but color images appeared washed out, dragging the ADI's overall score

down to a mediocre 60.9.

Though some older LCDs can't support full-motion video, all the new models handled it without difficulty. Even so, the quality of the video in our tests was richer on the CRTs. People who play a lot of PC-based games will want to save up for a big-screen CRT.

## FACE-OFF

NOT SURPRISINGLY, the top overall performance honors went to the two highest-priced units. The Advan AGM14T, which finished ahead of the Princeton DPP500 by an eyelash, is the second most expensive but doesn't come with speakers, a microphone, USB ports, or other extras. It's an excellent choice, especially for those who don't mind keeping their old desktop speakers.

The more-expensive Princeton DPP500 scored slightly lower than the AGM14T on performance tests. But for the additional \$146, you get built-in speakers plus an ATI Accelerated Graphics Port card with side-by-side digital and analog monitor ports. The AGP card is good for anyone who wants a single card that is compatible with any kind of monitor. But don't connect two

monitors to the card simultaneously. When we ran both a digital LCD and a CRT off the card, the CRT refreshed at an unacceptable rate of 60 Hz (we consider anything below 75 Hz inadequate). ATI says it expects to remedy this shortcoming by September with new drivers. But even then, you won't be able to use Windows 98's multiple-monitor feature to run different images on the two monitors, unless you use a separate board for each monitor. Also, the Princeton monitor adheres to a new standard that should further lower LCD prices and improve video quality as that specification becomes more available (see "Going Digital May Cut LCD Prices," below). ▶

## Going Digital May Cut LCD Prices

WITHIN A YEAR, two new digital video specifications could chop as much as \$150 off the price of LCD monitors, while improving overall display quality. How? LCDs require digital input. The standard video port on your PC delivers analog signals designed for CRT displays. Right now, most LCDs convert the analog signals to digital with built-in electronics, adding to the monitors' cost and sometimes causing image degradation.

The two specifications, which rely on similar technology, are the Video Electronics Standards Association's Plug and Display, and the Digital Flat

Panel Group's DFP. The less-expensive DFP supports only LCD displays. P&D also supports CRT monitors, plus two up-and-coming bus options, USB and Firewire.

SAVINGS  
STILL TO COME

THOUGH no P&D products are shipping yet, IBM expects to produce one next year. The first DFP products—Princeton Graphic Systems' DPP500 LCD mon-

itor and its bundled ATI Xpert-LCD AGP graphics card—are available now (see the main story). Unfortunately, the Princeton/ATI entry is more expensive than some comparable analog LCDs. The same goes for the 14.1-inch digital LCD monitor Compaq is offering as a \$1000 option for its new Presario 5000, 5100, and 5600 home computers, which ship with the ATI Xpert-LCD graphics card.

Prices should drop when other PC and LCD vendors jump into the market. But

PRINCETON Graphic's DPP500.

when is the key word here. Many vendors say they are waiting for one or the other of the two specifications—or even a third entirely different technology—to prevail. So for the time being, digital LCDs don't offer the best deal; but within a year, this could change.



ATI'S XPERT-LCD AGP graphics card comes bundled with the DPP500 monitor. The card supports both digital and analog displays with its side-by-side ports.





# TECHNOLOGY

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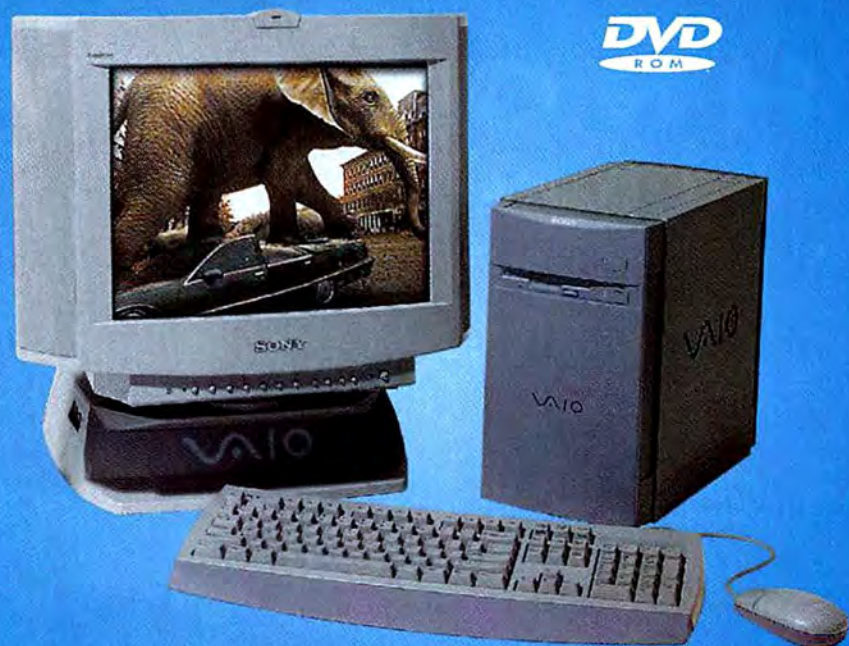
## Electronics

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### VAIO® MicroTower PCV-E203 with 15" CRT Multimedia Display (VIS 13.9")

#### VAIO MicroTower PCV-E203

- Intel® Celeron™ processor, 266 MHz
- 48 MB SDRAM (expandable to 256 MB)
- 6.4 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)<sup>1</sup>
- Additional features same as PCV-E205

#### VAIO 15" CRT Multimedia Display CPD-120VS (VIS 13.9")

- Features same as 17" CRT display

**Combined Price: \$1,499.99  
with \$100 rebate<sup>A</sup>**

**Monthly payments as low as \$27.75\***

### VAIO MicroTower PCV-E205 with 17" CRT Multimedia Display (VIS 16")

#### VAIO MicroTower PCV-E205

- Intel Pentium® II processor, 333 MHz
- 64 MB SDRAM (expandable to 256 MB)
- 8.4 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)<sup>1</sup>
- Advanced 3D graphics hardware accelerator (ATI 3D Rage Pro Turbo)
- 4 MB SG video RAM
- "Sony Tuned" MPEG2 for Full-Screen and DVD Playback
- Dynamic High Fidelity 3D PCI Audio and 3D Stereo Surround Sound
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- K56flex Data/Fax modem (software upgradeable)<sup>1</sup>
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**SONY**



Images on the preproduction Samsung SyncMaster 320TFT, which had the smallest screen (13.3 inches), appeared a bit darker than on the others. But the monitor scored very respectably on performance, and it includes both multimedia hardware and a handsome, pewter-colored chassis—not bad for \$799.

The least-expensive LCD—

ADI's MicroScan 5TN—was the poorest performer. Still, it's the only one that provides a USB hub as well as speakers and microphone. Consider it if price is a priority and you don't mind fiddling with brightness settings.

### THE LCD DECISION

CLEARLY the prices of LCD monitors are plunging. Stan-

ford Resources, an organization that tracks the display market, predicts that by the beginning of next year, the average 14-inch LCD monitor will cost less than \$825.

Moreover, prices of larger LCDs will also slide. At press time, Philips had announced plans to release the Brilliance 151AX, a 15.1-inch display with an unusually low street price

of \$799 (viewing space on a 15-inch LCD approaches that of a 17-inch CRT).

Meanwhile, CRT prices also keep dropping. But if space matters—and in the age of the cramped cubicle and the humidior-size home office, it usually does—these new LCD monitors may be worth the extra few hundred bucks.

—Yardena Arar

## IE 5 Aims to Display Web Pages Your Way

**P R E V I E W**  
ARE WEB DESIGNERS trying to make life difficult, or does it just seem that way? With many sites, you must struggle to read undersized fonts and/or wait endlessly for fancy elements to render on screen. Not to worry: Help is on the way. The next version of Microsoft's Internet Explorer promises to remedy these problems.

We took a look at a very early version of Internet Explorer 5 that was posted at press time on Microsoft's Web site. Many of the features discussed here were not ready for testing. A final ship date had not yet been set, but we expect a beta version to be available by the time you read this, with the final product shipping by year's end.

### NO MORE SQUINTING

IE 5'S IMPROVED support for two important standards—Dynamic HTML and Cascading Style Sheets 2—will let Web designers attach “behaviors” to Web objects. When you visit a site designed with behaviors, you can change the

color, positioning, and other attributes. Is the type in a particular paragraph too small to read? Enlarge the font and



The next version will let you control how Web sites appear on screen.

spare yourself some eyestrain. Your change won't affect what other users see, because the process is restricted to your PC and browser.

A new Persistence feature will “remember” changes you make to objects on a page, such as the enlarged font. Once you modify a page and save its location to your Favorites folder, the browser will remember your configuration changes the next time you visit that page. Persistence files are larger than cookies files and can save more information about your preferences.

IE 5's enhanced support for CSS2 includes new drag-and-

drop capabilities. You'll be able to go to a shopping site and drag an item to your shopping basket. The site will calculate the cost and add it to your running bill. From an FTP site, you'll drag a file to your desktop for a quick download.

In addition, some smaller changes will make IE 5 easier to use. Enhanced “Save As” capabilities will let you save a Web page complete with its accompanying graphics and other elements, a feature Navigator Gold users have enjoyed since version 3.

The most notable performance improvement (and the only one I could test at press time) is the new “fixed table layout” option, which renders

HTML tables almost instantaneously. Web designers use tables to create everything from lists to fancy page layouts. Currently, tables don't show up until the browser has completely calculated their layout and content. The new “fixed layout” tag will let users see the top rows of a table, even while the rest of the table is being calculated and generated.

### TOO EARLY TO JUDGE

AT THIS TIME, comparisons between IE 5 and Netscape's upcoming Communicator 5 are not possible. Still, both products appear to focus on some similar areas, namely improved performance plus features that let you customize your screen and browsing experience. This should be good news both for Web designers and for the users who are so often at their mercy.

—Yael Li-Ron

## BROWSER

## FEATURES

### IE 5: The Shape of Things to Come

FEATURE	Details
Fixed table layout	Generates on-screen tables significantly faster.
Persistence	Next-generation “cookie” saves page-specific layout preferences along with URLs.
Enhanced drag-and-drop	Simplifies FTP downloads by dragging icons from sites to local system.



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## Intel Goes Inside the Workstation With the Powerful New Xeon Chip



NOT TOO long ago, workstation might as well have been a synonym for UNIX. The typical unit was an expensive black box that only the geekiest nerd would consider owning. But not anymore. Intel's new Pentium II Xeon chip—in tandem with Microsoft's NT operating system—brings ultra-high-end performance within reach of small businesses, work-at-home professionals, and large offices that need to buy many powerful systems.

These days, \$7000 will buy you a workstation robustly configured with a pair of 400-MHz Pentium II Xeons and a high-end graphics card. With this ordnance in hand, you'll be able to attack Photoshop or mechanical design jobs that would slow a conventional PC to a crawl—or force you to buy an expensive UNIX box from Sun Microsystems or Silicon Graphics. If you design Web pages for a living, create interactive presentations, or work with massive quantities of financial data, one of these Xeons could be the solution you've been looking for.

Dell and Hewlett-Packard already market Xeon workstations, and within just a few months you can expect to see similar offerings from other vendors, including Compaq, IBM, and Intergraph. Prices for dual-processor Xeon systems range from \$5000 for machines with 512KB of secondary cache to more than \$12,000 for systems with 1MB of secondary cache and a high-end graphics card.

Not everyone needs a dual-processor workstation, however. Even if you can afford the freight, buying a Xeon workstation to run standard office applications is an invitation to disappointment. In fact, a \$6824 256MB Dell Precision 610 workstation (with 512KB of secondary cache each) did no better on PC WorldBench 98—which tests performance on conventional business applications—than a \$2220 64MB PII-400

Dell OptiPlex GXi. When we tested the systems with demanding workstation apps like AutoCad and LightWave,



DELL Precision 610.

however, the workstation clearly outclassed the PC.

### WORKSTATION ABCs

XEON—Intel's replacement for the Pentium Pro—is a new version of the PII designed for servers and workstations. Launched in late June, the

Xeon is now available at 400 MHz, with a 450-MHz version due out by year's end.

Xeons are essentially turbo-charged Pentium IIs with a dedicated bus, located between the main processor and the secondary cache chip(s), that runs at the same speed as

the processor. The corresponding bus in a standard Pentium II cartridge runs at half the speed of the processor. The largest secondary cache offered in a PII cartridge is 512KB, but Xeons will be available with secondary caches of up to 2MB later this year.

A chip set called the 440GX handles Xeon workstations. The similar 450NX chip set supports up to four Xeon CPUs and is designed for servers. A bug discovered shortly before the Xeon was launched affected servers only, not workstations.

You won't see the Xeon in a desktop PC any time soon. Like the Pentium II, the ►

## Do You Need a Workstation?

If your check marks are mainly on the left, it's time to start shopping.

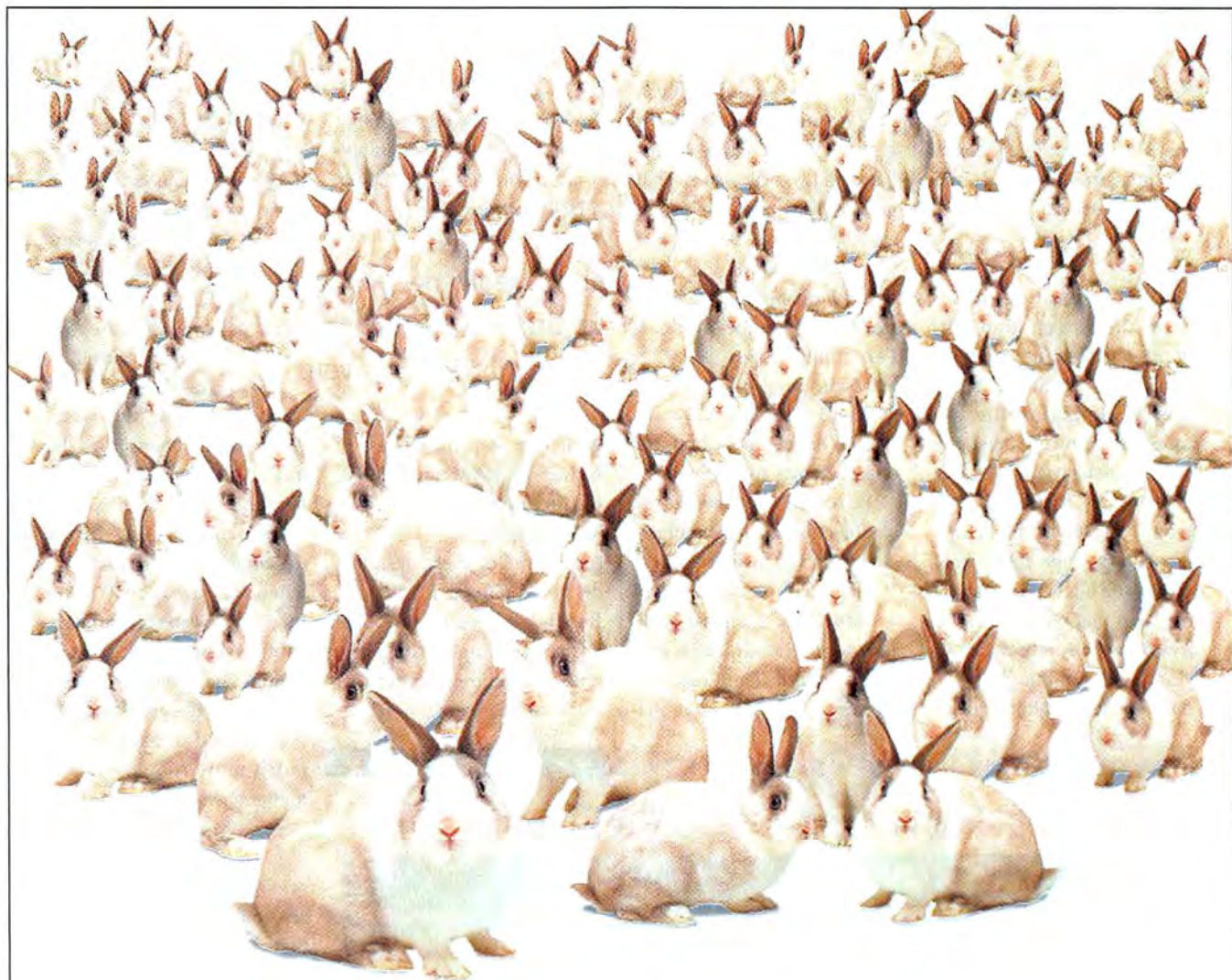
### YES, YOU DO

- ☐ Your key applications run under Windows NT.
- ☐ You need to run applications like Pro/Engineer, Unigraphics, SolidWorks, or 3D Studio MAX.
- ☐ Your work is graphics intensive.
- ☐ Your software costs almost as much as your hardware, or more.
- ☐ Your PC works all day, every day.

### NO, YOU DON'T

- ☐ You use a suite of common business applications.
- ☐ They run under Windows 95/98.
- ☐ You work mainly with text and numbers.
- ☐ Your software costs less than your hardware.
- ☐ Your PC sits idle for hours each day.
- ☐ You never wait more than a few seconds for your PC to finish what it's doing.





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Xeon occupies a single-edge contact cartridge. But unlike the PII, its cartridge fits only in Slot 2 motherboards and requires a special chip set.

## WHAT'S A WORKSTATION?

The line separating the PC from the workstation gets blurrier all the time. But Intel-based workstations do share several distinguishing features, including high-end processors (usually a pair), large amounts of RAM (ranging from 128MB to 512MB in most cases), high-speed SCSI drives, and high-end 3D graphics cards that typically cost at least \$1200. Another (rather circular) definition: Workstations run workstation apps.

Many workstation applications are multithreaded, divvying up the computing chores between two processors. That goes for the operating system as well, so these systems run Windows NT 4 Workstation, not Windows 98. Few multithreaded apps run well on standard desktops, though Adobe Photoshop and QuarkXpress are exceptions.

We tested two new workstations from Dell. The Precision 410 (\$4575) sported dual Pentium II-400 processors, 256MB of RAM, and an 8MB Diamond Fire GL 1000 Pro graphics card. The Precision 610 (\$6824) had dual PII

Xeon-400 CPUs, 256MB of RAM, and a 16MB Intergraph Intense 3D Pro 3410-T graphics card. Our baseline PC was a Dell OptiPlex GX1 (\$2220)

If what **you really need** is a fast PC to run Office-type **applications**, a **workstation isn't** for you.

with one Pentium II-400, 64MB of RAM, and 8MB of integrated ATI Rage Pro Turbo graphics.

All three of these systems delivered similar PC WorldBench 98 results, because Office-type applications are not robust enough to use the workstation's extra power.

But when we tested performance with LightWave, the superiority of the workstations was obvious to us. LightWave is a multithreaded, processor-intensive application, and one CPU does not have enough horsepower to run it well. In the duel of dual-

CPUs, the Xeon workstation outperformed the dual Pentium II by just 4.9 percent. However, the Xeon system convincingly dusted the conventional workstation when we ran Indy 3D and ViewPerf, two industry-standard workstation benchmark suites. That's because those tests stress the graphics subsystem, and the Xeon's was much more robust—not to mention expensive.

workstation outperformed the dual Pentium II by just 4.9 percent. However, the Xeon system convincingly dusted the conventional workstation when we ran Indy 3D and ViewPerf, two industry-standard workstation benchmark suites. That's because those tests stress the graphics subsystem, and the Xeon's was much more robust—not to mention expensive.

## WORKSTATIONS VS. PCs

## TEST REPORT

### Tough Graphics Job? Get a Workstation

COMPONENTS AND TESTS	WORKSTATIONS		PC
	Dell Precision 610	Dell Precision 410	Dell OptiPlex GX1
Processor	dual PII Xeon-400	dual PII-400	single PII-400
Secondary cache (KB)	512 each	512 each	512
RAM (MB)	256	256	64
Graphics card	Intergraph Intense 3D Pro 3410-T	Diamond Fire GL 1000 Pro	Integrated ATI Rage Pro Turbo
Video memory (MB)	16	8	8
System price	\$6824	\$4575	\$2220
PC WorldBench 98 score (larger is better)	221	223	222
LightWave 5.6 Float (in seconds, smaller is better)	350	367	650
AutoCad (in seconds, smaller is better)	320	335	411
Indy 3D (in frames per second, larger is better)			
Simulation	14.6	6.4	0.4
MCAD	7.6	3.9	1.2
Animation	10.1	7	0.6
ViewPerf 5.1 (in ViewPerf units, larger is better)			
CDRS-03	76.6	22.1	12.1
DRV-04	10.1	3.7	1.7

**TEST HOW WE TEST** All systems tested with PC World's application-based benchmark PC WorldBench 98, and Newtek's 3D modeling program LightWave 3D 5.6, which tests the speed of 3D rendering. We also tested with Autodesk User Group Int'l. Augi Gauge, which tests computer-aided drawing; and two industry-standard benchmarks, Sense8's Indy 3D and Graphics Performance Characterization Group's ViewPerf 5.1, both of which test Open GL real-time 3D animation.

## TIME TO BUY?

FG SQUARED MULTIMEDIA, an Austin, Texas, company that creates multimedia presentations and 3D animation, has moved from desktop PCs to dual-processor workstations and expects to buy Xeons in the near future. Why? Productivity, says Casey Gum, the company's technical director. He says a typical "blurring" operation on a 50MB Photoshop file takes 3 minutes on a conventional PC, but only about 20 seconds on a PII workstation.

So if you spend most of your day in front of a computer struggling to run graphics-intensive applications, it may be time to move up. But, if what you really need is a fast PC to run Office, a workstation isn't for you.

—Stan Miastkowski, with additional reporting by Bill Snyder.





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**Boom.**



**Bang.**



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## AOL 4.0: An Old Online Service Learns New Tricks



THE LATEST revision of America Online's software—version 4.0, in case you're counting—is about to hit the virtual streets. And while AOL's ongoing success may have more to do with in-your-face marketing than savvy software design, the new interface's improvements confirm that AOL's engineers aren't just sitting around resting on their stock options.

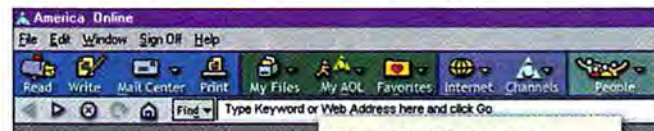
The question is, are these changes enough? Everything from log-in scripts to e-mail has been tweaked, making AOL easier to use and more powerful. But don't expect too much. While the new options provide many of the features

not sort Address Book entries, and to check spelling, you had to open a separate dictionary and type in the suspect word. With AOL 4.0, spelling is checked automatically, and you can now change text colors and fonts and alphabetize your Address Book. You can also attach multiple files and even embed pictures in your e-mail messages.

Predictably, such enhanced messages take longer to transmit than their text-only counterparts. But AOL 4.0 seems to perform such transfers faster than AOL 3.0. For example, in my informal testing using a Pentium II-266, connecting over the company LAN via TCP/IP, a message

The overall navigation of AOL 4.0 is much smoother than before, due in part to tighter integration with Internet Explorer. A single address box lets you enter either AOL's internal keywords or URLs. And the main AOL toolbar now sports Forward and Back buttons and a drop-down History list (courtesy of Internet Explorer), so it's easier to nav-

beefed-up modem banks as it does with the new software: AOL officials report they're adding 20,000 to 25,000 modems a month.) You can add as many as four additional screen names (for a total of five) and switch among them without logging off. The software will also automatically redial your local access numbers up to 25 times.



**THE NEW AOL interface sports a customizable toolbar, a keyword field that understands Internet URLs, and browserlike navigation tools.**

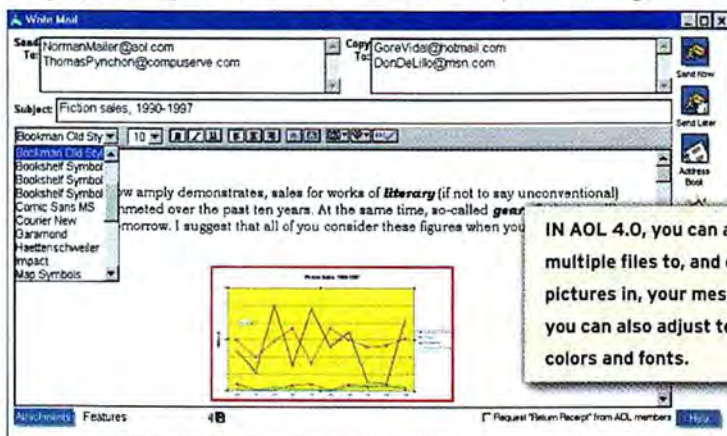
igate among AOL Channels and move around on the Web.

The toolbar is also more intuitive in AOL 4.0. For example, the People button (which gives you access to chat, Instant Messaging, the member directory, and member profiles) now shows a group of waving stick-figure people, instead of the two bland faces

In sum, AOL 4.0 is still a fine option for Net newbies. But seasoned customers probably won't find the improvements alluring enough to keep them from checking out cheaper ISPs and the myriad of more powerful tools available on the wide-open Net.

To download AOL 4.0, users of AOL 3.0 should type the keyword **AOL 4.0**. For AOL 3.0 users who want to keep using IE 3.02, the installation file measures 8.5MB; AOL says it should take roughly 57 minutes to download over a 28.8-kbps modem, 37 minutes at 56 kbps. If you want to upgrade to IE 4.01, the file balloons to 24MB.

—Lisa Moskowitz



**IN AOL 4.0, you can attach multiple files to, and embed pictures in, your messages; you can also adjust text colors and fonts.**

found in popular stand-alone e-mail and browser programs, advanced users will still be compelled to surf elsewhere.

### OVERALL OVERHAUL

IF ANYTHING ON AOL needed attention, it was e-mail. Previously, you could attach only one file to a message, and when you did, the transfer was excruciatingly slow. You could

with a 50KB attachment took about 7 minutes to travel from mailbox to mailbox; in version 3.0, that same message took approximately 13 minutes.

While such enhancements are welcome, AOL's e-mail still has some holes. It'd be nice, for example, if AOL supported automatic message replies and signature files and had better sorting capabilities.

found in previous versions. If you still can't divine what a button represents from its picture, AOL has added text labels. And you can

now add up to three toolbar buttons of your own; previous versions didn't let you add any.

AOL has also improved its setup and access options. Modem detection is better, the registration process simpler. And thanks to a new dial-up engine, connections are more reliable. The service has been plagued in the past with clogged lines and fumbled connections, but I have yet to encounter either problem in testing the new version. (Of course, that has as much to do with AOL's

**FOR TIPS** on how to use AOL 4.0, see the online-only feature "AOL 4.0: You've Got Tips" at [www.pcworld.com](http://www.pcworld.com).

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INFONET NO. 751



**Let's talk.**

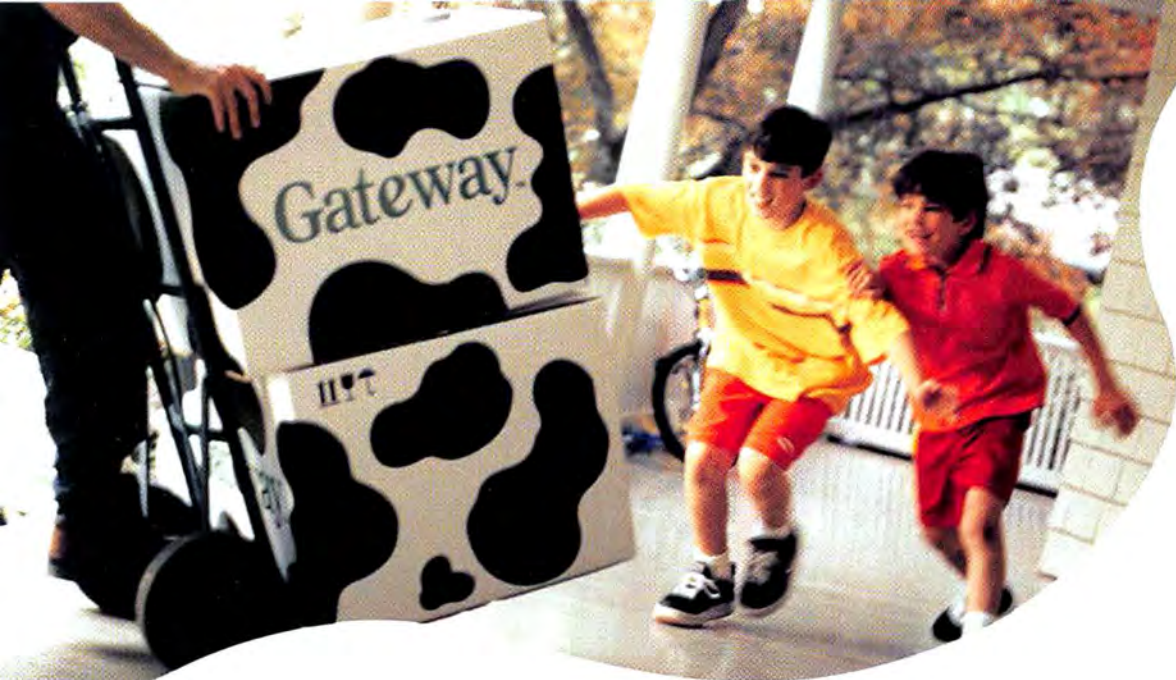


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Microsoft Windows 98  
Microsoft Home Essentials Software  
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3.5" Diskette Drive  
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Microsoft Windows 98  
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Microsoft® Windows® 98  
Microsoft® Home Essentials  
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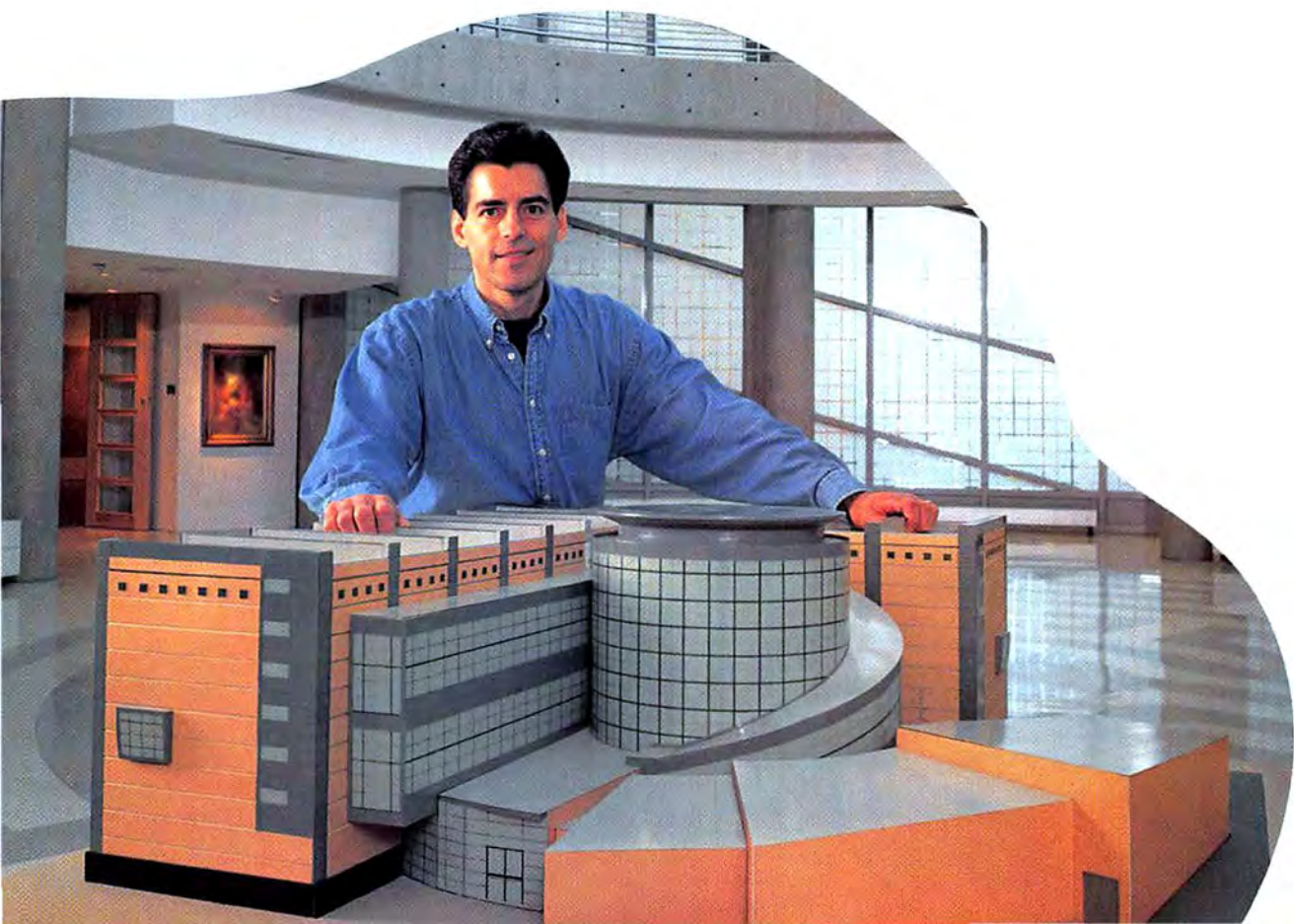
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CD-ROM Drive  
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USB Ports, CardBus &  
Zoomed Video Support  
NTSC/PAL Video Output  
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# NEW PRODUCTS

## Now Hear This: IBM and Philips Voice Recognition Apps



**CAN WE TALK?** In our test of the newest voice recognition apps, IBM's ViaVoice 98 Executive Edition beat Philips FreeSpeech 98 on ease of use. Both apps use short training sessions to learn your speech habits.

### VOICE RECOGNITION

THE CONCEPT OF voice recognition software sounds great: Sit back, put your feet up, and dictate your letter, memo, or e-mail into a microphone—then watch the text flow across your monitor screen. But turning voice into text is actually a daunting technical job. Two new packages, IBM ViaVoice 98 and Philips FreeSpeech 98, improve upon past products, based on my tests of shipping versions. But I'm not throwing my keyboard away yet.

Both packages are designed as a convenience. People who rely solely on voice recognition (such as those with repetitive stress injuries) need products that handle more PC tasks.

IBM ViaVoice 98 comes in three versions (each with a headset): Home Edition (\$50) with basic dictation for Word 97; Office Edition (\$89), which adds Windows navigation support; and Executive Edition (\$149), which also lets you dictate directly into any Windows program that accepts

text. I tested Executive Edition.

Philips FreeSpeech 98 has an interesting pitch: It's free for seven days—an appealing option, since results will vary depending on your PC, sound card, and sound card drivers. The package is downloadable via the Web, but since it's a 30MB file, you're better off ordering the trial version CD-ROM (\$5 shipping fee). If you like it, \$39 gets you an unlock code for the disc. Philips does not include a headset; you can get a decent one for \$30 to \$40.

Both IBM and Philips require at least a Pentium-166 system with 32MB of RAM. (ViaVoice needs 48MB to dictate into Word.) But I've found that a more practical minimum is a Pentium MMX-200 with 64MB of RAM. I used a PII-333 with 64MB of RAM and a Sound Blaster AWE64 Gold sound card in my testing.

### IBM GETS IT RIGHT

YOU CAN'T JUST sit down and talk to your computer like you're George Jetson. You have to train the software to recognize your voice, through a scripted chat. Although both ViaVoice and FreeSpeech offer basic training sessions that take about 10 minutes, to get the best accuracy you should opt for the full treatment—which took me about 30 minutes to complete.

Both packages let you dictate, format, and correct text by voice. In my experience, the IBM worked better overall, in part due to its 64,000-word active vocabulary. FreeSpeech has an active vocabulary of 30,000 words. Also, ViaVoice accepts spoken commands like "delete line" or "move back four words"; FreeSpeech makes you click an icon on its control bar to switch between dictating and editing.

Both apps do a competent job with basic business text. But ViaVoice shines with trickier prose, where FreeSpeech tends to produce more errors. In my experience, ViaVoice



was close to 95 percent accurate, while FreeSpeech was more like 80 to 85 percent accurate. Like their peers, both packages promise to improve

### FreeSpeech 98

**PRO:** Seven-day free trial period; low price.

**CON:** Not very easy to use, comes with a smaller active vocabulary than ViaVoice.

**VALUE:** No-risk proposition, but disappointing results.

List price: \$39

Phillips Speech Processing

800/851-8885

www.freespeech98.com

INFONET NO. 746

accuracy with continued use.

IBM's package makes it easier to fix incorrectly recognized words; you type in the correct spelling and speak the

### ViaVoice 98 Executive Edition

**PRO:** Good performance and accuracy; includes headset.

**CON:** Not a great product for drawing up long documents.

**VALUE:** Preferred choice between the two software packages for business use.

List price: \$149

IBM

800/825-5263

www.ibm.com/viavoice

pronunciation. FreeSpeech requires you to type in a phonetic pronunciation.

Tip: Use of a fancier noise-canceling headset (instead of the one bundled with IBM's ViaVoice) eliminated a common problem with voice recognition apps—the insertion of small words like *a*, *an*, or *the* when you pause or breathe.

Voice recognition technology has improved, and these packages can be useful for e-mail or brief letters. But think twice before tackling longer documents like reports. You'll spend as much time correcting as dictating.

—Stan Miastkowski

## Tiger GT-333: Well-Stocked for \$1049

### DESKTOP

IF YOU DON'T need a desktop PC with rocket power, you're not alone. The universe of budget systems continues to grow, as does price competition. The latest case in point: TigerDirect's new GT-333 desktop, based on an IBM-built version of the Cyrix M II-333 processor, costs just \$1049 with a 17-inch monitor. It's not for intensive graphics work or 3D games, but it runs basic business apps well. If you're on a budget and you're comfortable buying from a smaller vendor, check out the GT-333.

This Tiger system has 64MB of RAM, unlike many budget desktops that skimp by with 32MB or 48MB. It has 1024-KB of secondary cache, double the usual amount. You also get a 6.4GB hard drive, an ATI AGP Xpert@Work graphics accelerator card with 4MB of SGRAM, a 14X-32X CD-ROM



**A REAL BUDGET PC:** TigerDirect's GT-333 won't break speed records, but it's loaded with goodies for the price, including a 17-inch monitor.

drive, and a 56-kilobits-per-second modem.

Although its processor is designed to perform similarly to a Pentium II-333 or PII-300, my tests of a shipping unit indicate that the GT-333 can't keep up. In our PC World-Bench 98 test suite of business apps, it earned a score of 149, much like an average PII-266 machine. (PII-300s average 159, about 7 percent faster

than the Tiger, and PII-333s average 170, about 14 percent faster.) The GT-333's lackluster graphics scores fell far behind a good Pentium II system's.

But a PC that runs like a PII-266 on business apps is still a good deal for \$1049. You'd pay at least \$1399 to \$1499 for a comparably configured PII-266. Most Intel Celeron-based PCs we've seen cost between \$1149 and \$1500, have less

- 74** FreeSpeech 98, ViaVoice 98 voice recognition software
- 75** Tiger GT-333 budget desktop
- 76** TrueX 40x40 CD-ROM Drive, CDPS-PX24 portable CD-ROM drive; DDU220E/H DVD-ROM kit
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### INTERNET



FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at [www.pcworld.com/news](http://www.pcworld.com/news).

generous configurations, and run 16 to 28 percent slower than the Tiger machine.

TigerDirect includes a good three-year, on-site warranty, but toll-free phone support is available only 14 hours a day Monday through Saturday. Still, for budget buyers, the Tiger GT-333's price is nothing to sneeze at.

—Paul Heltzel ►

### Tiger GT-333

**PRO:** True budget price, configuration is well-stocked.

**CON:** Slow on graphics applications and games.

**VALUE:** Low-cost option for running productivity apps.

Street price \$1049

TigerDirect

800/830-0056

www.tigerdirect.com

INFONET NO. 747



## TrueX 40x40: Fastest CD-ROM Drive Yet

**C D - R O M**  
TRUE TO ITS NAME, Hi-Val's new TrueX 40x40 CD-ROM Drive delivers a 40X transfer rate—more than 40 times faster than original 1X (150 kilobytes per second) CD-ROM drives. That's no small point. Today's 32X drives reach 32X

### TrueX 40x40 CD-ROM Drive

**PRO:** Fastest CD-ROM yet, equals hard drives in throughput.

**CON:** Need a powerful PC to realize the benefits.

**VALUE:** Appealing for a few jobs, but overkill for most PC users.

Street price: \$199

Hi-Val

714/953-3000

www.hival.com

INFONET NO. 748

speed only on rarely used outer disc tracks, averaging 18X otherwise. I tested a pre-production version of the \$199 Kenwood-made TrueX drive and found that while it's fast, it's overkill for most PC users.

New technology from Zen Research allows the drive to spin at a constant 10X speed; specially designed circuitry lets it read seven tracks at once. The drive can sustain data transfer rates of more than 6 megabytes per second, whereas 32X CD-ROM drives average 2.7 MBps. Using CD Tach, an industry standard benchmark test, I found that TrueX's 86-ms random access rate equals that of the fastest 32X drive we've tested, the \$189 SCSI Plextor UltraPlex.

However, because few apps capitalize on the TrueX's fast data transfer technique, the drive isn't worth the cost. Performing real-world tasks using the 32X Plextor drive, then the 40X Hi-Val drive, I saw no speed increase on database searches or when downloading a 19MB Kodak Photo CD image to my PC's hard drive.

A few jobs—like installing applications, and copying and converting music from CD-ROM into WAV files on hard disk—use the fast data transfer rate. But these tasks tax the CPU, so you need a fast Pentium II PC to see the benefits.

If you're upgrading an older PC, a 32X IDE CD-ROM drive for \$80 is a better buy.

—Jeff Sengstack

### 24X Portable CD-ROM

NO MATTER what the label says, most portable CD-ROM drives can't transfer data faster than about 4X. The bottleneck at the connection point—typically the parallel port of your notebook PC—slows software loading. But I-O Data Device's **CDPS-PX24**, a \$289 CD-ROM drive, bypasses poky ports by using its own bundled SCSI PC Card interface. Used with its AC adapter, this drive zips along at 16X to 24X and is the fastest portable CD-ROM drive we've used. When running on six AA batteries, it delivers a respectable constant speed of 10.3X. I noted the performance when loading software, during my review of a shipping version of the drive. I-O Data Device; 800/733-3374; www.iodata.com.

INFONET NO. 749

—Yardena Arar

## Sony Speeds Up DVD-ROM Drives to 5X

**D V D - R O M**  
DOES THE WORLD need a faster DVD-ROM drive? Sony Electronics thinks so, but we're not so sure. Sony's new DVD-ROM drive, the DDU220E/H, spins DVD-ROM discs at 5X speed, compared to today's 2X standard. This \$349 drive is also rated to handle CD-ROMs at 14X to 24X, but in my tests of a preproduction unit, it was poky with those discs.

Thorough documentation made for an easy install on my Pentium MMX-200 Dell Dimension XPS with 32MB of RAM. (Sony recommends at least a Pentium-133 PC with 16MB of RAM.) The kit includes the Sigma Designs Realmagic DVD Hollywood



**FAST DVD-ROM:** Sony's DDU220E/H drive handles DVD-ROM discs at 5X speed; today's standard is 2X. But CD-ROM speeds are slow.

Plus PCI card, which handles hardware MPEG-2 decoding.

But do you need 5X DVD-ROM speed? Compared to 2X DVD-ROM drives, this Sony doesn't deliver any noticeable performance improvement

while running DVD movies—they always play at 1X DVD speed. Sony says you should see an improvement with data-intensive DVD-ROM titles.

The DDU220E/H played CD-ROM discs at 14.8X speed

(as measured by TestaCD Labs' CD Tach benchmark). That's better than 2X DVD-ROM drives but not as fast as a good CD-ROM drive: Toshiba's 20X XM6102B CD-ROM drive recorded a speed of 18.4X.

The Sony costs only about \$150 more than 2X DVD-ROM kits. But given the lack of titles and the inability of today's drives to handle future rewritable media, I suggest you wait.

—Dean Andrews ▶

### DDU220E/H DVD-ROM kit

**PRO:** Reasonable price.

**CON:** Unimpressive performance running CD-ROMs.

**VALUE:** You can wait to buy.

List price: \$349

Sony Electronics

800/352-7669

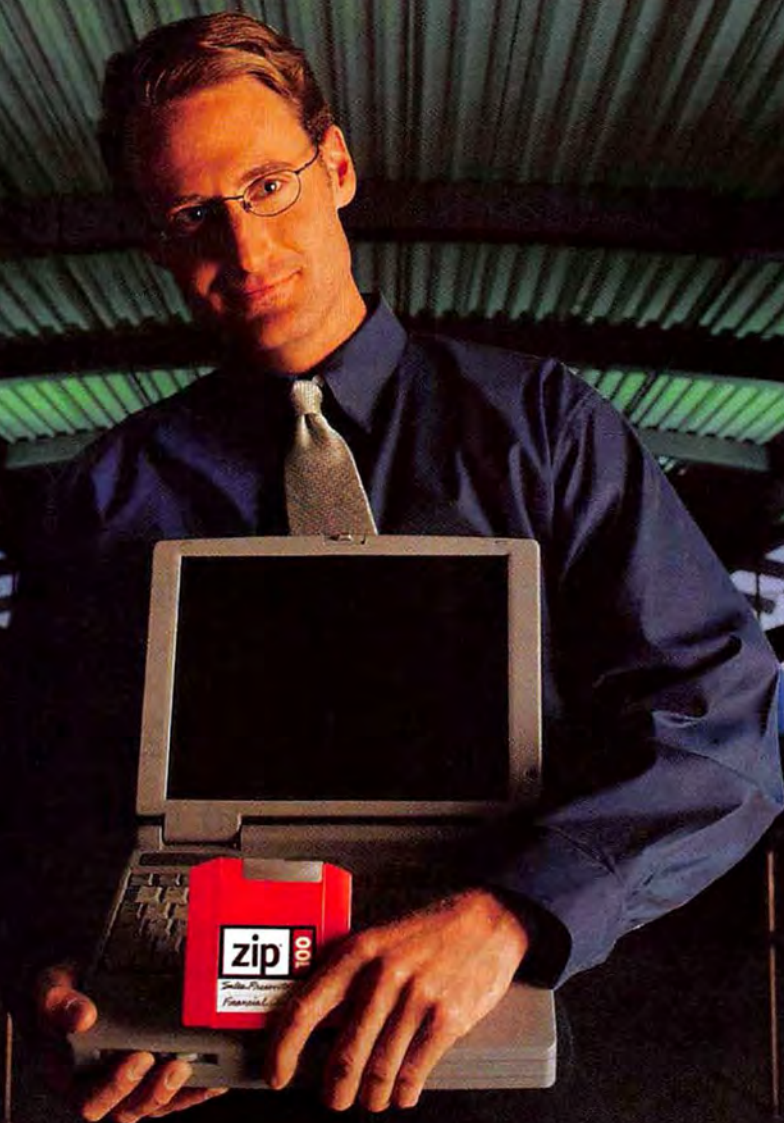
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INFONET NO. 750



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


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## SupraSonic II: Slightly Ahead of Its Time

### MODEM

MOST OF US don't just want faster Web access, we *crave* it. If you have two phone lines, Diamond's \$200 SupraSonic II modem kit will let you surf at up to 112 kilobits per second, a rate rivaling ISDN. My tests of a shipping unit show that the SupraSonic II is indeed fast—but ISP support for modem doubling isn't good enough yet to make this a worthwhile purchase.

The SupraSonic II kit consists of a dual-modem ISA adapter card and Shotgun, a software utility that harnesses the modems together using Multi-Link Point-to-Point Protocol. This standard enables two phone lines to behave as one double-bandwidth line. Installing the SupraSonic II was easy. The manual is terse but clearly written and well illustrated.

Once set up, the SupraSonic II worked faster than any of the other modem-bonding products we've tested to date (see "Modem Doublers Fall Far Short of Bold Claims," *Top of the News*, April.) This Diamond kit cruised through FTP transfers and let me surf through Web pages at twice

the speed of a single modem.

But I only got the increased speed when I could keep both modems connected. One modem or the other often went offline a few minutes after the connection was established. Diamond's tech support suggested adjusting the board's

IRQ settings, which helped somewhat. But Diamond further informed me that ISPs are still experiencing some problems implementing ML-PPP smoothly.

Netcom is the only major ISP to support analog ML-PPP; it charges an extra \$10

over its standard \$20 rate for the second modem connection. Some regional ISPs also support the protocol (see this month's *Got a Problem?*).

Until ISP support is more widespread and ISPs iron out the ML-PPP kinks, I can't recommend the SupraSonic II. The product has promise, but you're wiser to wait.

—Bryan Hastings

## Double Up: Xircom's 2-in-1 Modem/LAN Card

### MODEM

USING A MODEM and a LAN adapter with your notebook PC has been, until recently, a two-step, two-PC-Card hassle. Just getting simultaneous connections on the modem and the network can be tough, not to mention how easy it is to lose or break connectors to the PC Cards. But Xircom's ingenious RealPort PC Card, which integrates a K56flex modem with an ethernet 10/100 LAN adapter, worked painlessly. In my test of a shipping version, the \$399 hard-plastic Type III PC Card exceeded my expectations.

For starters, I connected on the first try to America Online. This modem PC Card was the first I've seen with carrier detect and transmit/receive LEDs embedded on the chassis (just like the ones on my desktop modem). As a result, I got visual confirmation that my data was getting through. Later, while offline, I used the convenient telephone handset pass-through connector to use my telephone. To top it off, Xircom provides an extra port for connecting GSM and PCS 1900 cellular phones.



**DOUBLE WITH NO TROUBLE:** Xircom's RealPort card, which combines a modem and a LAN adapter, aced its road test.

Getting a LAN connection at my office was as easy as snapping in the network cable and making a few one-time software configurations. Once I was connected, the card's second pair of LEDs signaled that interactions with the LAN were working as expected.

Installation on my Dell Inspiron 3200 notebook went smoothly, with just one surprise. Because this is a dual-purpose card, Windows 95/98 Plug and Play must perform two separate install rounds—one for the modem and another for the network card. Thus, you may have to reboot the PC twice. And because RealPort is

a Type III card, it will fit only in notebooks that have two stacked Type II slots.

But otherwise, the RealPort is a convenience you should grab. On the double.

—Michael S. Lasky ▶

### SupraSonic II kit

**PRO:** Offers noticeable speedup over single modem.

**CON:** Limited ISP support, unstable modem connections.

**VALUE:** Modem kit has promise, but ISP end needs work.

Street price: \$200

Diamond Multimedia

800/352-7669

www.diamondmm.com

INFONET NO. 732

### Xircom RealPort

**PRO:** Convenient high-speed modem and ethernet 10/100 combination PC Card.

**CON:** Type III card fits only in notebooks with two stacked Type II slots.

**VALUE:** Solid choice.

List price: \$399

Xircom

800/438-4526

www.xircom.com

INFONET NO. 733





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## UnInstaller 5.1: Gentle Cleaning for PCs

### UTILITY

WHEN AN OFFICE colleague recently resigned, I was asked to reclaim her PC. She'd customized that machine *just so*, and I had to return it to something resembling its original, plain-vanilla state. Grabbing a beta version of CyberMedia's UnInstaller 5.1 for Windows 98, I was optimistic.

Its predecessor, UnInstaller 4.51, won a Best Buy award in *PC World's* June roundup of Windows utilities. The new



**WINDOWS 98 CLEANSER:** UnInstaller 5.1 helped us make someone's old, customized PC tidy again, including the Windows Registry.

### UnInstaller 5.1

**PRO:** Integrates with Windows 98, judiciously discards old files.

**CON:** BackTrack monitor is limited to smaller applications.

**VALUE:** A valuable tool for cleaning out your system.

Street price: \$49; \$20 upgrade from any previous retail version

CyberMedia

800/529-2373

www.cybermedia.com

INFONET NO. 734

\$49 version of UnInstaller (which also works with Windows 95 and Windows NT 4.0) integrates directly with several new system utilities in Windows 98.

In addition to regularly and automatically extracting temporary files and dead shortcuts, the utility deftly maneuvers the Windows Registry; I was impressed with its discretion in advising which of my

colleague's files to trash.

The Installation BackTrack monitor makes removing new programs simpler by watching their installations. But it slows installations slightly, and the company advises against using it to uninstall some items that dig deep into Windows (such as OS updates.)

Otherwise, this utility is a helpful guide at cleanup time.

—Glenn McDonald

### Don't Hire System Commander

**THE PITCH:** A safety net to install before you upgrade to Windows 98. The reality: a space-devouring utility fraught with potential problems. V Communications' \$30 **System Commander Special Edition for Windows 98** requires a huge amount of free C: drive space to create a duplicate of your current Windows 95 installation, before you upgrade to Windows 98. From then on, if things go smoothly, you get to choose between the two operating systems at boot-up time. My installation of a shipping copy consumed nearly 500MB for the Win 95 duplication, yet the program failed to copy Win 95 properly. If you must have multiple OSes, you're better off spending \$80 for the company's more powerful System Commander Deluxe, which lets you put Win 98 on a different partition, such as a D: or E: drive. V Communications; 800/648-8266; www.vcom.com.

INFONET NO. 735

—Yardena Arar

## ZipMagic98: Not a Perfect Upgrade

### UTILITY

BASED ON my review of a shipping copy, I have to say the new \$40 ZipMagic98 bites off more than it can chew.

ZipMagic has won many fans thanks to two key features: It launches when you start up Windows 98 and integrates with Windows Explorer. Zipped files then appear as regular folders, which you double-click to open. You can open and move compressed files, and even run applications, without unzipping them

first. This approach can save much time and trouble over using a separate Zip utility. Like its peers, ZipMagic also creates self-extracting Zip files.

ZipMagic98—compatible with Windows 3.1, 95, 98, and NT—adds some new tools. ZipSurfer for Navigator and Internet Explorer lets you view, unzip, or install a downloaded Zip file from your browser.

New plug-ins allow you to zip and send files directly from popular e-mail programs. ZipMagic98 also adds viewers for

previewing compressed files (in more than 60 formats).

However, all these tools and options take time to figure out, and online help is slim. More worrisome: ZipSurfer froze a few times when I tried directly installing zipped files through the browser plug-in. Once I closed my browser, I found the extracted file intact where I had saved it.

ZipMagic 1.0 rightfully won a Best Buy award in our June issue's roundup of Windows utilities. Consider ZipMagic98

if you're upgrading or if you do a lot of heavy-duty file compression. Casual users will prefer the simpler \$29 WinZip from Nico Mak Computing.

—Glenn McDonald ►

### ZipMagic98

**PRO:** New Web and e-mail integration features.

**CON:** Having so many options can be confusing; slim online help.

**VALUE:** Powerful and feature rich, but too complex for casual users.

Street price: \$40

Mijenix

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INFONET NO. 736



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## NEC's SuperScript 870: A Fast Laser Show

### PRINTER

IN PURSUIT OF looking new and cool, some PC products do everything but dance in a football field end zone. Not low-end laser printers: They're quiet types that get the job done fast when you need to send an important letter or distribute a report, with the best possible text quality. For small or home offices, NEC's new \$349 SuperScript 870 is a solid new player. It costs slightly less than the popular Hewlett-Packard LaserJet 6Lse (which sells for \$399) and runs faster.

In PC World lab tests of a shipping unit, the NEC printed about 7 pages of text per minute and 3.9 pages of graphics per minute—quicker than most lasers in the same price class. The HP 6Lse, for example, runs at 5.1 pages per minute for text and 3 pages per minute for graphics. (The NEC uses an 8-ppm printer engine, compared to the HP's 6-ppm engine.)

As for print quality, NEC's 600-by-600-dpi resolution laser produces text that looks crisp and clean, even at small sizes. Graphics seem a bit dark but show good detail.

The SuperScript 870 has a sleeker, more stylish and compact design than its predecessor, the SuperScript 860. We particularly like the handles on the side of the printer, which let you pick the machine up easily. The printer's simple control panel is a plus, as is the straight paper path that accommodates a wide range of paper, envelopes, and cards. The input tray can handle 150

sheets; an optional 500-sheet tray (\$169) snaps onto the bottom of the printer. You can get a 10/100Base-T network interface card for \$249.

NEC's full-featured software lets you adjust the brightness of the output; optimize for different media; and make booklets, watermarks, and "n-up" prints (reduced-size copies of several pages on one sheet). Home-office users will appreciate the Learning Company applications bundled with the

SuperScript 870: Project Manager Pro 1.0, Labels Unlimited 2.0, Business Card Pro 1.0, Form Designer Pro 1.0, and Calendar Creator 5.02.

One small gripe: Though the printer manual includes a good nine-page troubleshooting section, we would have preferred more illustrations and a more complete index.

NEC provides a two-year warranty as well as toll-free and online customer support. Overall, with its combination

of speedy printing, low price, and ease of use, the SuperScript 870 is a winner.

—Laurianne McLaughlin  
and Karen Silver

### NEC SuperScript 870

**PRO:** Compact design, speedy, great text quality.

**CON:** Graphics a bit dark; manual could use more diagrams.

**VALUE:** A solid value for home-office users.

Street price: \$349

NEC

800/632-4636

www.nec.com

INFONET NO. 737

## Sony Mavica Camera Slims Down, Speeds Up

### DIGITAL CAMERA

IN PC WORLD'S last digital camera roundup ("Snap Judgments," February) Sony's Mavica MVC-FD7 earned the Best Buy award for its good image quality, easy-to-use controls, and especially its ability to save photos directly to a floppy disk. The latest Mavica, the \$799 MVC-FD71, is a slimmer and faster improvement over its predecessor. After testing a shipping version of the new model, I was impressed with the changes.

### Sony Digital Mavica MVC-FD71

**PRO:** Stores pictures right to a floppy disk; faster than original.

**CON:** Smaller than original, but still not svelte; high cost.

**VALUE:** Best attribute is convenient transfer of photos to a PC.

List price: \$799

Sony

800/222-7669

www.sony.com/image

INFONET NO. 738



**SNAPPY WORK:** The Digital Mavica MVC-FD71 saves photos in about 4 seconds.

The original Mavica camera weighed almost 1.3 pounds and was a bulky 3 inches thick. The FD71 weighs 1.2 pounds and is 2.5 inches thick, making it a bit easier to hold and tote around. And whereas the original model took about 8 seconds to save a photo to a disk, this version averaged a more tolerable 4 seconds.

In addition, Sony has added some nifty new features. These include the ability to make copies of floppies using just the camera—very handy if you

want to hand out extra disks on the spot. A new quarter-resolution (320 by 240) option also makes it faster to e-mail photographs. (The camera's full resolution is 640 by 480.) A built-in menu on the MVC-FD71's LCD screen permits you to easily take advantage of use-

ful new options such as these.

My main complaint? The high price tag. List-priced at \$799, the Mavica costs more than many high-quality 35mm cameras. And as with most digital cameras, this model fails to deliver image quality that is comparable to the quality produced by a 35mm. Still, if you've decided to go digital and want a good camera that will let you effortlessly copy files to your PC, the MVC-FD71 is hard to beat.

—Bryan Hastings ►



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## Norton AntiVirus 5.0 Scans and Delivers

### UTILITY

IF YOU'VE BEEN shopping for antivirus software, your biggest problem may be keeping up with the options. Network Associates acquired both IBM Antivirus and Dr Solomon's Anti-Virus Deluxe, which we declared the new antivirus champ in July's *New*

#### Norton AntiVirus 5.0

**PRO:** Improved protection, weekly virus signature updates.

**CON:** Free updates limited to one year (\$4 thereafter).

**VALUE:** Proven technology with increased protection.

Street price: \$50; \$30 upgrade from previous version

Symantec

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www.symantec.com

INFONET NO. 739

*Products.* Meanwhile, Symantec released a new upgrade to its venerable antivirus package. According to my tests of a preproduction copy, Norton AntiVirus 5.0 is a useful—albeit incremental—upgrade.

NAV 5.0 uses the same core technology as past versions. In our tests, it earned a perfect detection score on in-the-wild viruses. The package protects against malicious (though uncommon) ActiveX and Java applets that may enter your PC via the Web. It sniffs for viruses in virtually all flavors of compressed files, files downloaded from the Internet, and e-mail attachments.

If a new virus is found, the Scan and Deliver feature will quarantine it, encrypt it, and e-mail it to the Symantec Anti-

Virus Research Center, which will respond within a week.

Weekly (formerly monthly) virus signature updates are free for a year, \$4 thereafter.

(LiveUpdate still automatically retrieves this information via the Internet.) All in all, NAV 5.0 is a worthy investment—and one that brings Symantec back to the front of the antivirus pack.

—Stan Miastkowski



**SMART UPGRADE:** Symantec's Norton AntiVirus 5.0 adds increased protection against possible viruses in files and e-mail attachments.

## Business Plan Pro Beats Guerrilla Tactics

### BUSINESS PLANNING

HOW DO YOU turn a good idea into a coherent business plan? Short of getting an MBA, you might turn to business planning software. Some packages sell for \$100 or less, but shop carefully: I tested shipping versions of Houghton Mifflin Interactive's \$50 *Guerrilla Business: Automate Your Business Plan*, as well as Palo Alto Software's \$100 *Business Plan Pro 3.0*, and only the latter is worth the price.

On the plus side, *Guerrilla Business* has a simple interface, and resources like online help, a glossary, and tax schedules make it easy to use. The program helps you develop an

eight-part plan using examples and editable templates. Preformulated financial sheets calculate cash flow and quarterly budgets. You can also determine your break-even point, projected income, and profit and loss. The program works with Word and Excel for import and export of files.

But *Guerrilla Business* is thin on important features: It doesn't supply a plan outline or customized templates for a specific business. It also lacks a thorough search-and-replace function as well as customization features.

For \$50 more, *Business Plan Pro 3.0* is more comprehensive. It has a detailed interface

with a split input screen: one for instructions, tips, and examples; the other for text you enter. A Plan Wizard takes you through 16 steps of questions, then custom-builds a plan outline. The app also comes with 20 useful real-life samples.

The program's Task Manager shows what you'll need for each step and tracks each job. Row-by-row audio help is available. Version 3.0 also offers more flexibility in creating tables, and a programwide search-and-replace function. You can export your plan in rich text format. Charts can be saved as bitmap files or exported to spreadsheets.

On the downside, *Business*

*Plan Pro 3.0* can't import all types of file formats. But overall, it's worth the \$100 cost.

—Lisa Moskowitz ▶

#### Business Plan Pro 3.0

**PRO:** Many options and features.

**CON:** Can't import all types of files.

**VALUE:** Good choice.

Street price: \$100; \$40 upgrade

Palo Alto Software

800/229-7526

www.palo-alto.com

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#### Guerrilla Business: Automate Your Business Plan

**PRO:** Simple interface, cheap.

**CON:** Limited templates and options.

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## Two Monitors Is the Appian Way

### GRAPHICS

THE WAY MICROSOFT has been touting Windows 98's multiple-monitor support, you'd think everyone would be jumping to double the fun.

Of course, multimonitor support has been around well before Windows 98. Appian Graphics has long specialized in adapter cards designed to

display programs on two or more monitors. I checked out a shipping version of Appian's new \$490 Duet card, which supports two displays.

Windows 98 supports two cards and two monitors, but that means fewer slots are open for other devices. The advantage of the Appian card is that it requires only one AGP or PCI slot for two monitors.

Appian didn't have a Windows 98 driver for the Duet in time for my review (it should be out by the time you read this). But using the product in Win 95 was easy. (It also works with Windows NT 4.0.) Using a 17-inch monitor and an old 14-incher, I discovered the luxury of keeping my e-mail open on one monitor while crunching spreadsheets on another.

Appian also provides great utilities for managing unforeseeable things like where you want dialog boxes to pop up.

However, the board's \$490 price tag is high for the average user. Moreover, its processor, the S3 Virge/MX, was designed for notebook PCs and doesn't pack the power of today's desktop PC graphics chips. To Appian's credit, the choice of the Virge/MX allows the board to use just one chip to drive two monitors (unlike most of its peers). The company says this improves the card's compatibility with PCs.

I wouldn't pay \$490 just to have two monitors. But some professionals who could benefit from multiple monitors will find the Duet a good choice.

—Brad Grimes

### Legal Eagle

UNTIL RECENTLY, flatbed scanners for legal documents commanded big premiums. At \$249, Microtek's X6EL is among the most affordable. It has an 8.5-by-14-inch scanbed, plus a SCSI 2 PCI card interface—less convenient to install than parallel-port models, but faster. The X6EL, with 600-by-1200-dpi optical resolution (up to 9600 dpi with software interpolation) and 36-bit color, is a solid choice for graphics. The software includes limited editions of Adobe Photoshop image editor, Caere's OmniPage optical-character-recognition program, and DocuMagix's PaperMaster document manager. However, the X6EL can't scan more than a couple of pages a minute, so it's not for volume work. Microtek; 800/854-4160; [www.microtek.com](http://www.microtek.com).

INFONET NO. 743

—Yardena Arar

### Appian Duet

**PRO:** Single graphics card easily drives two monitors; great utilities.

**CON:** A bit pricey for the masses; processor is somewhat old.

**VALUE:** A good choice, but not priced for all business users.

List price: \$490

Appian Graphics

800/727-7426

[www.appiangraphics.com](http://www.appiangraphics.com)

INFONET NO. 742

## Fast Reader: HP's Newest CD-RW Drive

### CD-REWRITABLE

YOU MIGHT THINK OF CD-RW drives as the missing link between recordable magnetic storage (like floppy or Zip disks) and read-only CD-ROM and CD-R (recordable) discs. The benefit of CD-RW (rewritable) technology is that you can not only burn your own data or music CDs, but also record, erase, and re-record data on a CD-RW disc any number of times.

That's why the \$399 internal CD-Writer Plus 8100i drive from Hewlett-Packard is so handy. It records and plays CD-RW and CD-R media, and it reads standard CD-ROM discs faster than its peers.



**GOOD SPEED BOOST:** HP's CD-Writer Plus 8100i reads CD-ROMs at a maximum speed of 24X. Previous CD-RW drives topped out at 6X.

Just six months ago, the best CD-RW drive read CD-ROM discs at a maximum speed of 6X; the 8100i reads CD-ROM discs at a top speed of 24X. It records to CD-R media at 4X and to CD-RW media at 2X.

So, you can replace your old CD-ROM drive with the HP—not all CD-ROM drives read CD-RW discs anyway—and get rewritable storage.

I found installing a shipping version of the drive simple—it

took me a mere 15 minutes.

In my test, the notably quiet 8100i halved the time it takes to format CD-RW discs, from nearly 10 minutes (using an older CD-RW drive) to just under 5 minutes.

You also get backup software and a way to restore your OS, in case of hard drive problems.

—Andrew Brandt

### CD-Writer Plus 8100i

**PRO:** First CD-RW drive to read CD-ROM discs at 24X speed.

**CON:** None significant.

**VALUE:** Fast and affordable rewritable storage option.

Street price: \$399 for the internal EIDE version

Hewlett-Packard

800/752-0900

[www.hp.com/go/cdr](http://www.hp.com/go/cdr)

INFONET NO. 744



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### TOSHIBA Libretto 70CT

♦ 120MHz Intel Pentium® processor with MMX™ technology ♦ 16MB EDO DRAM standard ♦ 1.58GB hard drive ♦ 1.44MB external 3.5" floppy drive with PC Card connector ♦ 6.1" active-matrix display ♦ Windows® 95

Free port replicator with purchase!

**\$1297<sup>36</sup>**

CDW 121067

## 166MHz PENTIUM® MMX

### IBM Business Partner IBM® ThinkPad® 380ED

♦ 166MHz Intel Pentium® processor with MMX™ technology ♦ 16MB EDO RAM standard ♦ 3GB hard drive ♦ 20X CD-ROM ♦ 12.1" active-matrix display ♦ Windows® 95

**\$2147<sup>56</sup>**

CDW 94543

**Lease \$73**

### TOSHIBA Tecra 520CDT

♦ 166MHz Intel Pentium® processor with MMX™ technology ♦ 32MB EDO DRAM standard ♦ 2.02GB hard drive ♦ 12.1" TFT active-matrix SVGA display ♦ 10X CD-ROM drive ♦ Sound Blaster® compatible sound ♦ 33.6K bps internal data/fax modem ♦ Windows® 95

**\$2197<sup>89</sup>**

CDW 90355

**Lease \$74**

## 200MHz INTEL PENTIUM® MMX

### COMPAQ Armada 1505DM

♦ 200MHz Intel Pentium® processor with MMX™ technology ♦ 32MB RAM standard ♦ 2.1GB hard drive ♦ 20X Max CD-ROM drive ♦ 12.1" dual-scan display ♦ Integrated 56K bps (K56flex) modem ♦ Windows® 95

**\$1597<sup>68</sup>**

CDW 117883

**New!**

### IBM Business Partner IBM® ThinkPad® 770

♦ 200MHz Intel Pentium® processor with MMX™ technology ♦ 512KB Level 2 cache ♦ 32MB RAM standard ♦ 3.2GB hard drive ♦ 13.3" active-matrix color display ♦ 3D graphics ♦ Windows® 95

**\$2837<sup>96</sup>**

CDW 94545

**Lease \$96**

## 233MHz INTEL PENTIUM® MMX

### TOSHIBA Satellite 320CDS

**Price Drop**

♦ 233MHz Intel Pentium® processor with MMX™ technology ♦ 32MB EDO RAM standard ♦ 4.1GB hard drive ♦ 20X CD-ROM drive ♦ 12.1" dual-scan display ♦ 56K bps (K56flex) modem

**\$1629<sup>89</sup>**

CDW 114027



## 233MHz INTEL PENTIUM® II

### IBM Business Partner IBM® ThinkPad® 600

♦ 233MHz Intel Pentium® II processor ♦ 512KB Level 2 cache ♦ 32MB RAM standard ♦ 3.2GB hard drive ♦ 24X CD-ROM drive ♦ 13.3" active-matrix XGA display ♦ 56K bps (K56flex) modem ♦ Windows® 95

**New!**

**\$3757<sup>56</sup>**

CDW 110886

**Lease \$127**

## 266MHz INTEL PENTIUM® MMX

### TOSHIBA Satellite 330CDT

♦ 266MHz Intel Pentium® processor with MMX™ technology ♦ 32MB EDO RAM standard ♦ 4.1GB hard drive ♦ 12.1" active matrix display ♦ 20X CD-ROM drive ♦ 56K bps (K56flex) PC card modem

**New!**

**\$2397<sup>56</sup>**

CDW 117013

**Lease \$81**

## 266MHz INTEL PENTIUM® II

### COMPAQ Armada 7800

♦ 266MHz Intel Pentium® II processor ♦ 512KB Level 2 cache ♦ 5GB hard drive ♦ 64MB SDRAM standard ♦ 13.3" active-matrix display ♦ 20X Max CD-ROM drive ♦ Windows® 95

**\$4357<sup>26</sup>**

CDW 110852

**Lease \$147**

### IBM Business Partner IBM® ThinkPad® 600

♦ 266MHz Intel Pentium® II processor ♦ 512KB Level 2 cache ♦ 32MB EDO RAM standard ♦ 4GB hard drive ♦ 24X CD-ROM drive ♦ 56K bps modem ♦ Windows® 95

**New!**

**\$4327<sup>86</sup>**

CDW 110889

**Lease \$146**



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Source: Computer Intelligence, 2H97 MarketModel update, 10/97.  
Data reflects U.S. market share based on portable computer units  
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exclude handhelds.

- ✓ **Toshiba**
- ✓ **IBM**
- ✓ **Compaq**
- 4. **Dell**
- 5. **HP**

## 266MHz INTEL CELERON™

### COMPAQ Deskpro EP

- ◆ 266MHz Intel Celeron™ processor
- ◆ 16MB SDRAM standard
- ◆ 2.1GB SMART II Ultra-ATA hard drive
- ◆ ATI RAGE IIC AGP graphics
- ◆ Towerable desktop case
- ◆ Windows® 95

**\$845<sup>74</sup>**

CDW 113185

**New!**



### HP Brio 8314

- ◆ 266MHz Intel Celeron™ processor
- ◆ 32MB SDRAM standard
- ◆ 2.1GB hard drive
- ◆ 2MB S3 Trio 64V2 graphics
- ◆ Two USB ports
- ◆ Windows® 95

**\$898<sup>75</sup>**

CDW 116358

## 266MHz INTEL PENTIUM® II

### COMPAQ Deskpro EP

- ◆ 266MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 32MB SDRAM
- ◆ 3.2GB SMART II Ultra-ATA hard drive
- ◆ Towerable desktop case
- ◆ Windows® 95

**\$1047<sup>87</sup>**

CDW 113187



### HP Vectra VE Series

- ◆ 266MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 32MB EDO DRAM standard
- ◆ 3.2GB Ultra ATA hard drive
- ◆ Matrox MGA graphics
- ◆ Windows® 95

**\$1147<sup>62</sup>**

CDW 118149

## 300MHz INTEL PENTIUM® II

### COMPAQ Deskpro EP

- ◆ 300MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 32MB SDRAM standard
- ◆ 3.2GB SMART II Ultra-ATA hard drive
- ◆ ATI RAGE IIC AGP graphics
- ◆ 24X Max CD-ROM drive
- ◆ Windows® 95

**\$1327<sup>55</sup>**

CDW 113188



### IBM® PC 300GL

- ◆ 300MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 32MB SDRAM standard
- ◆ 4.2GB Ultra ATA hard drive
- ◆ 64-bit AGP graphics
- ◆ Wake on LAN™ enabled
- ◆ Windows® 95

**\$1237<sup>55</sup>**

CDW 105869

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## 333MHz INTEL PENTIUM® II



### HP Vectra VE Series

- ◆ 333MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 32MB EDO DRAM standard
- ◆ 3.2GB EIDE hard drive
- ◆ Matrox MGA graphics
- ◆ Windows® 95

**New!**



**\$1437<sup>05</sup>**

CDW 118152

Monitor sold separately

## 350MHz INTEL PENTIUM® II



### HP Vectra VE Series

- ◆ 350MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 100MHz Front Side bus (FSB)
- ◆ 32MB EDO DRAM standard
- ◆ 3.2GB Ultra ATA hard drive
- ◆ Matrox MGA graphics
- ◆ Windows® 95

**New!**

**\$1659<sup>21</sup>**

CDW 118157

### COMPAQ Deskpro EP

- ◆ 350MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 100MHz Front Side bus (FSB)
- ◆ 64MB SDRAM standard
- ◆ 6.4GB SMART II Ultra-ATA hard drive
- ◆ 24X Max CD-ROM drive
- ◆ Windows® 95

**\$1787<sup>23</sup>**

CDW 113190

**New!**

## 400MHz INTEL PENTIUM® II

### COMPAQ Deskpro EP

- ◆ 400MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 100MHz Front Side Bus (FSB)
- ◆ 64MB SDRAM standard
- ◆ 6.4GB SMART II Ultra-ATA hard drive
- ◆ 24X Max CD-ROM drive
- ◆ Windows® 95

**\$1937<sup>85</sup>**

CDW 113191

**New!**



### HP Vectra VE Series

- ◆ 400MHz Intel Pentium® II processor
- ◆ 512KB Level 2 cache
- ◆ 100MHz Front Side Bus (FSB)
- ◆ 64MB EDO DRAM standard
- ◆ 6.4GB Ultra ATA hard drive
- ◆ 32X Max CD-ROM drive
- ◆ Windows® 95
- ◆ Mini-tower case

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### INTERNET

A NEW SERVICE called Homestead makes Web page creation so easy that you can whip up a personal home page in about an hour. Did we mention the magic word? It's *free*.

#### Homestead

**PRO:** Fast and free personal Web page creation.

**CON:** Limited templates, very basic design options.

**VALUE:** Fine, user-friendly choice that couldn't be cheaper.

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www.homestead.com

Homestead lets you build your own Web site—up to 5MB big—with no HTML programming and no software installations. The Homestead Editor feature works entirely through your Web browser as a Java applet. (You'll need Netscape Navigator 3.01 or higher, or Microsoft Internet Explorer 4.0.) Though the idea of online, on-the-fly Web creation isn't new, Homestead works very well, based on my tests of a beta version.

After you sign up at the Web site, you choose from over 40 Web site templates—résumé, family album, FAQ, and so

on. Or you can start from scratch with a blank page.

From there, the Homestead Editor works like a bare-bones desktop publishing program. You can drag and drop elements (buttons, text boxes, background fields) from the toolbar onto your page, and resize them. You can import your own text and images, and hotlink any text or image to other Web sites. Homestead even offers integrated chat services, so you can run a chat room on your page.

Given the usually schizophrenic performance of Java applets, Homestead's use of

the technology is impressive. I created a basic résumé page, with imported text and images, in about 45 minutes. The applet-based process never stalled or crashed my browser, Navigator 4.0. The aesthetically plain pages are saved as basic HTML documents on Homestead's servers.

Pages can be password protected, and access rights to edit a page can be granted to as many as 20 people. Features such as these make the service handy for a club or workgroup setting. One more plus: Homestead doesn't profit from banner ads, so you won't see pop-up advertisements in your personal Web page.

—Glenn McDonald

## Design Shop: Doesn't Match FrontPage 98

### AUTHORING

USED TO BE nobody was fired for buying IBM. These days, you can't go wrong buying Microsoft FrontPage 98 for corporate Web page authoring. But at \$149, FrontPage costs more than many competitors. So when Boomerang Software's Internet/Intranet Design Shop Gold 98 stepped up for \$99, we were interested. However, based on my experience with a shipping version, I'd say Design Shop has its charms but doesn't quite match FrontPage.

Unlike low-cost or free Web page authoring tools aimed at individuals (like Homestead, see above), Design Shop contains a considerable suite of design tools. Like FrontPage, it offers a basic WYSIWYG editor and extensive site management through a Windows Explorer-like interface. You can



**SIMPLE BUT PLAIN:** Design Shop Gold 98 offers an easy-to-use interface, but not enough features for creating sophisticated designs.

rearrange pages, and the app automatically updates referring links. Straightforward tools handle tables and frames.

Boomerang bundles MGI's PhotoSuite graphics editor and Ulead's PhotoImpact GIF animation utility, both welcome additions. The company

also provides Web site hosting for about \$10 a month.

However, Design Shop lacks FrontPage's point-and-click feature for adding site-searching and message forums, as well as FrontPage's more sophisticated templates.

If your needs are simple and your budget is tight, Design Shop has what you need to get started. But in this price range, FrontPage 98 is still the superior program.

—Paul Heltzel ■

#### Internet/Intranet Design Shop Gold 98

**PRO:** Easy-to-use, straightforward tools; reasonably priced.

**CON:** Lacks sophisticated design and interactive features.

**VALUE:** Spend the extra \$50 for FrontPage 98.

Street price: \$99

**Boomerang Software**

617/489-3000

www.boomerangsoftware.com

INFONET NO. 745



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1997 Direct Channel Achievement Award for Systems

### PC Computing

1997 Most Valuable Product:  
QP6/266 SM-4x

### PC World

18 Best Buy Awards  
M & SM Series Desktops  
(11/97 - 08/98)

### PC World

3 Best Buy Awards  
#1 Power Notebook  
H-1331 (06/98-08/98)

### Windows Magazine

WINLIST Award  
QP6/333 SM-4x  
(07/98)

### Windows Magazine

WINLIST Award  
QP6/300 SM-4x SE  
(07/98)

### C/Net Online

Editors' Choice Award  
QP6/233 SB-3  
(06/98)

### PC Computing

4-Star Rating  
Notebook Torture Test  
H-1211 Notebook (04/98)

### Windows Magazine

WINLIST Award  
QP6/233 SB-3  
(03/98)

### PC Portables

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H-1331 Notebook  
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### C/Net Online

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### PC Magazine

Editors' Choice Award  
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the Intel Pentium® II processor

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Whether you have a question or are experiencing technical difficulties, Quantex is always there to help. Our support lines are open for business 24

hours a day, 7 days a week, 365 days a year—and it's a toll free call! Aside from being ultra-convenient, our services were rated "Excellent" in a *Windows Magazine* survey (08/97) that asked respondents to evaluate their PC vendors in terms of reliability, service, and tech support. This ranking not only adds to our stellar reputation, it adds to the value you get when you choose Quantex.

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When *PC Magazine* surveyed 17,000 PC owners about their tech-support experience over the past two years, Quantex beat the competition, hands down. We're talking about some serious competition here: Dell, Micron, Gateway, IBM, Compaq. We beat them all. That should tell you something about the quality and dedication of our technical support. Look at the chart below and you'll be convinced of what Quantex can do for your business.

### Tech Support Experience

Vendor	Tech was knowledgeable	Tech tried everything to help	Prompt resolution	Got a run-around
<b>Quantex</b>	<b>57%</b>	<b>58%</b>	<b>49%</b>	<b>9%</b>
Micron	56%	47%	43%	9%
Gateway	54%	48%	45%	10%
Dell	54%	43%	49%	10%
IBM	41%	33%	36%	15%
Compaq	37%	30%	30%	17%
<b>Average*</b>	<b>40%</b>	<b>33%</b>	<b>32%</b>	<b>16%</b>

--- "Service and Reliability Survey," *PC Magazine*, July 1998  
\* calculations based on all 25 PC vendors evaluated in the survey.

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## Business Notebooks

Options: Mini Docking Station: \$169.00 • 2nd Lithium Ion Battery: \$129.00 • PCMCIA NIC: \$129.00 • Deluxe Carrying case: \$99.00

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- 12.1" SVGA Active Matrix Display
- 32MB SDRAM
- 512KB Secondary Cache
- 2GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem
- 24X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Corel Office Suite 8
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

H-1210 w/Pentium processor w/MMX Technology 266MHz...\$1799

### Quantex H-1331 \$2599

Business lease: \$91/Mo.

- Pentium® II processor 266MHz
- Intel Mobile Module (I.M.M.) Architecture
- 13.3" XGA Active Matrix Display
- 80MB SDRAM
- 512KB Secondary Cache
- 4GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem
- 24X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
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H-1331 w/Pentium II processor 233MHz or Pentium processor with MMX Technology 266MHz...\$2449

### Quantex H-1410 \$2449

Business lease: \$86/Mo.

- Pentium® II processor 233MHz
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- 14.1" XGA Active Matrix Display
- 96MB SDRAM
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- 4GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem
- 24X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
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H-1410 w/Pentium II processor 266MHz...\$2599

Above system also available with 13.3" XGA Active Matrix Display, Pentium II processor 233MHz, 64MB SDRAM, and 3GB Ultra ATA HD...\$2199

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- 14.1" XGA Active Matrix Display
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- 512KB Secondary Cache
- 6GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- PCMCIA K56flex protocol Fax/Modem
- 24X Modular CD-ROM Drive
- PCI Bus with 128-bit graphics accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- 2nd Lithium Ion Battery
- Mini Docking Station
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98 or Windows NT Workstation 4.0
- MS Office 97 Small Business Edition
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

H-1411 w/Pentium II processor 233MHz...\$2799

## Business Desktops

Options:

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- Business Audio Kit: \$49
- APC Back-UPS 300: \$99
- APC Back-UPS 500: \$129
- APC Back-UPS 650: \$199
- Seagate 4/8GB TP-4 Tape Backup: \$199
- Seagate 10/20GB TR-5 Tape Backup: \$299

### QP6/266 SB-1 \$1049

Business lease: \$37/Mo.

- Pentium® II Processor 266MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 32MB SDRAM Memory / 512KB Pipelined Burst Cache
- 2 1GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- 64-bit 3D PCI Graphics Card with 4MB VRAM
- 15" Digital Monitor (13.8" viewable)
- Intel Pro 100/100 PCI Ethernet Adapter w/RJ-45
- 32X Max EIDE CD-ROM Drive
- Quantex Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- 3-year limited warranty with 1-year On-Site Service\*\*
- 24-hr/7-day Technical Support
- QSentry Technology (including Intel LANdesk Client Manager V3.1)
- Upgrade to Windows NT Workstation 4.0 for \$99

QP6/300 SB-1 (w/ Pentium® II Processor)...\$1099

QP6/333 SB-1 (w/ Pentium® II Processor)...\$1199

### QP6/300 SB-2 \$1399

Business lease: \$49/Mo.

- Pentium® II Processor 300MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 32MB SDRAM Memory / 512KB Secondary Cache
- 4 3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel 740 AGP Graphics with 8MB SDRAM
- 17" Digital Monitor w/ OSD (15.8" viewable)
- Upgrade to 17" Monitor w/ NEC ChromaClear CRT for \$99
- Choice of Intel Pro 100 Ethernet Controller with Wake-On-LAN Technology or K56flex protocol Fax/Modem
- 32X Max EIDE CD-ROM Drive
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- MS Office 97 Small Business Edition
- Upgrade to MS Office 97 Professional for \$199
- 3-year limited warranty with 1-year On-Site Service\*\*
- 24-hr/7-day Technical Support
- QSentry Technology (including Intel LANdesk Client Manager V3.1)
- Upgrade to Windows NT Workstation 4.0 for \$99

QP6/266 SB-2 (w/ Pentium® II Processor)...\$1349

QP6/333 SB-2 (w/ Pentium® II Processor)...\$1499

### QP6/350 SB-3 \$1799

Business lease: \$63/Mo.

- Pentium® II Processor 350MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6 4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel 740 AGP Graphics with 8MB SDRAM
- 17" Digital Monitor w/ OSD & NEC ChromaClear CRT (16.0" viewable; 25 dp; 1600x1200 max resolution)
- Choice of Intel Pro 100 Ethernet Controller with Wake-On-LAN Technology or K56flex protocol Fax/Modem
- 32X Max EIDE CD-ROM Drive
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- MS Office 97 Small Business Edition
- Upgrade to MS Office 97 Professional for \$199
- 3-year limited warranty with 1-year On-Site Service\*\*
- 24-hr/7-day Technical Support
- QSentry Technology (including Intel LANdesk Client Manager V3.1)

QP6/300 SB-3 (w/ Pentium® II Processor)...\$1549

QP6/333 SB-3 (w/ Pentium® II Processor)...\$1649

QP6/400 SB-3 (w/ Pentium® II Processor)...\$1999

### QP6/400 SB-4 \$2199

Business lease: \$77/Mo.

- Pentium® II Processor 400MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8 4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 3Dlabs Permedia 2 AGP Graphics Card with 8MB SDRAM
- 19" Monitor w/ OSD (15.1" viewable); 1600x1200 26dp
- Choice of Intel Pro 100 Ethernet Controller with Wake-On-LAN Technology or K56flex protocol Fax/Modem
- 32X Max EIDE CD-ROM Drive
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- MS Office 97 Small Business Edition
- Upgrade to MS Office 97 Professional for \$199
- 3-year limited warranty with 1-year On-Site Service\*\*
- 24-hr/7-day Technical Support
- QSentry Technology (including Intel LANdesk Client Manager V3.1)

QP6/300 SB-4 (w/ Pentium® II Processor)...\$1799

QP6/333 SB-4 (w/ Pentium® II Processor)...\$1899

QP6/350 SB-4 (w/ Pentium® II Processor)...\$2049

## Microsoft Office 97

Small Business Edition includes: Word 97 • Excel 97 • Outlook 97 • Publisher 97 • Small Business Financial Manager 97 • Automap Streets Plus

## Business Servers

### QX5000 Server \$2499

Pentium® II Processor 400MHz

Business lease: \$88/Mo.

- Pentium® II Processor 400MHz (Dual-Processor Upgradable)
- 64MB 100MHz ECC SDRAM (1GB Max) / 512KB L2 ECC Cache
- 32X Max EIDE CD-ROM Drive / 3.5" 1.44MB Floppy Drive
- 4GB Ultra Wide SCSI-3 Hot-Swappable Hard Drive
- Dual Channel Ultra Wide & Narrow SCSI-3 Controller
- Intel EtherExpress Pro™ 100B Fast Ethernet w/RJ-45
- Server Tower Case w/ 5 Hot-Swap Bays
- 160 Ready & RAID capable
- Emergency Management Port
- 3-year limited warranty with 1-year On-Site Service\*\*
- Intel LANdesk Server Manager V2.8

### QX5000 Server \$3699

Pentium® II Processor 400MHz

Business lease: \$121/Mo.

- Pentium® II Processor 400MHz (Dual-Processor Upgradable)
- 128MB 100MHz ECC SDRAM Memory
- 9 1GB Ultra-Wide SCSI-3 Hot-Swappable Hard Drive
- MS Windows NT Server 4.0 w/10 Client License

### QX4000 Small Business Server \$3999

Pentium® II Processor 350MHz

Business lease: \$130/Mo.

- Pentium® II Processor 350MHz (Dual-Processor Upgradable)
- 512KB L2 ECC Cache
- 128MB 100MHz ECC SDRAM Memory (1GB Max)
- 3.5" 1.44MB Floppy Drive
- 4GB Ultra-Wide SCSI-3 Hard Drive (7200 rpm)
- 15" Digital Monitor (13.8" viewable)
- Dual Channel Ultra Wide & Narrow SCSI-3 Controller
- 32X Max EIDE CD-ROM Drive
- K56flex protocol Fax/Modem
- Intel EtherExpress Pro™ 100B Fast Ethernet w/RJ-45
- Server Tower Case
- 104-Key Keyboard with MS Mouse
- Microsoft® BackOffice® Small Business Server Suite
- 3-year limited warranty with 1-year On-Site Service\*\*
- 24-hr/7-day Technical Support
- Intel LANdesk Server Manager V2.8
- Call for Special Server Support Options
- Call for additional processor configurations

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## Value Multimedia Series

Software: Corel Office Suite 8 • MS Money '97 • Compton's Interactive Encyclopedia • Body Works 6.0 • Amazon Trail II • American Heritage Talking Dictionary • Internet the City • Compton's Reference Collection • Dr. Solomon's Find Virus • MS Internet Explorer 4.0

### QP6/266 M-1x \$1149

Lease: \$41/Mo.

- Pentium® II Processor 266MHz
- 32MB SDRAM Memory / 512KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 128 bit RIVA 3D Graphics Card with 4MB
- 15" Digital Monitor (13.8" viewable)
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 32X Max IDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service\*\*

QP6/300 M-1X(with Pentium II processor)...\$1199

QP6/333 M-1X(with Pentium II processor)...\$1299

### QP6/300 M-2x \$1399

Lease: \$49/Mo.

- Pentium® II Processor 300MHz
- 32MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB SDRAM
- 17" Digital Monitor w/OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC CinemaClear CRT for \$99
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive w/MPACT2 Decoding
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

QP6/266 M-2X(with Pentium II processor)...\$1349

QP6/333 M-2X(with Pentium II processor)...\$1499

QP5/350 M-2X(with Pentium II processor)...\$1649

### QP6/333 M-3x \$1599

Lease: \$56/Mo.

- Pentium® II Processor 333MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB SDRAM
- 17" Digital Monitor w/OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC CinemaClear CRT for \$99
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive w/MPACT2 Decoding
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

QP6/300 M-3X(with Pentium II processor)...\$1499

QP6/350 M-3X(with Pentium II processor)...\$1749

QP6/400 M-3X(with Pentium II processor)...\$1899

### QP6/350 M-4x \$2049

Lease: \$72/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers w/ACS 251 Subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

QP6/333 M-4X(with Pentium II processor)...\$1899

QP6/400 M-4X(with Pentium II processor)...\$2199

## Power Multimedia Series

Software: MS Office '97 Small Business Edition • MS Money '97 • Office Mate • Day Planner Pro • Power Business Plans • Form Designer Pro • Project Manager Pro • Labels Unlimited • Compton's Reference Collection • Dr. Solomon's Find Virus • MS Internet Explorer 4.0

### QP6/300 SM-1x \$1299

Lease: \$46/Mo.

- Pentium® II Processor 300MHz
- 32MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- 15" Digital Monitor (13.8" viewable)
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 32X Max IDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service\*\*

QP6/266 SM-1X(with Pentium II processor)...\$1249

QP6/333 SM-1X(with Pentium II processor)...\$1399

QP6/350 SM-1X(with Pentium II processor)...\$1549

QP6/400 SM-1X(with Pentium II processor)...\$1699

### QP6/333 SM-2x \$1649

Lease: \$58/Mo.

- Pentium® II Processor 333MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB SDRAM
- 17" Digital Monitor w/OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC CinemaClear CRT for \$99
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive w/MPACT2 Decoding
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

QP6/300 SM-2X(with Pentium II processor)...\$1549

QP6/350 SM-2X(with Pentium II processor)...\$1799

QP6/400 SM-2X(with Pentium II processor)...\$1949

### QP6/350 SM-3x \$1899

Lease: \$67/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- Call for special upgrade to Matrix Millennium G200 w/16MB
- 17" Digital Monitor w/OSD & NEC CinemaClear CRT (16.1" viewable, 25 dp, 1600x1200 max resolution)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 32X Max IDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition

QP6/300 SM-3X(with Pentium II processor)...\$1649

QP6/333 SM-3X(with Pentium II processor)...\$1749

QP6/400 SM-3X(with Pentium II processor)...\$2099

### QP6/400 SM-4x \$2199

Lease: \$77/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- Call for special upgrade to Matrix Millennium G200 w/16MB
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 32X Max IDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service\*\*
- Upgrade to Internal 100MB Zip Drive for \$79

QP6/300 SM-4X(with Pentium II processor)...\$1799

QP6/333 SM-4X(with Pentium II processor)...\$1899

QP6/350 SM-4X(with Pentium II processor)...\$2049

## Super Multimedia

### QP6/333 M-4x SE \$1799

Lease: \$63/Mo.

- Pentium® II Processor 333MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB SDRAM
- 17" Digital Monitor w/OSD & NEC CinemaClear CRT (16.0" viewable, 25 dp, 1600x1200 max resolution)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive w/MPACT2 Decoding
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service\*\*
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

QP6/300 M-4X SE(with Pentium II processor)...\$1699

QP6/350 M-4X SE(with Pentium II processor)...\$1949

QP6/400 M-4X SE(with Pentium II processor)...\$2099

### QP6/400 SM-4x SE \$2649

Lease: \$93/Mo.

- Pentium® II Processor 400MHz
- 128MB SDRAM Memory / 512KB Secondary Cache
- 16.9GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-490 Dolby Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service\*\*

QP6/300 SM-4X SE(with Pentium II processor)...\$2249

QP6/333 SM-4X SE(with Pentium II processor)...\$2349

QP6/350 SM-4X SE(with Pentium II processor)...\$2499

## Best Buy Specials

### M-Series Best Buy \$2199

Lease: \$77/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB SDRAM
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive w/MPACT2 Decoding
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-90 Speakers w/ACS 251 Subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- Upgrade to Quantex "Ultimate Gaming Bundle" for \$299

### Ultimate Gaming Bundle

- 3Dfx Voodoo2 based 3D Accelerator w/12MB
- Aureal A3D PCI Sound Card
- MS SideWinder 3D Pro Joystick
- 3 Activision Game Titles

Upgrade for  
**\$299**

### SM-Series Best Buy \$2399

Lease: \$84/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel®400 AGP Graphics with 8MB SDRAM
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- 100MB Internal Zip Drive with one cartridge
- K56flex PCI Fax/Modem™ w/Voice Mail and Speakerphone
- 2nd Generation DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Attec Lansing ACS-490 Dolby Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition



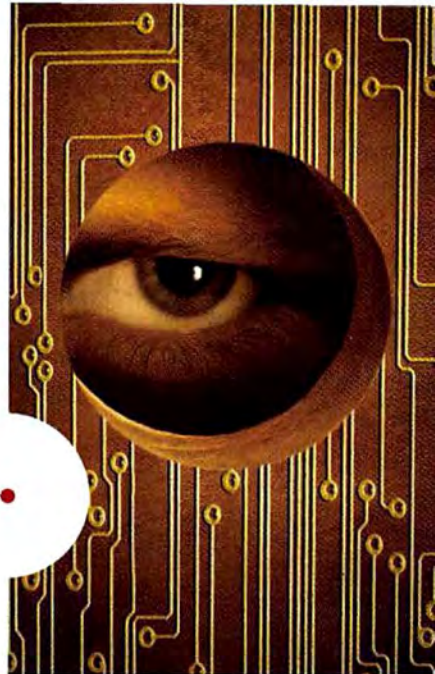
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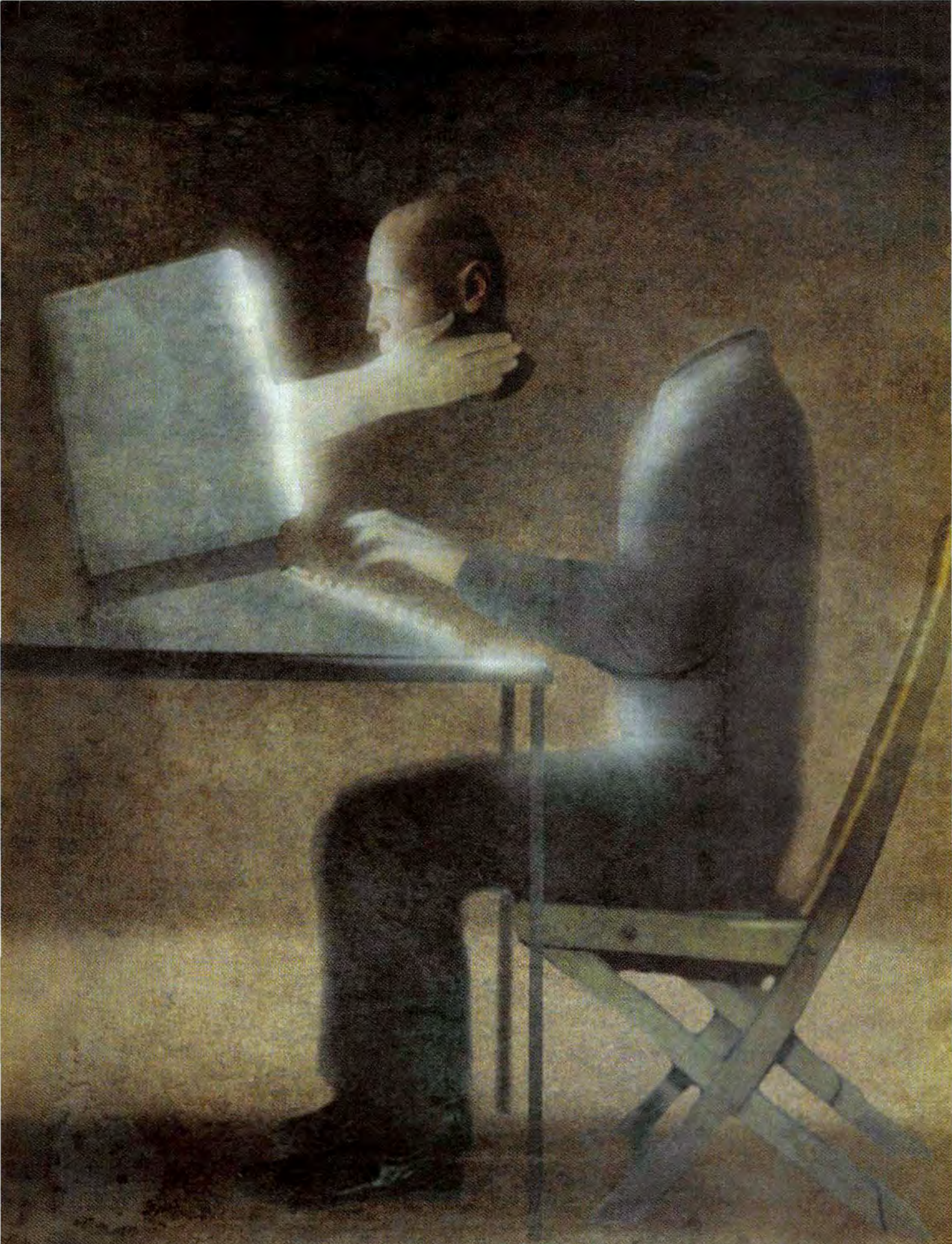
# Privacy in the Internet Age

SECTION EDITOR DANIEL TYNAN

A SPECIAL REPORT

SPECIAL REPORT ILLUSTRATION BY WILLIAM DUKE





ILLUSTRATIONS BY MATT MAHURIN





# You Are For Sale

Medical **histories**, bank balances, even  
unlisted **phone** numbers—the  
**details** of your life are **brokered**  
**online** every day.

BY JEFFREY ROTHEFEDER

**A WASHINGTON, D.C., MAN** who is desperately trying to quit smoking receives a letter from a marketing firm: "Our records indicate that you have tried to stop smoking using a prescription nicotine replacement product. We hope you have succeeded, but if you, like many others who have tried to quit, are still smoking, we have good news for you." The rest of the letter touts a new cessation drug called Zyban.

Meanwhile, a week before her birthday, a Pennsylvania woman gets a card in the mail from RadioShack, wishing her happy returns and offering \$10 off her next purchase at one of the company's retail stores. She has never

bought anything from the store and never told RadioShack when she was born. No matter. RadioShack bought the information from the state's motor vehicles department.

Technology has changed the rules of privacy. We go through life inadvertently dropping crumbs of data about ourselves. Following right behind us are powerful vacuum cleaners—computers accessed by marketers, snoops, and even criminals—sucking up the crumbs, labeling them, and storing them for future reference.

"Privacy is like clean air," says Kevin Murray, who runs Murray Associates, a New Jersey-based firm that sweeps clients' offices for bugs and other surveillance equipment. "At one time there was plenty of it. Now it's almost gone." ►



## A LONG TIME COMING

Long before the Internet and home PCs became staples of everyday life, credit bureaus and junk mailers collected information about consumers from the purchases they made and the warranty cards they mailed. But gathering this data was slow and expensive. Most of it had to be input by hand, making the task of cross-referencing other infor-

mation sources virtually impossible.

All that has changed. Personal computers, sophisticated database software, and electronic information networks have transformed the slothful business of poring over mainframe records into a high-tech industry that compiles, cross-references, and exchanges private data instantaneously.

At the same time, the amount of avail-

able information about us has increased astronomically. When we buy books and groceries, rent movies, or pay bills with credit and debit cards, we give away information about ourselves. Each time we visit a Web site, we unwittingly leave traces of who we are. As a result, data gathering (or data mining) has become a booming business, with scores of firms pooling what they know about us.

Wells Fargo Bank, for example, has teamed

# What's Your Privacy Quotient?

**W**ith all the hoopla over Big Brother and cyberspies, the reality is that most people voluntarily disclose personal information every day—without going near their PCs. “Not me,” you say? Take a look at the table below and give yourself a point for each activity you’ve done. At the end, tally up your

points and check your score. If you scored fewer than 4 points, you’re practically invisible; 5 to 9 points, you’re doing a pretty good job of remaining private; 10 to 13 points, your letter carrier probably has a backache; 14 to 15 points, you might as well put your picture up in the neighborhood post office.

—Don Ray

IF YOU'VE...	YOU GAVE UP THIS INFORMATION	AND HERE IS WHERE ALL THAT INFORMATION ENDS UP
Registered to vote	Your name, address, birth date, birth place, occupation, political affiliation, and signature.	Voter registration records are open to public inspection in most states and are part of nationwide, commercial databases.
Bought a house	Spouse's name, address, purchase price, down payment, loan amount, and property description.	Property tax information, deeds, and trust deeds are open for public inspection, available at title companies, and stored on public and commercial databases.
Had a baby	Baby's name and date of birth; parents' names, addresses, and jobs; plus some medical info.	The birth certificate is everyone's first public record. Some states seal the records, but most don't. That's why new parents get so much junk mail for baby products.
Owned substantial stock in a company	Your name, the number of shares you own, and your address if you're a corporate officer.	The Securities and Exchange Commission makes public the names of anyone owning 15 percent or more of the shares of stock in any publicly held firm.
Given more than \$50 to a campaign	Your name, title, address, employer, and amount of contribution.	Campaign disclosure laws make contributions a matter of public record at the city, county, state, and federal levels. Most of the records are available online.
Had your dog vaccinated for rabies	Your name and address; animal's name, age, and breed; sometimes your phone number.	Many states require veterinarians to report information to the animal regulation department or ASPCA, which regularly sells the information to commercial firms.
Taken out a permit for a yard sale	Your name, address, sometimes phone number, date of sale, and signature.	Records of all such permits are usually available for public inspection.
Paid a fine for an overdue library book	Your name, address, sometimes phone number, book titles, due date, return date, and fine paid.	Librarians everywhere have fought to keep their patrons' information private, but when someone is fined for violating a law, the records are almost always public.
Received a parking ticket for your car	Your name, address, vehicle make, license number, date of violation, place of violation, and fine.	Copies of citations are usually available at the police department or local court. Sometimes the courts notify the motor vehicles department of unpaid fines.
Participated in a phone survey	Aside from your opinions, your name, address, phone number, age, income level, and more.	Depending on the group conducting the survey, the data could be sold to advertisers, mail-order companies, commercial businesses, or government agencies.
Mailed in a warranty card	Your name, address, phone number, age range, income range, and interests.	Warranty cards are nothing more than marketing surveys. Companies may hold the information or they may sell it to other companies.
Entered a contest or sweepstakes	Your name, address, maybe your phone number, and possibly more marketing information.	The prize they're offering is small change compared to what they're going to make selling your name and address. You're now on a "sucker list."
Used your ATM card for any purchase	Your name, bank, account number, and balance; plus what you've bought and where.	No one knows how far grocery stores, restaurants, and other retailers will go with your information. Knowing who you are and what you buy is valuable to marketers.
Rented a movie	Your name, address, phone number, credit-card number, and movie preferences.	Though they can't disclose exactly what movies you've rented, video stores can share your contact information and your general interests with outside marketers.
Subscribed to a magazine	Your name, address, telephone number, and at least one interest—the topic of the magazine.	Magazines sell their mailing lists to generate revenue. (Note: <i>PC World</i> sells subscriber lists to third parties; to remove your name from such lists, see page 14.)





up with a grocery chain in California (the bank declines to say which one) to cross-reference people's shopping patterns with their financial records—a process called *cluster analysis*. This helps the bank predict which of its services a person may be interested in, based on shopping habits.

"The aim [of the project] is to be able to promote, for instance, a self-directed IRA to everyone who makes over \$50,000 and buys Arabica bean coffee every week," says a Wells Fargo Bank marketing vice president, who requested anonymity.

The top data aggregators—companies like Metromail, First Data Solutions, and Acxiom—each maintain information on more than 90 million households and 140 million people. Their databases store such tidbits as when we were born, how often we travel, what we buy, which prescription drugs we use, and whom we call.

"In a perfect world, companies would have to get people's consent before they shared information about them," says Evan Hendricks, editor of the Washington, D.C.-based newsletter *Privacy Times*. "But this isn't a perfect world."

The most obvious results of data mining are extra junk mail and unrelenting telemarketers who call at dinnertime. But this free flow of information can also have sinister consequences. The things you tell your doctor could keep you from getting a job. Your reputation can be made or lost depending on what your electronic profile—accurate or not—says about you. And an unlucky few may have their identities stolen by computer-age criminals who obtain victims' credit files and make purchases in their names, leaving them in financial ruin.

## MONEY TALKS

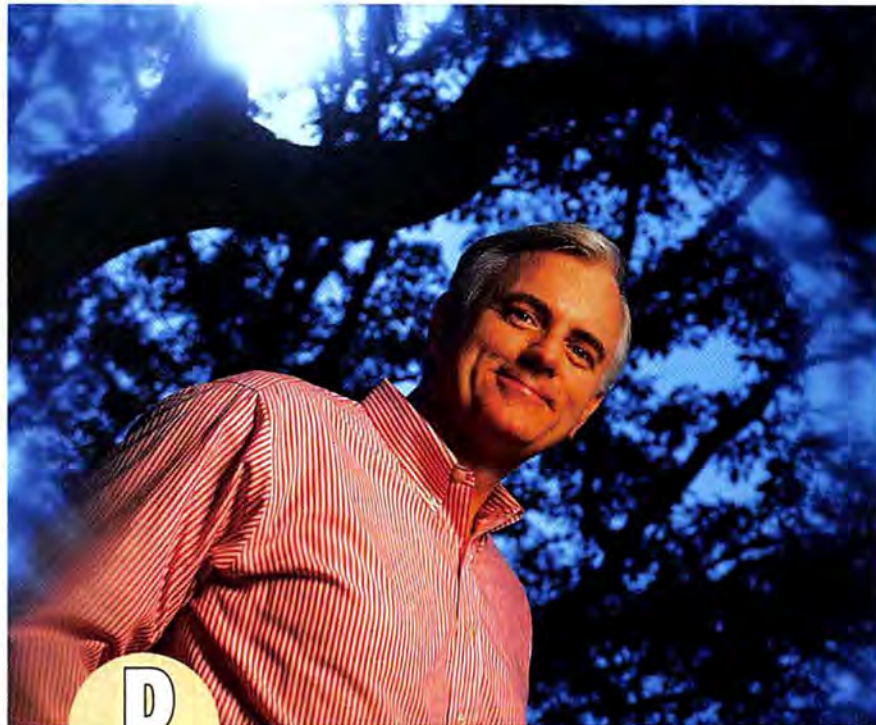
Among the biggest information databases are those maintained by the three major credit bureaus—Experian (formerly TRW), Equifax, and Trans Union. They contain a wealth of information about people's income, jobs, bank accounts, purchasing behavior, and

credit limits. An aggressive company such as Experian can combine this data with public information that it draws from motor vehicle and property records. It can then put together sophisticated lists with the names of individuals who, for instance, live in the Dallas area, make more than \$100,000 per year, drive foreign cars, and have no more than two children.

But the greatest danger is what can happen when credit data falls into the wrong hands.

including your shoe size," says David Szwak, an attorney based in Shreveport, Louisiana, who specializes in credit-card fraud and computer security. "But if you know enough about someone, such as his social security number, electronically you can get a \$5000- or \$10,000-limit credit card in his name with no personal contact."

That's what happened to Ken Robinson, a client of Szwak's near Dallas. Someone stole Robinson's identity and



**P**rivacy is like clean air. At one time there was plenty of it. Now it's almost gone.

—KEVIN MURRAY, security expert

Credit reports are one of only three types of files protected by federal law (the other two are video store records and cable television accounts). Only you and any third parties you've authorized (such as your landlord) can access your report. But with so many resellers marketing credit files online, a data criminal can easily obtain unauthorized files, open new credit-card accounts, get loans in your name, or attempt to blackmail you.

"If you walked into a bank and wanted a \$2000 loan, [the bank] would want every bit of information about you,

bought a satellite dish, a diamond ring, and a houseful of furniture in his name. Two years later, Robinson is still trying to clear his record. "It's just a never-ending nightmare," he says.

How easy is it to get a credit report? Fill in the requisite information at QSpace ([www.qspace.com](http://www.qspace.com)), and within minutes you can get a person's Experian credit file on-screen. QSpace, a company based in Oakland, California, claims that by using VeriSign's encryption technology it can ensure that only authorized persons may view an individual's credit report.

But accidents do happen. Last year, Experian began offering credit



# Nowhere to Hide

## An Investigative Reporter Digs Through Cyberspace to Get the Goods on People Like You

How many people know your name and approximately where you live? Lots, including hundreds you've never met. Each of those people has the keys to your private life. Just imagine them by the glow of a computer screen, harvesting bits of your personal profile as though they were apples on a tree. It can happen.

To find out just how much personal data could be gleaned online, *PC World* hired me to dig into the personal lives of four individuals. The results of my two-week investigation were extensive (see table), but they only scratched the surface of what is actually available.

### HITTING THE JACKPOT

I had only one ground rule in conducting my investigation: I could break no laws. Armed with a computer, a modem, and several free and fee-based services, I began searching for information on two high-profile, yet relatively private individuals—Microsoft cofounder Paul Allen and reclusive author Thomas Pynchon. Then I turned my attention to two “average” volunteers, whom I’ll call Betty and Bob. Both are in their 40s, live and work in the Los Angeles area, and both, as my digging revealed, are divorced.

As you might expect, even the most private celebrities can’t keep their personal lives out of cyberspace. My queries about Allen and Pynchon turned up hundreds of pages of facts. Once I had a date of birth or an address, I searched a database that provided header information from credit reports. Suddenly I had detailed profiles that included social security numbers, current and prior addresses, and more.

Getting the goods on Betty and Bob was harder, but eventually I had a good picture of them, too. Motor vehicle data came in handy. Bob owns two cars and a motorcycle, a fact that certain marketers might like to know. In Betty’s case, motor vehicle records even led me to her America Online screen name—it was the same as

the nickname on her vanity plates. And though it’s not necessarily the most useful information, I uncovered the names of each subject’s victims, enemies, and former friends: ex-spouses, ex-significant others, plaintiffs in lawsuits, and others who might want to rat on the person.

Who cares if people can discover your address, date of birth, vehicle preferences, or AOL screen name? You should care. Remember, my investigation was conducted through legitimate means. With the data I’ve gathered on Betty and Bob, I could wreak havoc using their identities if I wanted to skirt the law. I could obtain copies of their birth certificates, then use these to apply for driver’s licenses. I could get full credit reports, apply for credit in their names, and run up their

bills. Heck, I could even send change-of-address notices to their banks and creditors, redirect their mail, and take off with months’ worth of checks, credit cards, and other personal information.

### PROTECT YOURSELF

Though this kind of identity theft is unlikely to happen to you, it will happen to someone. You can trim your odds dramatically by being careful about the personal information you volunteer and the places where you volunteer it.

Consider the cautionary tale of two hikers. When they spot a grizzly bear barreling their way, one of them sits down on a log, removes his hiking boots, and dons his jogging shoes. “You’re crazy if you think you can outrun a grizzly bear,” his buddy tells him.

“I don’t have to outrun the bear,” the first guy says, “I just have to outrun you!” The moral of the story: Don’t be an easier target than the next person. —D. R.

## HERE’S THE DIRT

I found a lot of information about my four subjects in a short amount of time, but some key data, though not impossible to find, proved elusive. A few tidbits were free, but most cost me money (indicated in the table by a dollar sign). The fact that many data services charge fees

(from \$5 to \$50 per search) should deter amateur hackers from invading your privacy, but it doesn’t mean they can’t.

Type of Information	Paul Allen	Thomas Pynchon	“Betty”	“Bob”
Social security number	\$	\$	\$	\$
Date of birth	—	free	\$	\$
Home address	\$	\$	\$	free
Prior addresses	\$	\$	\$	\$
Home phone number	—	—	—	free
Business or occupation	free	free	—	—
Parents, siblings	—	\$	\$	\$
Children	—	free	free	—
Victims, enemies, former friends	\$	free	\$	\$
Possible aliases, nicknames	—	free	\$	—
Lawsuits	\$	—	\$	\$







reports via e-mail from its Web site. The company discontinued the program after just one day when a glitch in the system sent credit reports to the wrong e-mail addresses. At the time, Experian said it would restart its online credit report program as soon as it had worked out the security bugs; that day hasn't come yet.

Back then, the Experian incident scared away Equifax and Trans Union from providing online reports. But recently, Equifax launched an initiative with IBM to use an electronic certificate system to make sure that online credit reports go only to authorized recipients.

QSpace won't discuss its security procedures. "Due to the competitive nature of the Internet, spelling out details of our security policy would not be in our best interest," says Arash Saffarnia, QSpace's chief technology officer.

## UNHEALTHY DISCLOSURE

As sensitive as credit reports are, medical records are even more so. But here, too, your privacy is at risk. The biggest repository of medical files in the United States and Canada is the Medical Information Bureau. This consortium of insurance companies maintains millions of records culled from insurance applications as well as from doctors' and hospitals' files. When someone applies for a policy, insurers scan MIB's computers for information about any preexisting conditions that might affect their decision to issue the policy or how much to charge.

MIB tries to be careful about who sees its files. But because every insurer in the United States and Canada has access to these records, information sometimes ends up in the wrong hands. Paul Billings, chief medical officer for a Texas health care network, wrote about such a case. He tells of a woman who was turned down for a job because her MIB file indicated that she had a predisposition for a muscular disease, even though she had no symptoms of the condition. Her prospective employer had obtained her records through the firm's insurance company.

Lately, marketers have gotten into the act, increasingly using medical records to target consumers. For example, Elen-sys, a company in Woburn, Massachu-

## When someone applies for an insurance policy, insurers can scan medical files for information about preexisting conditions.

setts, manages electronic records for thousands of pharmacies and uses their customer files for marketing purposes. Developing mailing lists on the basis of prescription information, Elensys sends personalized letters—on pharmacy letterhead and sometimes paid for by drug manufacturers—reminding customers to keep taking their medicine or pitching new products to treat an ailment.

Elensys spokesperson Kathryn St. John defends the company's practice as a service to patients. She adds, "It's important to note that we don't sell the names in the database to other compa-

nies so they can market products."

But some critics aren't appeased. "It's a gross invasion," complains George Lundberg, a physician and the editor in chief of the *Journal of the American Medical Association*.

"Do you want the great computer in the sky to have a computer list of every drug you take, from which can be deduced your likely diseases—and all without your permission?"

## SHADOWY SITES

In the shadow of big credit bureaus and medical consortiums are dozens of smaller online firms that sell all types of personal data. Some of these sites, like [www.whowhere.com](http://www.whowhere.com) and [www.switchboard.com](http://www.switchboard.com), are relatively innocuous repositories of names, addresses, and phone numbers. The more disturbing sites deal in more invasive forms of personal information.

Companies like 1-800U.S.Search, ►





American DataLink, A1-Trace USA, Discreet Data Systems, and Dig Dirt trumpet their wares on Web sites. Enter a social security number at 1-800U.S.Search, and within an hour you can get someone's current and past addresses for up

to ten years, as well as telephone numbers, date of birth, and aliases. And if you want a background report on "nannies, employees, associates, doctors, neighbors, or friends," the company will provide, among other things, driver's license information, vehicle ownership, and bankruptcies. Go to A1-Trace's site and you can dig deeper. For \$179, find out what's in someone's safe deposit box; for \$289, access bank records; and for \$789, learn how much a person has saved in overseas accounts.

These data resellers are usually run by private investigators, former cops, or ex-corporate security chiefs. Legitimate companies are circumspect about what they provide customers. They don't give out credit reports without authorization, for instance, and they may withhold social security numbers if they question a buyer's motives.

And what they sell isn't illegal. No federal law will safeguard your medical files, bank accounts, phone logs, or phone numbers, so such data can be sold without fear of prosecution. In fact, most federal and state agencies sell motor vehicle records, voter registration files, and other data to information resellers.

### DANGEROUS CHARACTERS

There is, however, an underground network of resellers who freely traffic sensitive data, no matter how personal or illegally obtained. These firms collect

information from dozens of legal as well as illicit institutional sources (including the major credit bureaus), in addition to informants at banks, insurance companies, and other firms.

Six years ago, the federal government cracked down on such criminal activity. But the perpetrators—Super Bureau, Tracers Worldwide, and six other companies—got off with the equivalent of a slap on the wrist: in most cases, a one-year suspension and a warning. According to some legitimate information resellers, who requested that their names be withheld, most of those com-

Internet has the authorities stymied. "So many data companies come and go, change their names, close their sites, and open new ones on the Internet," says one FBI agent who heads up a computer crime unit. "Only if they do something egregious and obviously illegal, like selling tax returns, can we hope to stop them."

### NET SURFERS ANONYMOUS?

But as the Internet grows, the worst threat to privacy may ultimately be consumers' own lack of discretion. Each day hundreds of people post messages to Usenet newsgroups, offering personal information as if they were talking to a friend in their living room. In reality, each piece of electronic correspondence can be seen by millions of Internet users for many years to come.

"Usenet droppings," as electronic-information resellers like to call them, are among the most fertile sources of personal information for digital sleuths. Karen Coyle, western regional director of Computer Professionals for Social Responsibility in Palo Alto, California, recalls an incident in which a woman complained in a health care

newsgroup about her medical plan and physician. Soon thereafter, she received an e-mail from a representative of her health maintenance

organization, asking her if she would like to discuss why she was unhappy with her plan. It seems that her HMO scans newsgroups for all mentions of itself, and then follows up by responding to comments.

None of this sits well with Americans, who are becoming increasingly frightened about their lack of online pri-



**If you know enough about someone...you can get a \$5000- or \$10,000-limit credit card in his name with no personal contact.**

—DAVID SZWAK, attorney

panies are currently back in business on the Internet.

"Being able to peddle their wares on the Internet lets them sell information quickly, hidden behind an electronic screen, and move on to the next job before any curious authorities look too closely," says an insider.

All of this secretive activity on the



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vacancy. A *Business Week*/Harris poll conducted late last year found that 53 percent of the respondents believe that laws should be passed to specify how personal information can be collected and used on the Internet.

So what's being done to combat this invasion of privacy? Because of the relative novelty of Web-based data collection, the Internet has been the target of most initiatives. In June, the Federal Trade Commission issued a report claiming that Web sites are not doing enough to protect surfers' privacy.

Soon after the FTC's report came out, the Commerce Department proposed guidelines for safeguarding people's private information online. Among the Commerce Department's recommendations: Web sites should disclose when they are collecting information about users and outline what they will do with the data; visitors should also be given the option to determine how the information may be used; medical records should not be shared without a patient's consent; and companies should be held accountable when privacy policies are violated.

For its part, the Clinton administration has done little to advance privacy measures, relying on the industry to police itself and resisting encryption standards for protecting electronic information. In May, the administration launched an FTC-sponsored Web site ([www.consumer.gov](http://www.consumer.gov)) where people can learn how to preserve their privacy, prohibit companies from using their credit records for direct marketing, and remove their names from direct-mailing and telemarketing lists.

In addition, an organization called the World Wide Web Consortium proposed a system called Platform for Privacy Preferences. The system is designed to help Web sites disclose their privacy policies and allow consumers to decide what kinds of personal data they would be willing to divulge in return for goods and services.

One of the groups working with the consortium is Truste, which helps com-

panies develop privacy guidelines. These policies are then posted on the companies' Web sites along with the Truste logo as a seal of approval. So far, about 100 firms, including American Eagle Outfitters, Excite, Lands' End, and State Farm Insurance, have signed up for the Truste logo program.

Despite these efforts, nothing will keep snoops and data miners from making money off your personal information in the foreseeable future. There-

**Web sites should disclose when they are collecting information about users and specify how the data will be used.**

fore, the burden is squarely on you. Whether you're online or offline, learn how your personal information can fall into the wrong hands and what you can do about it. Check out our story "Going

Private" on page 114 in this issue for tips on protecting yourself as well as on taking back some of the privacy you've lost. Maybe you won't mind getting a birthday card from RadioShack. But don't wait until RadioShack sends you a mysterious bill for \$500 before you decide to take action.



For sources of statistics found in "Privacy by the Numbers," visit [www.pcworld.com/sep98/privacy](http://www.pcworld.com/sep98/privacy). Jeffrey Rothfeder is a freelance writer and the author of *Privacy for Sale* (Simon & Schuster, 1992). Don Ray is a Los Angeles-based investigative reporter and the author of *Checking Out Lawyers* (MIE Publishing, 1997). Freelance writer Regina Lynn Preciado and Barbara Quint, editor of *Searcher: The Magazine for Database Professionals*, contributed research to this story. ■

## Privacy by the Numbers

Chance that a U.S. citizen believes his or her privacy has been violated: **1 in 4**

Minimum cost of obtaining an e-mail address for marketing purposes: **1 cent**

Number of pieces of junk e-mail delivered each day on America Online: **9 million**

Number of pieces of junk mail delivered each day by the U.S. Postal Service: **600 million**

Estimated weight of U.S. junk mail delivered each year, in tons: **4 million**

Percentage of commercial Web sites that collect personal information: **92**

Percentage of commercial sites that have a comprehensive privacy policy: **2**

Percentage of people who lie when asked to provide personal information over the Web: **40**

Estimated corporate losses from computer crime in 1997: **\$136 million**

Annual losses from credit-card fraud: **\$700 million**

Chance that your credit report contains a serious factual error: **3 in 10**

Number of state and federal wiretaps issued in 1997: **1186**

Number of phone conversations employers eavesdrop on each year: **400 million**

Increase in the number of U.S. workers under electronic surveillance since 1991: **275 percent**

Number of insurance companies that access the Medical Information Bureau database: **750**

Number of federal laws that protect the privacy of medical records: **0**

Federal laws that protect the privacy of video rentals: **1**

Number of privacy bills introduced in state legislatures in 1997: **over 8500**

Number of times the word *privacy* appears in the U.S. Constitution: **0**

FOR SOURCES, SEE [WWW.PCWORLD.COM/SEP98/PRIVACY](http://WWW.PCWORLD.COM/SEP98/PRIVACY)



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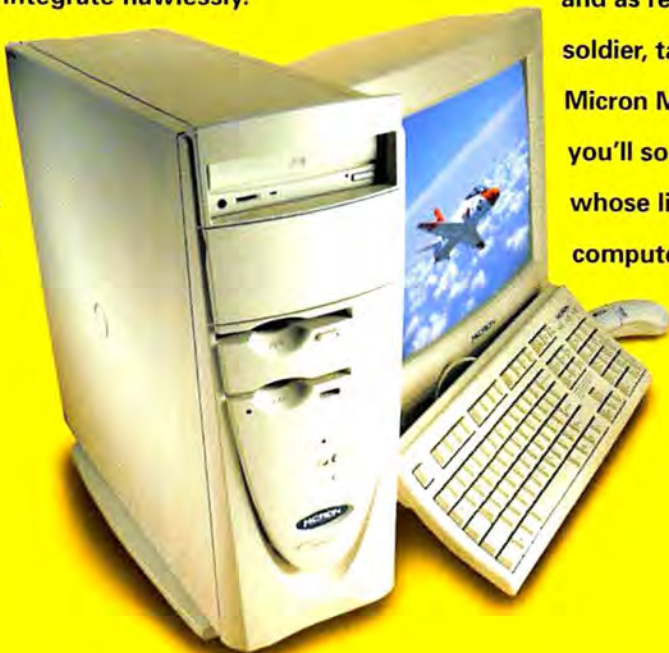
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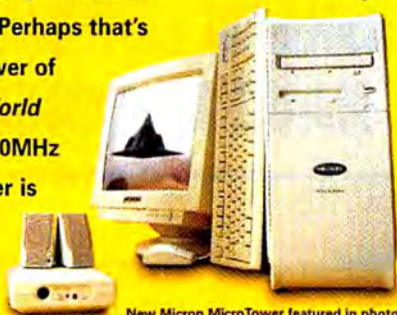
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# INSPIRED DESIGN REQUIRES BOTH VISIONARY THINKING AND FLAWLESS EXECUTION. (TWO THINGS DOREEN LORENZO AND HER GOBOOK HAVE IN COMMON)



As president of frog New Media, Doreen Lorenzo is pioneering integrated strategic design and communications.

Covering the spectrum from strategic planning and brand communications to product development and new media, frog has emerged as one of the clear leaders in the design industry. For over three decades and through hundreds of innovative design solutions for clients like Sony, Apple, and Disney, frog has perfectly blended a brilliant staff and the high-end equipment

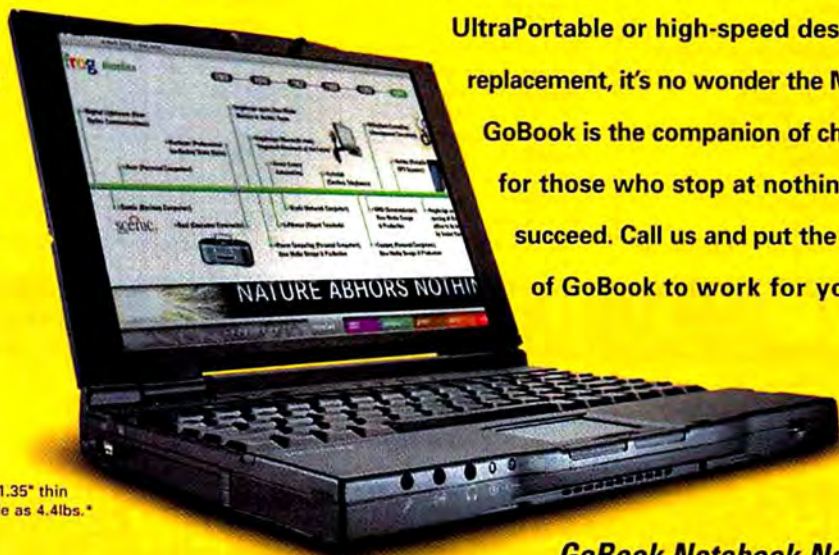
necessary to bring their ideas to life. Lorenzo and her GoBook™ are no exception. "There's just no way to take our clients global when I'm shackled to a desk,"

says Lorenzo. "And my GoBook gives me the mobility

I need, without giving up power." With an innovative modular battery design and the versatility to play the role of either lightweight

UltraPortable or high-speed desktop replacement, it's no wonder the Micron™

GoBook is the companion of choice for those who stop at nothing to succeed. Call us and put the power of GoBook to work for you.



Starts at just 1.35" thin  
weighs as little as 4.4lbs.\*

**GoBook Notebook Now Features  
Fast Intel® Pentium® II Processors.**

***"For Standing Up to the Vagaries of Travel,  
the Micron GoBook is the Best Bet Going."***

- CNET Editors' Choice, Best UltraPortable Reviewed, June '98



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# "THE GOBOOK OUTPERFORMED EVERY OTHER MACHINE IN OUR REVIEW BY A SIZABLE MARGIN."

CNET Editors' Choice, Best UltraPortable Reviewed, June '98

Remember when you first heard about portable computers? You probably imagined an unbelievably powerful, incredibly light machine that lasted all day without being plugged in. A machine that would unshackle you from the office forever. So did our engineers. The experts



and professionals who use them agree, with an innovative modular battery design, as little as 4.4\* pounds in weight, and true desktop performance, nothing compares to the Micron GoBook.

## GoBook - Now With The Power Of The Intel Pentium II Processor

GoBook™ 266	GoBook <sup>2</sup> 233	GoBook <sup>2</sup> 266
<ul style="list-style-type: none"> <li>• Intel Pentium processor with MMX™ technology 266MHz</li> <li>• 32MB EDO RAM</li> <li>• 2.1GB hard drive</li> <li>• Bay battery</li> <li>• 4.4lbs (w/floppy)*</li> <li>• 6.7lbs (w/opt./base battery &amp; floppy)</li> <li>• 512K L2 pipeline burst cache</li> <li>• 12.1" SVGA display</li> <li>• PCI bus with 128-bit graphics</li> <li>• USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports</li> <li>• S-Video Out; MPEG compatible</li> <li>• CardBus/Zoomed Video ready</li> <li>• 16-bit stereo/Wavetable sound</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• 24X modular CD-ROM drive</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• 2-way infrared port</li> <li>• Touchpad pointing device</li> <li>• Norton Anti-Virus</li> <li>• System Wizard Mobile Client™</li> <li>• Microsoft® Windows® 98</li> <li>• 5-year/1-year Micron limited warranty</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 233MHz</li> <li>• 32MB EDO RAM</li> <li>• 2.1GB hard drive</li> <li>• Bay battery</li> <li>• 4.4lbs (w/floppy)*</li> <li>• 6.7lbs (w/opt./base battery &amp; floppy)</li> <li>• 512K L2 pipeline burst cache</li> <li>• 12.1" SVGA display</li> <li>• PCI bus with 128-bit graphics</li> <li>• USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports</li> <li>• S-Video Out; MPEG compatible</li> <li>• CardBus/Zoomed Video ready</li> <li>• 16-bit stereo/Wavetable sound</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• 24X modular CD-ROM drive</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• 2-way infrared port</li> <li>• Touchpad pointing device</li> <li>• Norton Anti-Virus</li> <li>• System Wizard Mobile Client™</li> <li>• Microsoft Windows 98</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office Small Business Edition</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 266MHz</li> <li>• 32MB EDO RAM</li> <li>• 2.1GB hard drive</li> <li>• Bay battery</li> <li>• 4.4lbs (w/floppy)*</li> <li>• 6.7lbs (w/opt./base battery &amp; floppy)</li> <li>• 512K L2 pipeline burst cache</li> <li>• 12.1" SVGA display</li> <li>• PCI bus with 128-bit graphics</li> <li>• USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports</li> <li>• S-Video Out; MPEG compatible</li> <li>• CardBus/Zoomed Video ready</li> <li>• 16-bit stereo/Wavetable sound</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• 24X modular CD-ROM drive</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• 2-way infrared port</li> <li>• Touchpad pointing device</li> <li>• Norton Anti-Virus</li> <li>• System Wizard Mobile Client™</li> <li>• Microsoft Windows 98</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office Small Business Edition</li> </ul>
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# **PEDIATRICIAN, DR. AMY ALCORN HAS DEVOTED HER LIFE TO SAVING CHILDREN. (SHE LEAVES SAVING TIME AND MONEY UP TO MICRON)**



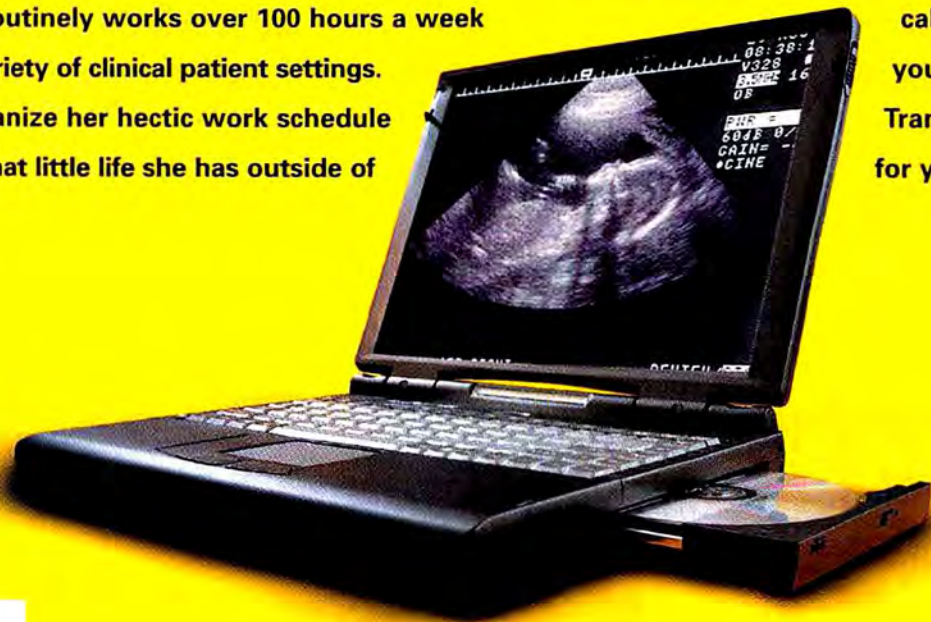
As the field of medicine continues to evolve at a rapid pace, a generation of physicians are turning to the latest technology to offer better patient care

and management. Dr. Amy Alcorn is no exception. As a pediatric resident at the Texas Medical Center, one of the largest and most prestigious medical centers in the world, Amy routinely works over 100 hours a week in a variety of clinical patient settings. To organize her hectic work schedule and what little life she has outside of

her job, Amy relies on her Micron™ TransPort Trek™. "If I need medical research, I can get it online virtually anywhere I am. So where I go, my Trek goes. It has become an indispensable part of my life." If you're in the market for a durable, reliable, and affordable desktop replacement notebook that can handle the rigors of any job you can throw at it, give us a



call and let us show you what the Micron TransPort Trek can do for you.



***"The TransPort Trek is the fastest budget notebook we've run through our mill."***

**- PC World, Ranked #1, April '98**

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# MICRON TRANSPORT TREK - RANKED #1 BUDGET NOTEBOOK BY PC WORLD

Those who use them and those who test them agree, Micron notebooks are among the best available. Practically every notebook line we've released has won the coveted *PC Magazine*



*PC World*, "Best Buy," April & May '98<sup>11</sup>

Editors' Choice award. And the TransPort Trek™ is no exception.

Call Micron today and order any one of our award-winning notebooks custom configured to meet your specific needs.

(Trek system featured in photo)

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## TransPort Trek – Now Featuring The Power Of Pentium® II

TransPort Trek™	TransPort Trek <sup>2</sup>	TransPort Trek <sup>2</sup>
<ul style="list-style-type: none"> <li>• Intel® Pentium processor with MMX™ technology 233MHz</li> <li>• 32MB EDO RAM</li> <li>• 3.2GB hard drive</li> <li>• 12.1" SVGA TFT display</li> <li>• 512KB L2 pipeline burst cache</li> <li>• PCI bus with 128-bit graphics accelerator</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• S-Video Out; MPEG compatible</li> <li>• CardBus and Zoomed Video ready</li> <li>• Wavetable/3D positional sound</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• 24X modular CD-ROM drive</li> <li>• 2-way Infrared port</li> <li>• Touchpad pointing device</li> <li>• Modular floppy drive</li> <li>• Li-Ion battery</li> <li>• Norton Anti-Virus</li> <li>• System Wizard Mobile Client™</li> <li>• Microsoft® Windows® 98</li> <li>• 5-year/1-year Micron limited warranty</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 233MHz</li> <li>• 14.1" SVGA TFT display</li> <li>• 64MB EDO DRAM</li> <li>• 3.2GB hard disk drive</li> <li>• 440BX chip set</li> <li>• 512KB L2 pipeline burst cache</li> <li>• 24X CD-ROM drive Bay</li> <li>• Hard Drive Bay</li> <li>• Floppy Drive Bay</li> <li>• Li-Ion Battery Bay</li> <li>• 4MB video memory</li> <li>• Zoomed video capable</li> <li>• CardBus ready</li> <li>• Wavetable/3D positional sound</li> <li>• S-Video Out; MPEG compatible</li> <li>• Built-in stereo speakers &amp; microphone</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• Microsoft Windows 98</li> <li>• System Wizard Mobile Client™</li> <li>• Norton Anti-Virus</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office 97 Small Business Edition</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 266MHz</li> <li>• 14.1" SVGA TFT display</li> <li>• 64MB EDO DRAM</li> <li>• 3.2GB hard disk drive</li> <li>• 440BX chip set</li> <li>• 512KB L2 pipeline burst cache</li> <li>• 24X CD-ROM drive Bay</li> <li>• Hard Drive Bay</li> <li>• Floppy Drive Bay</li> <li>• Li-Ion Battery Bay</li> <li>• 4MB video memory</li> <li>• Zoomed video capable</li> <li>• CardBus ready</li> <li>• Wavetable/3D positional sound</li> <li>• S-Video Out; MPEG compatible</li> <li>• Built-in stereo speakers &amp; microphone</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• Microsoft Windows 98</li> <li>• System Wizard Mobile Client™</li> <li>• Norton Anti-Virus</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office 97 Small Business Edition</li> </ul>
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# Going Private

How to protect yourself from hackers, snoops, and spammers.

BY CAROLE LANE

**UNLESS YOU'VE BEEN IN** a state of cryonic suspension for the past few years, you've heard that computers and the Internet pose a threat to your privacy. Reports of identity theft, vindictive employers, password thieves, and greedy spammers are commonplace. Even the U.S. government agrees that surfing can be hazardous to your privacy. It's as if people were watching your every click. Well, they are.

Everything you do on your PC and online leaves a trail. Like to surf the Web? Your favorite sites monitor the pages you visit and the kind of information you like to view, recording this lore in text files called cookies and storing it right on your own computer. Those messages

you posted to a political newsgroup, lambasting your local legislator? Archived for posterity. Employers want (and have the right) to know that employees aren't distributing company secrets, so they read your e-mail. Meanwhile, marketers make a killing collecting and selling tidbits of data about your spending habits, interests, ailments, and beliefs. And the greater the amount of personal information about you out there, the greater your exposure to threats like identity theft or credit card fraud.

Are you feeling scared yet? Take heart—you can still compute, telecommute, and surf in relative safety, if you'll just take a few commonsense steps to ensure your privacy. In this article, we offer tips and tricks to help you protect your PC, secure your e-mail transactions, surf the Web safely, and post newsgroup messages anonymously. You'll also learn how to select and protect your passwords, how to find your personal records online, and how to take back some of the data you've already lost to snoops. If you want to stop being an open book, you'll have to change the way you look at security. The snoops, hackers, and spammers won't go away, but they will have a much harder time playing you for a sucker. ►



# Five Essential Steps to Privacy

## • KEEP IT TO YOURSELF

Don't share personal information—your name, address, phone number, date of birth, social security number, mother's maiden name—until you know who you're dealing with and what they plan to do with the data. Any time you respond to an offer of free information, goods, or services and provide personal data (including the fact that you are interested in that particular topic), you give away your privacy. Your employer, bank, creditors, and the IRS occasionally

have a legitimate need for this personal information. Almost no one else does.

## • BE YOUR OWN HERO

Don't expect your employer, ISP, or software to safeguard your privacy. Locate online references to yourself, and then take steps to excise your records from any sites, companies, or lists that you're uncomfortable with. A few public records, such as titles to property or motor vehicle registration, can't be removed, but some agencies will keep your

data confidential upon request. Not all private information (like credit reports) is found online, so be sure to check offline sources as well for errors.

## • COVER YOUR BACKSIDE

Strengthen your computer's log-in security, recognizing that it's far from impervious. Remove or encrypt private files and communications, learn how to browse the Internet and send e-mail messages without leaving a trail, and sidestep spam. In gen-

## PROTECT Your PC

Before you address the issue of online privacy, consider protecting something even more fundamental: your PC. Remember, your office computer and its contents don't belong to you. Your employers can track your movements on the Net by using sophisticated URL-tracking snoopware. They can intercept and read your e-mail, back up the data on your system, remove your hard disk, or take away your computer altogether. And as soon as you leave your office for the night, nosy coworkers can start poking around, if they haven't already done so over the network. Here's what you can do to avoid ugliness and embarrassment in the office.

### PLAY BY THE HOUSE RULES

Before you place any sensitive information on your PC, consult your human resources or information systems department for details about your company's privacy policy. The company may routinely intercept or monitor employees' e-mail transactions, and may archive e-mail files and the information stored on your computer. Like it or not, such oversight may be within your employer's legal rights.

If you don't want your employer to know that you worship Satan or impersonate Elvis, don't go looking for them on the Internet while you're at work.

Likewise, if you're searching for a new job and haven't told your boss, don't visit online job banks from your office.

### BIOS PASSWORDS ARE BEST

Though it's not an entirely foolproof method, the best way to prevent people from using your PC when you aren't around is to change the system password in the BIOS setup program. Because this tactic halts the computer's boot-up process before it loads the operating system, it works every time. You should be aware, however, that some hardware manufacturers provide "back-

door" passwords that enable your employer to bypass your security measures; moreover, a knowledgeable system cracker can defeat any BIOS password by opening the computer case and disconnecting the battery that powers the BIOS settings chip.

### DON'T RELY ON YOUR WINDOWS PASSWORDS

Each time you leave your desk, your PC is vulnerable to any snoop who comes along. Windows lets you create a log-in password by choosing *Start•Settings•Control Panel*, double-clicking the *Pass-*

## System Policy Editor

### A Free Windows Lock and Key

**Y**ou can't control which people can log on to your Windows 95 or Windows 98 system. But with Microsoft's free System Policy Editor utility, you can prevent unexpected visitors from viewing your files or running applications. Though it's likely to be useless against world-class hackers, Policy Editor is effective enough to bamboozle your average office snoop. But be careful: You must follow the steps here faithfully, or the security will be so effective that even you won't be able to break in.

### INSTALL POLICY EDITOR

Download the self-extracting file *W95poli-cy.exe* from [www.microsoft.com/windows/downloads/](http://www.microsoft.com/windows/downloads/) to a temporary directory, and run it. You'll also find the file both in the Windows 95 CD-ROM's *\admin\apptools\poledit*

folder and in the Windows 98 CD-ROM's *\reskit\netadmin\poledit* folder. Choose *Start•Settings•Control Panel*, double-click the *Add/Remove Programs* icon, click the *Windows Setup* tab, and click *Have Disk*. Browse to the installation file (*poledit.inf* or *grouppol.inf*, depending on which version you have). Click *OK*. Check the *System Policy Editor* box, click *Install*, and then click *OK*.

### LOG IN AS A NEW USER

Restart your computer, and press <Esc> at the log-in dialog box to log in as the default user. Launch Policy Editor (*Start•Programs•Accessories•System Tools•System Policy Editor*).

### ADJUST THE SETTINGS

Click *File•Open Registry*. Double-click *Local User (1)*, select *System•Restrictions*, and





eral, the idea is to lower your online profile to keep from being an easy target.

## DO IT AT HOME

Don't conduct personal communications on your computer at work, unless you're okay with the boss reading along.

## MUM'S THE WORD

Your passwords are the keys that unlock your identity; select and guard them well.

-C.L.

words icon, and then selecting *Change Windows Password*. Unfortunately, anyone can log in automatically as the default user by hitting the Cancel button at the log-in dialog box. And anyone can create a new log-in account and password. Aside from using a BIOS password, you have two security options: Third-party tools like those reviewed in "The Defenders" (page 152) put teeth in Windows' log-in security; and Microsoft's System Policy Editor (see below) lets you prevent others from opening files or folders, running applications, or doing anything else on your computer.

Even without added security measures, Windows 9x user accounts carry a modicum of security. If you check *Save Password* when you use a dial-up networking connection or log in to a server, only people who know your Windows log-in name and password can connect automatically using the stored password. However, someone who really wants to be you online—and who has access to your computer—can locate and decrypt the password file using software available for free on the Internet.

## SCREEN SAVER'S NO SAVIOR

Here's another bit of false security. You can password-protect Windows' screen saver, so Fred in the next cube can't peek at your sensitive memo to HR. But Fred can bypass this barrier by rebooting your computer and logging in as the default user (unless you've blocked access with a third-party security tool, System Policy Editor, or a BIOS password).

## SWITCH TO WINDOWS NT

No matter how many security tools you apply to Windows 95 or 98, a skilled, moderately determined snoop can access your files in minutes. Windows NT has better log-in security right out of the box. But NT costs more than Windows

95, is harder to configure, and may not work with all the software and hardware you use. For maximum NT security, you'll need to convert your hard disk to the NTFS file system and swear off booting to any other operating system. A plus: Because Windows NT has real log-in security, screen-saver passwords are real, too.

## WIPE OUT ALL FILE TRACES

If you want to eradicate something that's currently stored in a file on your computer, deleting the file isn't enough. The files that you thought were gone may still be sitting in Windows' Recycle Bin. And deleting files doesn't remove them from the drive—they're still there, and readable with special tools, until another file overwrites the space the "deleted" file still occupies.

To prevent files from languishing in the Recycle Bin (where your firm's backup software may find them), right-click *Recycle Bin* in Windows Explorer, and then select *Do not move deleted items to Recycle Bin*. To utterly erase the contents of deleted files, try using a deletion utility such as Stratfor Systems' *Shredder*. To block others from viewing files on your hard disk, consider a file-encryption utility like *SecureWin* (see "The Defenders," page 152). • *Shredder*; \$99 list; Stratfor Systems; 888/707-4733; [www.shredder.com](http://www.shredder.com) INFONET NO. 612

## TRAVEL INCOGNITO

Few valuables are more attractive to a thief than a laptop traveling around a luggage carousel in a plain black computer case. If you must check your laptop at the airport, place it in a distinctive case that doesn't look like it's built for a computer or camera equipment. Even if you carry your laptop, camouflage it in an ordinary-looking shoulder bag or briefcase. It's still important to protect your portable from spills, shock, and breakage, though, so be sure to provide adequate padding.

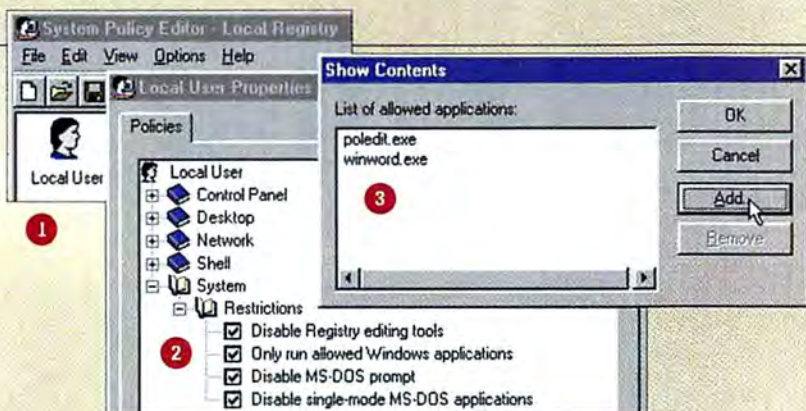
## PUT A TRACER ON IT

If the unthinkable does happen and your portable gets stolen, that's not the end of the story. For example, if someone attempts to use a computer pro-

wise, you won't be able to introduce any changes to the settings in the future.

## GET RID OF IT

Copy the *poledit.exe* file onto a floppy, and delete it from your hard drive when you're done. Doing so will make it harder for anyone to reverse your changes. —Angela Navarrete



check all the boxes under the Restrictions subhead (2). To allow other users to run some applications, select *Only run allowed Windows applications*. Then click *Show\*Add*, type the program's executable file name in the Add Item dialog box, and click *OK*. Make sure that you include the file *poledit.exe* in the list of allowed applications (3); other-



tected by Computer Sentry Software's \$80 CyberAngel, the utility asks for a password. If the thief does not respond correctly, CyberAngel makes the system seem disabled; then it checks to see whether the computer is connected to a

modem and telephone line, and secretly dials Computer Sentry, which traces the call. Absolute Software's CompuTrace operates in much the same way.

• **CompuTrace**; \$90 for one year; Absolute Software; 800/220-0733; [www.absolute.com](http://www.absolute.com) INFONET NO. 613 • **CyberAngel**; \$80 list; Computer Sentry Software; 800/501-4344; [www.sentryinc.com](http://www.sentryinc.com)

INFONET NO. 614

## Safer SURFING

Unless you take preventive measures, every Web site you visit has the ability to collect little pieces of data about you and store them in cookie files on your computer. Though most such cookies are innocuous, you need to know how and when to control them. Web sites collect—and sometimes share or sell—other types of information about you, too. Here's how you can minimize your wake when surfing.

### ENTER, BUT DON'T SIGN IN

Many Web sites require that you register before accessing their content. But if you sign a guest book or simply enter your e-mail address at a site devoted to, say, arthritis, you're adding yourself to a database of others who are interested in arthritis. The database can then be sold to marketers (of, say, arthritis medication). If you don't want your personal information shared, don't sign guest books or otherwise volunteer information about yourself. The Web page owners will still be able to gather some information about you (such as your IP address), but it will be hard for them to tie that information to your name, address, telephone number, and so on.

Not every Web site wants to sell your demographic data to the nearest school of marketing sharks, of course. But it's

up to you to find out what a site's policy is and to register only with sites that will keep your information confidential.

### WEAR A DISGUISE

Suppose you don't knowingly divulge anything about yourself at a Web site. Are you surfing anonymously? Not necessarily. When you access the Internet from work, you probably go through a *proxy server*, which serves as a firewall between your computer and the Internet and helps disguise your identity. But if you access the Net via a dial-up connection, Web site operators can track when and what you browsed, the host name and IP address of your computer, your browser version and computer type, and the URL of the last page you visited.

If that is more information than you would like to share with the hundreds of Web sites you visit, use Anonymizer ([www.anonymizer.com](http://www.anonymizer.com)), which works as an identity-masking proxy server. Anonymizer's free service can be slow (or very slow, depending on Internet traffic) at delivering Web pages; its fee-based service is snappier and costs only \$15 for three months.

### ERASE YOUR HISTORY

Web browsers do a great job of helping you return to frequently visited sites by keeping a running list of where you've been. Unfortunately, anyone who has access to your system—your boss, your family, the janitor—can scrutinize which Web sites you've been favor- ►







Do I want the best technology  
money can buy, or the  
best technology for the money?

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How did Compaq computers become the best selling in the world? By making the best technology easy to get. Take, for example, the Armada 1700. The first affordable, all-in-one notebook with the Mobile Intel® Pentium® II Processor. All the power you want, for less than you'd expect to pay. You can order by calling us directly or visiting our web-site. And don't forget to ask about our leasing options. Purchase technology the way that's best for you. Your way. What else would you expect from a leader like Compaq?



## Armada 1700

The fully integrated notebook from Compaq that combines the latest key technology with uncompromising value.

**\$2,869<sup>1</sup>**

- Mobile Intel Pentium II Processor @ 233 MHz; 512 KB L2 Cache
- 4.0 GB SMART Hard Drive<sup>2</sup>
- 32 MB SDRAM (expandable to 160 MB)
- 12.1" TFT SVGA display
- 24X Max CD-ROM<sup>3</sup>; K56flex modem<sup>4</sup>
- Integrated AC Adapter
- New Multibay design allows for easy swapping of options including a second hard drive, second battery, SuperDisk LS-120, or Zip Drive
- 3-spindle design allows simultaneous access to multiple storage devices
- Optimized for use in a networked environment
- Intelligent Manageability features offer lower total cost of ownership
- Certified for multiple operating systems, including Windows NT<sup>®</sup> 4.0
- 1-year limited warranty<sup>5</sup>

### Options for Armada 1700 Notebook

- Compaq Value Carrying Case: \$49<sup>1</sup>
- Additional Li-Ion battery: \$189<sup>1</sup>



## Compaq Armada Notebooks

### Armada 1505

The fully integrated notebook with everything you need in one convenient package.

**\$1,599<sup>1</sup>**

- Intel Pentium Processor with MMX<sup>™</sup> Technology @ 200 MHz; 512 KB L2 Cache
- 2.1 GB Hard Drive<sup>2</sup>
- 32 MB RAM (expandable to 96 MB)
- 12.1" CSTN SVGA display
- 20X Max CD-ROM<sup>3</sup>; K56flex modem<sup>4</sup>
- Integrated AC Adapter
- NiMH battery
- Dual-bay design supports second battery
- 1-year limited warranty<sup>5</sup>

### Armada 7800

The ultimate high-performance notebook delivering unprecedented desktop functionality and mobile convenience.

**\$5,549<sup>1</sup>**

- Mobile Intel Pentium II Processor @ 266 MHz; 512 KB L2 Cache
- 8.0 GB SMART Hard Drive<sup>2</sup>
- 64 MB SDRAM (expandable to 256 MB)<sup>3</sup>
- 14.1" TFT (1024 x 768) display
- 24X Max CD-ROM<sup>3</sup>; 33.6 Kbps Telephony modem
- Integrated AC Adapter
- Powerful AGP graphics allow for superior graphics while on the road or in the office
- Multibay design allows for easy swapping of options including a second hard drive, second battery, SuperDisk LS-120, or future DVD drive
- 3-year limited warranty<sup>5</sup>

### Options for Armada 7800 Notebooks

- ArmadaStation Expansion Base for full desktop functionality: \$779<sup>1</sup>
- ArmadaStation Tower Stand: \$99<sup>1</sup>
- Compaq Briefcase: \$99<sup>1</sup>

### Common features of Armada Series

- Optimized for use in a networked environment
- Intelligent Manageability features offer lower total cost of ownership
- Certified for multiple operating systems, including Windows NT 4.0



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### Compaq Deskpro EP Series

#### Small Business Deskpro Solutions

These Compaq product bundles have been designed specifically for growing businesses. They come pre-installed with Microsoft® Internet Explorer® 4.0, Norton AntiVirus 4.0 and INEX Commerce Court Publisher.

#### Model 6266/2100/CDSM

## \$1,459<sup>1</sup>

- Intel® Celeron™ Processor @ 266 MHz
- 2.1 GB SMART II Ultra ATA Hard Drive<sup>2</sup>
- 32 MB SDRAM
- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM<sup>4</sup>; K56flex modem<sup>5</sup>
- Microsoft Word 97
- Compaq Microsoft IntelliMouse™
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty<sup>6</sup>

#### Model 6300/4300/CDSM

## \$1,869<sup>1</sup>

- Intel Pentium II Processor @ 300 MHz
- 4.3 GB SMART II Ultra ATA Hard Drive<sup>2</sup>
- 32 MB SDRAM
- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM<sup>4</sup>; K56flex modem<sup>5</sup>
- Microsoft Office 97 Small Business Edition
- Compaq Microsoft IntelliMouse
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty<sup>6</sup>

#### Options for Deskpro EP Series

- Additional 32 MB SDRAM Memory: \$139<sup>1</sup>
- Upgrade to Compaq V90 Monitor: \$349<sup>1</sup>
- SuperDisk LS-120 Drive: \$129<sup>1</sup>
- Compaq C-Series 810 Handheld: \$599<sup>1</sup>



### Compaq Armada SB

#### Small Business Notebook Solution

The notebook designed specifically for small businesses to provide out-of-the-box productivity combined with affordable high performance.

#### Armada SB Notebook

## \$2,099<sup>1</sup>

- Intel Pentium Processor with MMX Technology @ 200 MHz
- 3.2 GB SMART Hard Drive<sup>2</sup>
- 32 MB EDO RAM (expandable to 96 MB)
- 12.1" CSTN SVGA display
- 20X Max CD-ROM<sup>4</sup>; K56flex modem<sup>5</sup>
- Microsoft Office 97 Small Business Edition included for out-of-the-box productivity
- Integrated AC Adapter
- 3-spindle design allows simultaneous access to multiple storage devices
- Dual-bay design supports a second battery for even greater power while on the road
- Optimized for use in a networked environment
- Intelligent Manageability features offer lower total cost of ownership
- Certified for multiple operating systems
- 1-year limited warranty<sup>6</sup>

#### Options for Deskpro EP Series

- Additional 32 MB SDRAM Memory: \$115<sup>1</sup>
- Enhanced Smart NiMH Battery: \$99<sup>1</sup>



### Compaq ProSignia 200 6/300

#### Small Business Server Solution

An integrated turnkey solution for small businesses needing inexpensive file/print, communications or database capabilities and bulletproof server reliability without the overhead cost of in-house technical expertise.

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- 4/8 GB SLR enterprise-class tape drive
- K56flex modem<sup>5</sup>
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- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM<sup>4</sup>
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty<sup>3</sup>

### Model 6350X/6400/CDS

**\$2,139<sup>1</sup>**

- Intel Pentium II Processor @ 350 MHz
- 6.4 GB SMART II Ultra ATA Hard Drive<sup>2</sup>
- 64 MB SDRAM
- ATI RAGE PRO TURBO AGP Graphics
- 24X Max CD-ROM<sup>4</sup>
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty<sup>3</sup>

### Model 6400X/6400/CDS

**\$2,269<sup>1</sup>**

- Intel Pentium II Processor @ 400 MHz
- 6.4 GB SMART II Ultra ATA Hard Drive<sup>2</sup>
- 64 MB SDRAM
- ATI RAGE PRO TURBO AGP Graphics
- 24X Max CD-ROM<sup>4</sup>
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty<sup>3</sup>

### Deskpro EP 6266X/2100

**\$1,299<sup>1</sup>**

- Intel® Celeron™ Processor @ 266 MHz
- 2.1 GB SMART II Ultra ATA Hard Drive<sup>2</sup>
- 16 MB SDRAM
- ATI RAGE IIC AGP Graphics
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty<sup>3</sup>

#### Options for Deskpro EP Series

- Additional 32 MB SDRAM Memory: \$139<sup>1</sup>
- Upgrade to Compaq V90 Monitor: \$349<sup>1</sup>
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- Compaq C-Series 810 Handheld: \$599<sup>1</sup>

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**INCOGNITO ONLINE: Anonymizer** helps you surf without leaving a digital trail for others to follow.

ing by cruising through your browser's history list. If you don't want anyone else to know where you've been and what you've seen, you need to clean up after yourself. But it's not easy.

To clear **Netscape Navigator 4.0's** history list, first select **Edit•Preferences**, next

select **Navigator** in the Category window, and then press the **Clear History** button. In **Navigator 3.0**, exit the program to clear the list. One problem: These actions don't clear URLs from the drop-down list in the browser's location window. In **Navigator 4.0**, the URLs are stored in the prefs.js file of your user directory (in most cases, C:\ProgramFiles\Netscape\Users\username, where username is your Windows log-in name). Open the file in Notepad, select the URL history lines that you wish to expunge (for example: user\_pref("browser.url\_history.URL\_1""www.pcworld.com/")), press **<Delete>**, and then save the file and exit Notepad.

**Navigator 3.0** stores the same information in Windows' Registry. To clear the URLs, exit Navigator; then choose **Start•Run**, type **regedit** and press **<Enter>** (to launch the Registry Editor), and press **<F3>**. Make sure **Values** is checked; then enter **URL\_1** into the 'Find what' field, and click **OK**. Select all the URLs that you want to remove from Navigator's drop-down list in Registry Editor's right-hand pane, press **<Delete>**, and click **OK** to confirm; then exit Registry Editor.

Blessedly, clearing Internet Explorer's history log also clears the drop-down URL list. In **IE 4.0**, select **View•Internet Options•General**, click **Clear History**, and then **OK**. In **IE 3.0**, choose **View•Options•Navigation**, and then click **Clear History**.

### CASH OUT THE CACHE

Another thing browsers do to speed up online travel is stash Web site files, including graphics, in a cache file or ►



Going Private

## And the Password Is...

**W**e have so many passwords—for logging in to our PCs, servers, Web sites, mail programs, and so on—that it's easy to get blasé about choosing strong ones and keeping them safe. But in the wrong hands, your password could cost you money, your good name, even your job. Everyone should heed these tips:

- **Don't use real words.** A combination of eight or more alphanumeric characters is much more difficult to guess or break than a dictionary word or proper name. Use both uppercase and lowercase characters, and avoid simple sequences of letters and numbers such as ABC123. Don't use birth dates, social security numbers, names of pets, or any other bit of data from your real life as a log-in name or password.
- **Be original.** Don't use the same log-in ID and password on every system or Web site you visit. A rogue employee might use your information to gain access to other systems or sites you use. And whatever you do, don't make your password the same as your log-in ID or your user name.
- **Find a mnemonic that works.** It's practically impossible to keep track of dozens of unique alphanumeric passwords that aren't words. Your PC and your Internet and LAN server accounts deserve strong passwords, but many other sites don't. For those lesser sites, you may want to employ a collection of medium-strength user IDs and passwords that are easy for you to remember but hard for others to guess—foreign-language terms or license-plate-like phrases (such as

ICUB4UCME). Here's a trick for touch-typists: To create a unique password from one you already use, simply move your fingers to the right or left by one key.

- **Stay fresh.** Change the default password your ISP gives you right away, then continue to change your password every two or three months for added security.
- **Write down your passwords.** With every Web site, server, and mail account password-protected, you can't expect to remember them all, especially if you follow the first three tips here. Don't store passwords on the PC, however—that's the first place a snoop will look. The second place is the computer's chassis, so don't scribble the passwords on a note either. Instead, handwrite them on paper that you store in a safe place—a safe, a locked cabinet, a secret panel, your copy of *Ulysses*. Or check out password-keeping software like Password Memorizer or Password Keeper for Windows (see [www.pcworld.com/sep98/defenders](http://www.pcworld.com/sep98/defenders)).
- **Don't be lazy.** Windows and many e-mail programs let you store your password, then enter it for you automatically the next time you log in to the server. Unfortunately, that gives anyone with access to your computer the ability to log in to those servers as you, without knowing your password.
- **Keep quiet.** Remember, your password is supposed to be a secret. Make sure you keep it that way.

— C. L.



folder on your PC. This makes returning to a recently visited site faster, but it also means snoops can see what you've seen. Luckily, it's easy to empty your cache. In **Navigator 4.0**, choose **Edit•Preferences**, select **Cache** under **Advanced**, click

the **Clear Memory Cache** button, then click **OK**. Repeat with the **Clear Disk Cache** button, and then click **OK** again to close the Preferences window. To get to these same buttons in **Navigator 3.0**, choose **Options•Preferences•Cache**.

To clear **Internet Explorer 4.0's** cache files, choose **View•Internet Options•General**, click the **Delete Files** button, then click **OK** twice to finish. In **IE 3.0**, select **View•Options•Advanced** and click first the **Settings** button and then the **Empty Folder** button. Click **Yes**, then **OK** twice.

### CRUMBLE YOUR COOKIES

Web sites store your preferences, identification numbers, and passwords in text files called cookies. Although most cookie content is safe and even helpful, you may not want to have after-hours busybodies nibbling every nut and raisin. The simplest solution is to delete the cookies. Bear in mind, though, that doing so will make it more difficult for Web sites you visit regularly to recognize you and keep track of your visits; it will also clear any options or settings you may have chosen on past visits.

To get rid of cookies in **Navigator 3.0** or **4.0**, select **Start•Find•Files or Folders**, look for the file **cookies.txt** in drive **C:**, and delete it, subfolders included. You can also open **cookies.txt** in a text editor and remove any lines you'd prefer that no one else be able to see. **Internet Explorer** (either version) stores its cookies in the **Windows\Cookies** folder. You can safely delete everything in this folder, or you can limit your attention to files that look incriminating.

Once you've swept away the crumbs of picnics past, you can control how your browser deals with new cookies. Both **Netscape Navigator** and **Internet Explorer** give you the option to reject all cookies, accept all cookies, or be prompted to accept or reject each individual wafer. In **Navigator 4.0**, the settings are located under **Edit•Preferences•Advanced**.

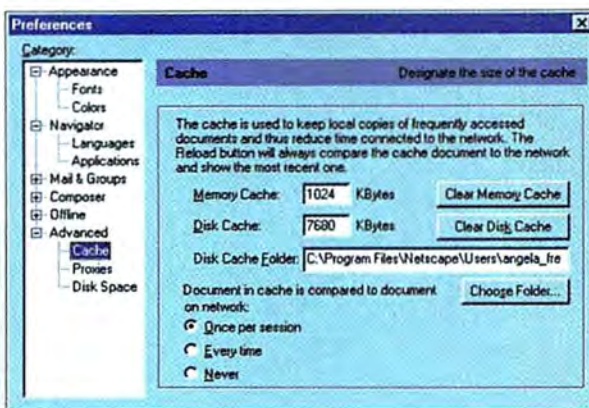
In **Navigator 3.0**, choose **Options•Preferences•Protocols**. In **IE 4.0**, choose **View•Internet Options•Advanced**; then scroll down until you see the

#### GOOD HOUSEKEEPING:

**Cleaning out your browser's cache keeps others from finding out which Web sites you've been visiting.**

cookie settings. In **IE 3.0**, look for the **Warn before accepting cookies** setting under **View•Options•Advanced**.

You don't know how rampant cookies are until you set your browser to warn you each time a site wants to slip you one. If you get tired of accepting and rejecting them but don't want drop your



guard completely, consider using a third-party cookie utility such as **Cookie Pal 1.2** (see "The Defenders," page 143).

### ESCAPE USENET ARCHIVES

If you regularly participate in Usenet newsgroups, you know that people often share their feelings, their histories, their opinions, and sometimes ▶





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# Returning to Private Life

**Y**ou spend a lifetime building good credit and a stable life. Then suddenly, an impostor takes it all away. That's what happened to Pat Goodman (not her real name) about two years ago, shortly after she realized that her Visa bill was overdue. The missing Visa bill, it turned out, was the least of Goodman's problems. She had just become a statistic in the latest crime wave: identity theft.

## STOLEN IDENTITY

Taking advantage of Goodman's gender-neutral name, the identity thief temporarily forwarded her mail to a post office box, and then waited for credit card bills and bank statements to roll in. When Goodman became suspicious and called the bank, she learned that someone had been regularly making \$400 to \$600 Visa purchases in her name over the phone. He had also ordered four additional credit cards using her name. "Here's where it gets ugly," she says. "I had to prove I didn't open those accounts." That time-consuming process entailed sending in copies of her police reports. Ultimately, Goodman had to close her checking account and her one remaining viable credit card account—and then she had to start rebuilding her credit from scratch.

The thief who had assumed her identity managed to rack up some \$42,000 in credit card and check purchases before police nabbed him at a bank in New York. "You're oblivious to fraud, until it happens to you," says Goodman.

Identity theft does not require high-tech tools: The thief need only rifle your mailbox, rummage through your trash, or peek into your personnel file. But increasingly, the personal data that identity thieves are after can be discovered online, says Beth Givens, director of the San Diego-based consumer group Privacy Rights Clearinghouse (see "You Are for Sale," page 96).

## GOING UNDERCOVER

Goodman wasn't liable for the credit card purchases and bounced checks, but it took her the better part of a year to correct all the errors with the credit bureaus. Today, she pays a service like ConsumerInfo.Com to alert her when someone orders her credit report or opens a new credit card in her name. She now has her mail sent to a post office box and regularly monitors her bank accounts online. She closely guards her address and phone number, doesn't register her real name on Web sites, and refuses to give out her social security number.

Whether you've been a victim of identity theft or just want to ensure that it never happens to you, here are some steps you can take to lower your profile:

- Use the Federal Trade Commission's Sample Opt-Out Letter ([www.ftc.gov/privacy/cred-ltr.htm](http://www.ftc.gov/privacy/cred-ltr.htm)) to ask each of the three national credit agencies not to share your personal information with others.
- Remove yourself from marketing lists, using forms available from the Direct Marketing Association ([www.the-dma.org](http://www.the-dma.org)).
- Notify your state's department of motor vehicles that you don't want your personal data sold. The FTC's DMV page is an excellent place to start ([www.ftc.gov/privacy/protect.htm#DepartmentofMotorVehicles](http://www.ftc.gov/privacy/protect.htm#DepartmentofMotorVehicles)).
- Tell your ISP that your personal data is not for sale. Provide the minimum information required, and hold the service accountable if it fails to maintain your privacy.
- For access to these forms and more, see [www.pcworld.com/sep98/secrets](http://www.pcworld.com/sep98/secrets).

"You can't let fear rule your life," Goodman advises, "but you have to realize there are all sorts of places where people can get information."

—Laurianne McLaughlin and Carole Lane



**Y**ou can't let fear rule your life, but you have to realize that there are all sorts of places people can get information.

—PAT GOODMAN



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When *Network World*<sup>†</sup> magazine gave the 400MHz dual-processor PowerEdge® 2300 server<sup>††</sup> their World Class Award, they rated it "... first in overall score, thanks to its strong showing in serviceability, features, flexibility and manageability." That's because the PowerEdge 2300 takes the anxiety out of the occasional upgrade or servicing issue. Need to install a card or add a drive? No tools necessary — hot swap bays, thumbscrews and flip tabs let you get in, handle it and get out with only your bare hands. Want performance? How about up to two screaming-fast Pentium® II processors at 400MHz, 100MHz ECC SDRAM, and up to six Ultra-2/LVD SCSI hot-swap hard drives. In short, you'll have a server you can rely on, a server that can grow and adapt with your business. A "World Class" server. For more information on the PowerEdge 2300, just give us a call or visit [www.dell.com](http://www.dell.com) — possibly the easiest decision you can make.

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<sup>††</sup>Award-winning configuration included 400MHz dual processors, 128MB 100MHz SDRAM, 4 hard drives and RAID.

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effort may be worthwhile if you want to tone down your public record of outspokenness. Unfortunately, your posts may remain archived on other Web sites, such as AltaVista, which offers no similar nuke feature.

## E-Mail ANONYMOUS

Anyone with direct access to your PC can read your mail, as can your employer and the people who administer your company's mail server. When it leaves your office and travels through the Internet, it is vulnerable to hackers at each server that relays it on its way. That doesn't mean you can't send reasonably secure messages. Just follow these steps.

### THINK BEFORE YOU SEND

If you think that your supervisor is a nut case, or if you can't wait to tell your best friend the details of your lunchtime

conquest, don't send these revelations through e-mail. Not only can employers read your mail (assume that they do), but you don't know how well your recipient will safeguard the missive. So if you don't want to tempt fate, impart your secrets to your confidant in a darkened parking garage (don't forget to wear a trenchcoat and disguise your voice).

### TALES FROM DECRYPT

One way to ensure that nobody reads your e-mail as it travels to its recipients is to encrypt it first. To encrypt, you use your recipients' public keys. They decode the encrypted message using their private keys. The downside is that you need your recipients' public keys first (and a mail program with encryption) in order to send messages. Netscape Mail, Outlook Express, and Eudora all support encryption, but messages encrypted in one program may not be readable in another, so you may need a third-party utility like PGP for Personal Privacy (see "The Defenders," page 150).

### POST VIA ANOTHER HOST

Hackers can use your messages to locate and break into your PC; the more outspoken, notorious, or even charming you are, the more likely you are to be a target. If you would prefer to remain unnamed in a rough-and-tumble Usenet newsgroup, use an anonymous remailer. Remailers strip off your name and e-mail address, allowing you to send e-mail to a Usenet news group, a mailing list, or an individual without revealing your identity. The Anonymizer is a good one (see "Wear a Disguise"), as is World Wide Web Anonymous Remailer ([www.replay.com/remailer/anon.html](http://www.replay.com/remailer/anon.html)). For more choices, visit the List of Reliable Anonymous Remailers at [www.cs.berkeley.edu/~raph/remailer-list.html](http://www.cs.berkeley.edu/~raph/remailer-list.html).

### SIGN YOUR MAIL

To let your recipients verify that mail they receive is actually from you, you can "sign" your e-mail with a digital signature. First you buy a digital ID, or ►

## Check Yourself Out Online

**Y**ou may not think anybody would be interested enough in you to post your particulars on the Internet. But take a look around—you might be unpleasantly surprised. Once you've surveyed the damage, see "Returning to Private Life" for tips on regaining your anonymity.

- **Search online telephone directories and people finders**—Four11 ([www.four11.com](http://www.four11.com)), Bigfoot ([www.bigfoot.com](http://www.bigfoot.com)), and Switchboard ([www.switchboard.com](http://www.switchboard.com)), for example. Just because your number's unlisted doesn't mean it isn't available on the Internet. Four11 and Switchboard let you withdraw or hide your listing.

- **Search genealogical sites** to find out if a relative has posted your whereabouts without permission. Genealogy software programs like Brøderbund's Family Tree Maker help people compile their family trees and post them on the Web. Make sure your Aunt Susan hasn't blown your cover online by publishing your home address and phone number.

- **Peruse government and public records sites** for records involving you. Such documents may include real property records, civil suits, criminal records, bankruptcies, liens, and judgments. It may not be possible for you to remove these public

records from sight, but you may be able to amend errors they contain and prohibit an agency (such as the state motor vehicles department) from selling your data to marketers.

- **Search Web sites** that may keep information on you, including professional associations, licensing agencies, schools, alumni associations, and companies.

- **Use multiple search engines** (Lycos, AltaVista, HotBot, and so on) to look for yourself—you never know who has misquoted or libeled you, or published your street or e-mail address or phone number. Be sure to read each engine's instructions or tutorial first; they don't all work the same way.

- **Use DejaNews** ([www.dejanews.com](http://www.dejanews.com)) to search for mentions of yourself or messages you've posted to Usenet newsgroups. (See "Escape Usenet Archives" to remove messages you've posted.)

- **Request copies of your credit records** from each of the three national credit reporting agencies (Equifax at [www.equifax.com](http://www.equifax.com), Experian at [www.experian.com](http://www.experian.com), and TransUnion at [www.tuc.com](http://www.tuc.com)). Most of them provide one free report per year, depending on your state's laws. Check the inquiries listed to find out who has requested copies of your credit history in the last six months. And check the credit information to make sure it's accurate—according to the U.S. Public Interest Research Group, almost one-third of all credit reports contain serious errors.

—C.L.



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certificate, and install it in your browser. Then, when you create a message, you can digitally sign it using the certificate's private key. Your recipient decodes, or verifies, the signed (encrypted) message using a public key you provide. Of course, the recipient needs to have the public key (and a mail program that supports digital signatures) in order to read your messages. Also, a digital ID isn't free—VeriSign ([www.verisign.com](http://www.verisign.com)), for example, charges \$10 per year.

To obtain a digital ID in **Navigator 4.0**, choose **Communicator•Security Info**, select **Yours** under **Certificates**, and click **Get a Certificate**. In **Navigator 3.0**, choose **Options•Security Preferences•Personal Certificates**, and click the **Obtain New Certificate** button. In **IE 4.0**, first obtain a digital ID from the Web site of VeriSign (or another certificate authority). Next, select **View•Internet Options•Content**, click the **Edit Profile** button, and create an e-mail address for yourself. Finally, click the **Digital IDs** tab, select the e-mail address you want to use a certificate with, click **Import**, and then browse to the certificate on your hard disk.

## STOP CHATTING

While it may be fun to chat in real time over the Internet, chat programs such as ICQ and AOL Instant Messenger expose your system to some serious security risks. To underscore the hazards

include but are not restricted to criminal acts such as electronic trespassing, sniffing, spoofing, impersonating, eavesdropping, breaking passwords, harassment, and fraud." The cold, hard truth is that

## THE SPAM POLICE:

**Organizations such as the Spam Patrol are leading the fight against Internet-based marketers who send junk e-mail.**

risk-proof chatting over the Net simply isn't an available option. So the question is, do you feel lucky? If not, don't chat.

## Jam That SPAM

At best, spam is annoying. At worst, it seriously clogs your productivity as you sort through hundreds of messages, or exposes you and your family to marketing scams and illicit materials. But it doesn't have to be that way. Follow these steps to free yourself from the glut.

## SURF UNDER AN ALIAS

If your service provider offers more than one account for the same monthly fee, reserve one of these as your main e-mail address. Cite it on your business cards and share it with friends and associates. But don't use that address to surf—don't enter it in your browser's e-mail user profile, and don't refer to it when you register with Web sites. Instead, use a second address for those tasks. Then sit back and watch the junk mail roll in. No problem—just dump the surf account's mailbox occasionally.

## DON'T EVEN OPEN SPAM

Spammers are continually knocking on e-mail doors, hoping that they'll find someone home. Sophisticated spam-



Don't Monkey around with the Internet!

Stay spam email NOW!!

"Spam: it's not just for lunch anymore!"

The use of Internet email services for private advertising is on the increase. The popularity and novelty of the Internet, like the glamor of the Old West, is attracting hucksters, hustlers and entrepreneurs of all sorts with the prospect of fast and easy money.

Like their counterparts in the Old West, these Internet newcomers understand very little about the real nature of the environment they seek to exploit. Like fishermen equipped only with sticks of dynamite, they accumulate ever larger lists of e-mail addresses with which to flood the e-mail services with advertising for products and services which few, if any people want. In the process of scattering these ill-conceived floods of digital garbage, they routinely appropriate domain names, mail relays, user identities and other resources which are not theirs, leaving a wake of angry users and angrier system admins behind them.

mers can send mail with a return receipt requested. The simple act of opening the message generates a reply and lets the spammers know that you're ready for more junk mail. Scan message headers first for obvious signs of spam ("Make \$\$\$ Working in Your Own Home!"), and delete mercilessly.

When you inadvertently open spam, don't be tempted to reply—even if the messages instruct you to do so in order to have your name removed from the spam list. Responding to the message only confirms that yours is a marketable address—one the spammer can sell to other spammers again and again.

## COMPLAIN TO MANAGEMENT

If you receive offensive e-mail, submit a complaint about it to your Internet service provider. In some cases, the ISP will add the spammer to its own spam filtering system, if it has one. In other cases, the ISP may bring these complaints directly to the spammer's service provider. Assuming that the spammer's return address isn't completely faked, its ISP may actually force it to desist or (failing that) may close the account. For help in tracking down spammers and their ISPs, see the Spam Patrol's Tracking Spam to Its Source page ([www.fmp.com/spam\\_patrol/tracking.html](http://www.fmp.com/spam_patrol/tracking.html)).

Find a consumer resource kit for protecting your privacy at PC World Online ([www.pcworld.com/sep98/secrets](http://www.pcworld.com/sep98/secrets)). Carole Lane is author of *Naked in Cyberspace* (Pemberton Press, 1997). Laurianne McLaughlin is a senior associate editor and Angela Navarrete a staff editor for PC World.

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# SO, HERE WE GO...

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# TIM WILLITS, LEVEL DESIGNER FOR QUAKE II, USES THE MICRON MILLENNIA FOR ITS MENACING POWER. (AND ITS ANYTHING BUT MENACING PRICE)

As Lead Map Designer for id Software, Tim Willits was charged with crafting the techno-palaces of



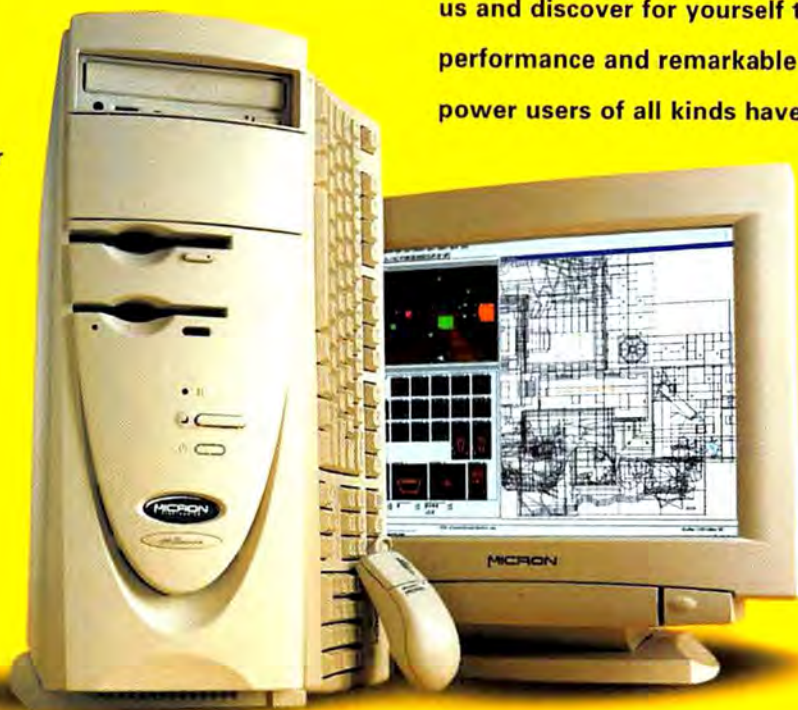
Quake and Quake II. The challenge was to build an unprecedented labyrinth of blissful mayhem. And

to put each level to the test, Tim realized he would need nothing less than the blazing power of the Micron™ Millennia®. In the cutthroat, budget-driven environment of software design, the tools make or break a project.

Through thousands of grueling hours of level testing, the Millennia delivered rock-solid reliability and lightning-fast processing, all at a price just as impressive as its performance. As with many Micron customers, Tim was duly impressed. "I liked the Micron I have at work so much, I bought another one for my home. All of my game playing is now on a Millennia." Call us and discover for yourself the killer performance and remarkable affordability that power users of all kinds have already found in



the 400MHz Millennia.



*"Power users will love the new Micron Millennia."*

- PC Magazine

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# "MICRON'S MILLENNIA 400 DVD EDITION WAS THE FASTEST OF ALL WITH A MIND-BENDING PC WORLDBENCH SCORE OF 210"

PC WORLD ONLINE "BEST BUY," MAY '98

Just named *PC World* "Best Buy" for power desktops, the Millennia® 400 continues Micron's tradition of industry-leading, award-winning performance. Perhaps that's why some of the most prominent power

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New Micron MicroTower featured in photo.



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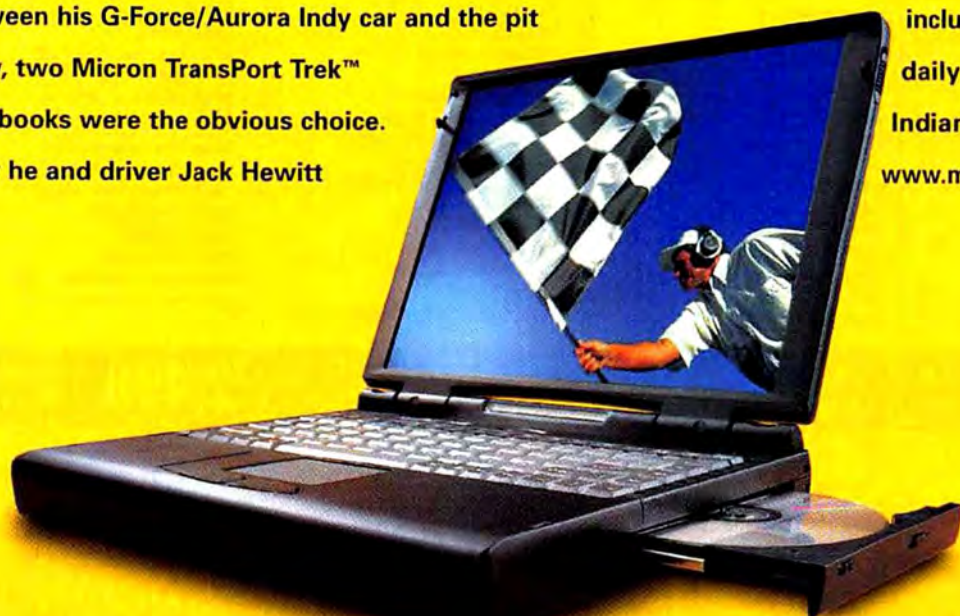
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you, call us and find out how the Micron TransPort Trek or other Micron systems can help you reach your goals as quickly and affordably as possible. (To read more about Micron and Indy, including Bob Parker's daily journal from the Indianapolis 500, go to [www.micronpc.com/indy500](http://www.micronpc.com/indy500)).



***"The TransPort Trek is the Fastest Budget Notebook  
We've Run Through Our Mill."***<sup>††</sup>

- PC World, Ranked #1, April '98

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# MICRON TRANSPORT TREK - RANKED #1 BUDGET NOTEBOOK BY PC WORLD. <sup>††</sup>

PC World, "Best Buy," April & May '98

Those who use them and those who test them agree, Micron notebooks are among the best available. Practically every notebook line we've released has won the coveted *PC Magazine*



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(Trek system featured in photo)

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## TransPort Trek – Now With The Power Of The Intel® Pentium® II Processor

TransPort Trek™	TransPort Trek <sup>2</sup>	TransPort Trek <sup>2</sup>
<ul style="list-style-type: none"> <li>• Intel Pentium processor with MMX™ technology 233MHz</li> <li>• 32MB EDO RAM</li> <li>• 3.2GB hard drive</li> <li>• 12.1" SVGA TFT display</li> <li>• 512KB L2 pipeline burst cache</li> <li>• PCI bus with 128-bit graphics accelerator</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• S-Video Out; MPEG compatible</li> <li>• CardBus and Zoomed Video ready</li> <li>• Wavetable/3D positional sound</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• 24X modular CD-ROM drive</li> <li>• 2-way infrared port</li> <li>• Touchpad pointing device</li> <li>• Modular floppy drive</li> <li>• Li-Ion battery</li> <li>• Norton Anti-Virus</li> <li>• System Wizard Mobile Client™</li> <li>• Microsoft® Windows® 98</li> <li>• 5-year/1-year Micron limited warranty</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 233MHz</li> <li>• 14.1" SVGA TFT display</li> <li>• 64MB EDO DRAM</li> <li>• 3.2GB hard disk drive</li> <li>• 440BX chip set</li> <li>• 512KB L2 pipeline burst cache</li> <li>• 24X CD-ROM drive bay</li> <li>• Hard drive bay</li> <li>• Floppy drive bay</li> <li>• Li-Ion battery bay</li> <li>• 4MB video memory</li> <li>• Zoomed video capable</li> <li>• CardBus ready</li> <li>• Wavetable/3D positional sound</li> <li>• S-Video Out; MPEG compatible</li> <li>• Built-in stereo speakers &amp; microphone</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• Microsoft Windows 98</li> <li>• System Wizard Mobile Client™</li> <li>• Norton Anti-Virus</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office 97 Small Business Edition</li> </ul>	<ul style="list-style-type: none"> <li>• Intel Pentium II processor 266MHz</li> <li>• 14.1" SVGA TFT display</li> <li>• 64MB EDO DRAM</li> <li>• 3.2GB hard disk drive</li> <li>• 440BX chip set</li> <li>• 512KB L2 pipeline burst cache</li> <li>• 24X CD-ROM drive bay</li> <li>• Hard drive bay</li> <li>• Floppy drive bay</li> <li>• Li-Ion battery bay</li> <li>• 4MB video memory</li> <li>• Zoomed video capable</li> <li>• CardBus ready</li> <li>• Wavetable/3D positional sound</li> <li>• S-Video Out; MPEG compatible</li> <li>• Built-in stereo speakers &amp; microphone</li> <li>• 2 Type II or 1 Type III PCMCIA slots</li> <li>• Microphone, stereo line-in/out jacks</li> <li>• USB, parallel, serial, VGA, PS/2 ports</li> <li>• Microsoft Windows 98</li> <li>• System Wizard Mobile Client™</li> <li>• Norton Anti-Virus</li> <li>• 5-year/1-year Micron limited warranty</li> <li>• Microsoft Office 97 Small Business Edition</li> </ul>
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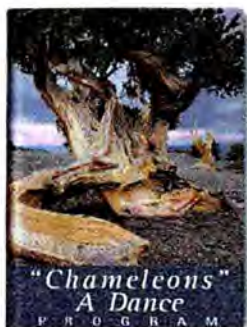
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# The Defenders

The **best** cookie killers, **spam** stoppers, e-mail encryptors, and a full **lockbox** of other **security** essentials.

BY MARK GIBBS

AND MICHAEL S. LASKY

**ADMIT IT: YOU'VE GOT FILES** on your computer you wouldn't want anyone else to see—employee evaluations, your monthly sales figures, maybe even a love letter from a colleague. Come to think of it, you probably have e-mail you'd rather keep private, too. And as for your surfing habits, well, it's nobody's business but your own where you go on the Web and what you see—right?

Unfortunately, staying private in the digital age isn't easy. Even if a thief never steals files off your PC, you leak information about yourself just by going online. "Going Private" (see page 114) offers tips on how to keep your files and online activities confidential. In this article, we tell you which products are best for implementing your new security plan. We reviewed 28 anticookie, antispam, and encryption utilities—as well as a few other security tools—that promise to keep snoops at bay, at home or in the office. We encountered a lot of duds, but we found at least one product in each category that's worth installing.

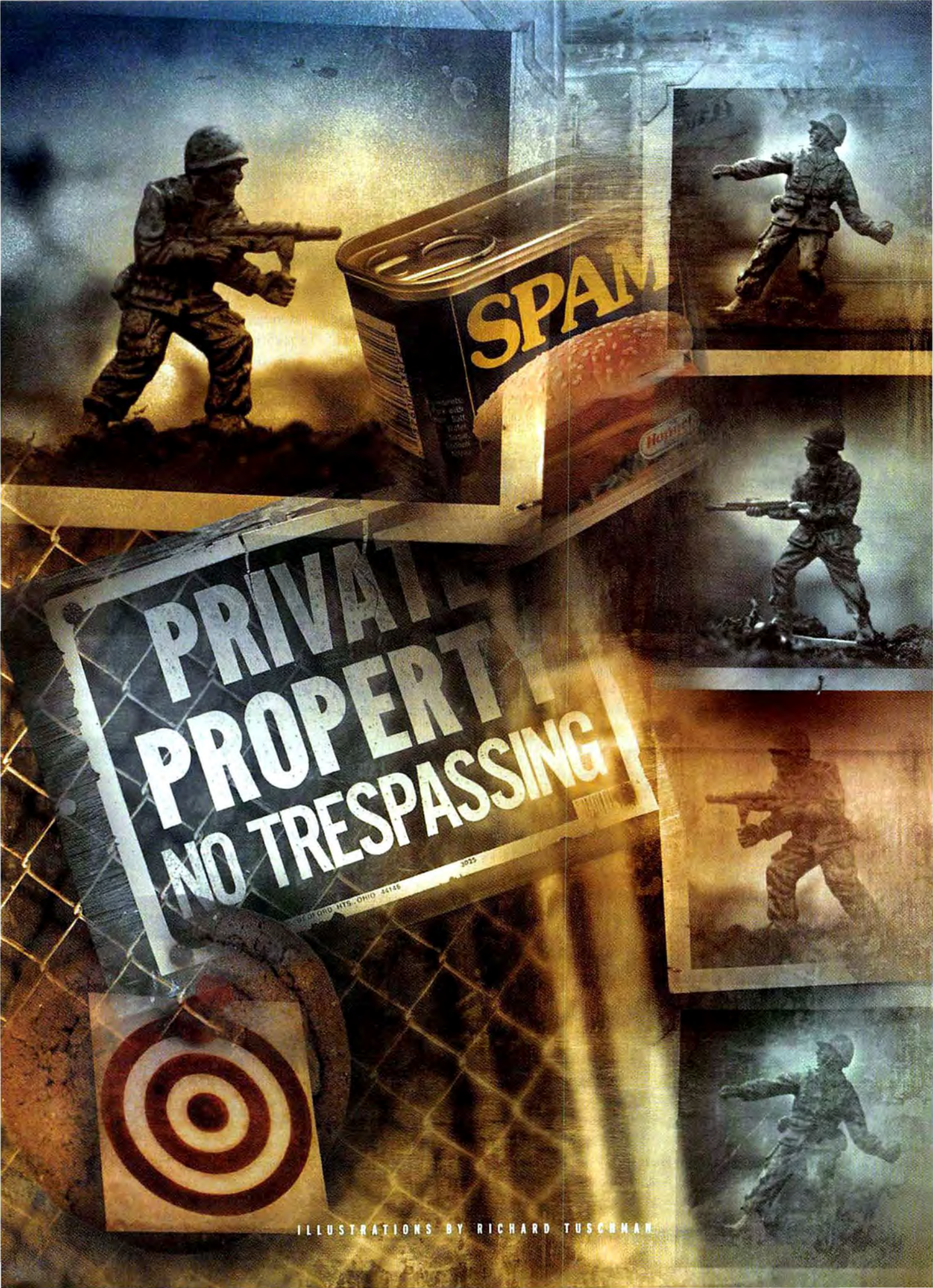
We also looked at a handful of futuristic products that herald a growing trend in security: biometrics. These devices use physiological measurements such as fingerprints and iris scans to grant data access. In "Body Blocks: The Future of Security Is Biometrics," we found that the latest retail biometry products work well—just be prepared to share a little more with your computer than you're accustomed to.

## SHAREWARE SKEPTICISM

A lot of security utilities, especially cheap shareware and freeware packages, are of questionable value. Most of the anti-cookie utilities we looked at, for instance, add little to what Navigator and Internet Explorer already offer. But the exceptions include our two favorites, Kookaburra Software's Cookie Pal and Luckman Interactive's Anonymous Cookie. They make dodging cookies (those sneaky files most Web sites save to your hard drive to monitor your surfing habits) a snap.

Beware of spam filters, too. We found that many of these products don't weed out unwanted e-mail any better than ►





ILLUSTRATIONS BY RICHARD TUSCHMAN



a browser's or an Internet service provider's built-in filters do. In fact, of the eight products we examined, only SpamScan97—our \$23 Best Buy from Webstar Image—was easy to use *and* nailed every spam we sent its way.

Although most e-mail encryption programs work fine, PGP for Personal Privacy (\$40 from Network Associates) performed best of the four we looked at. It's compatible with the largest number of e-mail programs and renders e-mail unreadable to anyone but the person you send it to.

Would you sleep better knowing that the data on your hard drive was snoo-proof? Then it may be time to add a file encryption program to your arsenal. These packages scramble individual files, folders, and even entire hard drives. Our top choice, the \$50 SecureWin from SecureWin Technologies, handles encryption and much more.

## CORPORATE SAFETY

Protecting your own data is one thing; what if you must keep your entire company's data safe? Take two aspirin and read "Security in the Wired Workplace"

# Your Best Defense

**Strong security for your PC is easy to come by—and easy on your wallet. For a modest cash outlay, our four Best Buys will protect your data from a range of risks.**

## COOKIE PAL 1.2



If you don't like the idea of having your Web visits monitored, filter or block surveillance cookies with our top-pick cookie manager, the \$15 Cookie Pal 1.2, one of the few useful cookie stoppers we saw.

## SPAMSCAN97



When it comes to canning spam, SpamScan97 is our favorite. With a perfect spam-killing record in our tests and a generous array of useful options, this \$23 utility helps you fight the scourge of every e-mail user.

for our guidelines when implementing a corporatewide security plan.

Finally, if your head is swimming from immersion in security terminology, get your bearings back with our glossary, "Security Speak."

## Cookie Killers

Do you accept cookies from strangers? Probably not, except when you surf the Web. Most sites silently download multiple cookies—small text strings that record your browsing habits and tastes—to a file on your hard drive every time you visit. Many PC users resent this invisible invasion once they learn of it.

Despite their presumptuous aggres-

siveness, most varieties of cookies are beneficial. Visitor cookies keep track of your visits to a site and bring pages up faster when you return. Preference cookies maintain details of how you like images or information to appear, so the page will load accordingly. Shopping basket cookies record the things you purchase from online catalogs.

The tracking cookie is the one that's hard to swallow. Used predominantly by ad banners that appear on Web pages (you don't even have to click on the ad), the tracking cookie maintains a running list of sites you've visited. Any Web site where you've entered registration information can then access the tracking cookie file, note your preferences and e-mail address (by matching the cookie ID number to your registra-

# Security Speak

**H**ere are the terms you need to know to keep abreast of the esoteric and often confusing security scene.

● **AUTHENTICATE** To verify that the person attempting to send a message or access data is who he or she claims to be.

● **AUTHORIZE** To grant or deny a person access to data or systems. Implementing controls over authorization is often the first and most basic step in a security system.

● **BIOMETRICS** The use of measurable physiological characteristics, such as fingerprints or facial features,

to authenticate a user.

● **CIPHERTEXT** Scrambled, unreadable contents of an encrypted message or file.

● **COOKIE** A block of text that is placed in a file on your hard drive by a Web site when you visit it. A cookie is used to identify you the next time you access the site.

● **DECRYPT** To decode data from its protected, scrambled form so it can be read.

● **DIGITAL CERTIFICATE** Data (usually text) used by one person to encrypt or sign messages sent to another. Also known as a *public key*, a digital certificate consists of a user's name and e-mail ad-

dress and an encryption key.

● **DIGITAL SIGNATURE** Text data—usually added to the main body of an e-mail message—that can be used by the recipient to authenticate the identity of the sender.

● **ENCRYPT** To scramble data into a private code.

● **FIREWALL** A computer, with associated software, that is used to prevent outsiders from obtaining unauthorized access to a private computer network.

● **PASSWORD** A private and unique series of numbers, letters, or both that enables the person who uses it to gain access to data. A longer pass-

word is called a *passphrase*.

● **PRIVATE KEY** A data file that is assigned to a single individual to use in decrypting messages previously encrypted through use of that person's public key.

● **PUBLIC KEY** A data file that is assigned to a specific person but that other individuals can use to send the person encrypted messages. Because public keys don't contain the components necessary to decrypt messages, they are safe to distribute to others.

● **SPAM** Unsolicited and unwanted e-mail, usually sent by advertisers.





## PGP FOR PERSONAL PRIVACY



Your best bet for securing your e-mail from snooping outsiders is PGP for Personal Privacy.

Easy to install, simple to use, and full of extensive encryption features, this \$40 program is a winner.

## SECUREWIN



Last, for easy, effective file and folder encryption, we recommend SecureWin. Its

long list of useful features—some of which are unique—and reasonable \$50 price tag earn it recognition as our top file-encryption program.

tion data), and use the information for marketing purposes.

Both Netscape and Internet Explorer let you block cookies en masse or one by one. Netscape 4.0 also allows you to single out tracking cookies—those from advertisers—for rejection, by choosing the setting “Accept only cookies that get sent back to the originating server.” These options should provide sufficient cookie controls for most users. But what if you dislike relying on your browser’s built-in anticookie tools? Or if you hate wading through dozens of cookie prompts

grams—Kookaburra Software’s Cookie Pal 1.2 and Luckman Interactive’s Anonymous Cookie—add some handy features to your browser.

### 1 COOKIE PAL 1.2



One of the few useful cookie stoppers, Cookie Pal 1.2 sits in your Windows tray and automatically works in the background whenever you go on the Web. Its tabbed dialog box displays the cookies you’ve received and lets you delete them one by one. Unlike other programs, it also

enables you to create filters for accepting or declining cookies from specific sites, and to see the cookies downloaded during your current browsing session so you can delete them immediately. It makes an endearing “mmm” sound whenever

you accept a cookie. • **Cookie Pal 1.2**; 290KB; \$15; Kookaburra Software; [www.kburra.com](http://www.kburra.com), [cplsetup.exe](http://cplsetup.exe)

### 2 ANONYMOUS COOKIE

Anonymous Cookie has fewer features than Cookie Pal, but on the other hand it’s free. With Internet Explorer, it can refuse cookies from advertisers. It works by tricking sites into thinking it has accepted cookies, when it’s got them in memory. Result: You can surf sites that demand cookie acceptance before letting you in—and you don’t have to delete any unwanted files later. • **Anonymous Cookie**; 1.4MB; freeware; Luckman Interactive; [www.luckman.com](http://www.luckman.com), [setupac\\_b2.exe](http://setupac_b2.exe)

### 3 COOKIE CRUSHER 1.6

Cookie Crusher 1.6 uses many of the same features as the identically priced Cookie Pal to stomp cookies, but it’s not quite as slick. Unlike Cookie Pal, Cookie Crusher flashes dialog boxes on screen before automatically closing them—an unnecessary (and aggravating) interruption. • **Cookie Crusher 1.6**; 865KB; \$15 shareware; The Limit Software; [www.thelimitsoft.com](http://www.thelimitsoft.com), [cookie16.exe](http://cookie16.exe)

### 4 IECLEAN 4.2 AND NSCLEAN 4.10

IEClean 4.2 (for Internet Explorer) and NSClean 4.10 (for Navigator) are expensive cookie and browser cache editors. Buy these products if you want to cover your tracks on the Web by selectively deleting evidence of where you’ve been. Otherwise, spend your money elsewhere. • **IEClean 4.2**; 934KB, \$40 shareware, [ied32301.exe](http://ied32301.exe) • **NSClean 4.10**; 1MB, \$40 shareware, [nsd32410.exe](http://nsd32410.exe); both from Privacy Software, [www.nsclean.com](http://www.nsclean.com)

### 5 COOKIE CRUNCHER 2.11

Don’t bother with Cookie Cruncher 2.11. It merely lets you view and trash cookies from your hard drive—once you get it to work, that is (we had some trouble). You’re better off using the Explorer file manager and Notepad. • **Cookie Cruncher 2.11**; 880KB; freeware; RBA Software; [www.rbaworld.com](http://www.rbaworld.com), [cook211.zip](http://cook211.zip)

### 6 BUZOF 1.4.4

The sole purpose of Buzof 1.4.4 is to dismiss pop-up dialog boxes—including cookie acceptance windows. It makes more sense to get a utility that lets you choose which kinds of cookies to accept, like Cookie Pal (our Best Buy). • **Buzof 1.4.4**; 310KB; \$15 shareware; Basta Computing; [www.basta.com](http://www.basta.com), [setupbuzof.exe](http://setupbuzof.exe)

### 7 ANTI-COOKIE 1.0 BETA

Despite its name, Anti-Cookie 1.0 Beta is a finished product, but its performance is early-alpha unreliable. We couldn’t get the software to work at all with Netscape Navigator 4.05. • **Anti-Cookie 1.0 Beta**; 2.92MB; \$10 shareware; 2Dudes.com, [www.2dudes.com](http://www.2dudes.com), [cookie10.zip](http://cookie10.zip)



every time you surf the Web? You probably won’t want to impose a total ban

**WITH COOKIE PAL, you’ll receive instant notification whenever a Web site attempts to send you a cookie.**

on cookies, either—many sites, such as The New York Times ([www.nyt.com](http://www.nyt.com)), require you to accept a cookie before they permit you to browse.

That’s where a third-party cookie stopper can come in handy. Many of these dedicated utilities act as editors, providing a nice interface for culling your cookie file. The best utilities can be configured to automatically accept cookies only from specified sites, so you never have to click through an acceptance dialog box. Most of the seven cookie managers we examined simply aren’t worth downloading. However, two pro-



# Say No to Spam

Spam happens. Named after Homer's celebrated "chopped pork shoulder meat," digital spam is unsolicited, unwanted e-mail.

How do spammers find you? You leave your e-mail address in a surprising number of places. If you register at a Web site, for instance, the site may in turn send you mail about new products and services—or sell your address to a marketing firm. (Some sites let you choose not to receive e-mail advertisements, but it's easy to miss that little checkbox during registration.)

If you're sick of spam, fight back. Some e-mail clients and packages (such as Eudora, Outlook, and America Online) include special antispam filters, but third-party apps permit greater customizing. Most clients' filters combine the words most frequently used in spam mail subject headers (free, get rich quick, XXX, sex) with the addresses of notorious spammers. Good antispam software enhances this protection by letting you add information. For example, some products give you the option of setting up your own list of addresses to block or allow.

In our test, we set up a dummy e-mail account, installed eight filtering programs separately, and sent ourselves ten typical spam messages (such as "Do you need more money?"). We found that many add-on antispam utilities were ineffective—and most of them don't work on proprietary, non-Internet-standard e-mail programs like AOL and Lotus Notes—but we found two we liked a lot: Webster Image's SpamScan97 and Contact Plus's Spam Buster 1.4.

## 1 SPAMSCAN97



SpamScan97 put our spam in the fryer: It caught every junk message we sent its way—and it was the easiest antispam product to set

up and use. SpamScan97 comes with a list of spam keywords and forbidden domains, to which you can add friendly or forbidden addresses and spam hot words of your own. Afraid of barring a legitimate message? You can set filters to specify when to reject a message outright and when to make exceptions. • **SpamScan97**; 2.19MB; \$23 shareware; Webster Image; webster-image.com, sscan97.zip

## 2 SPAM BUSTER 1.4

Like SpamScan97, Spam Buster resolutely stonewalled all our test e-mails. It can scan your e-mail messages before you open your mail program, or you can opt to launch your mail directly from Spam Buster after it cleans out the unwanted messages. It relies on a list of about 15,000 known spam mailers,



**SPAMSCAN97 allows you to accept or reject varieties of e-mail automatically through a simple setup wizard.**

which you can modify with your own parameters and update for free via the company's Web site (once you register). Unfortunately, novices may have trouble finding some functions in Spam Buster's confusing interface. • **Spam Buster 1.4**; 1.1MB; \$20 shareware; Contact Plus; www.contactplus.com, spambu32.zip

## 3 MAILJAIL 2.3

This plug-in for Eudora and Microsoft Outlook 97 caught all our slabs of test spam, but it's too tentative for our tastes. Instead of automatically deleting suspected spam messages, it stores them in a separate folder, where you have to review the messages and manually chuck them. Though this method

ensures that only truly unwanted mail gets deleted, it takes too much time. • **MailJail 2.3**; \$20 shareware; Omron Advanced Systems; www.mailjail.com

## 4 SPAMKILLER 1.61

Sad to say, SpamKiller 1.61 isn't as ruthless as its name suggests. It uses built-in rules (and any you add) to decide whether to mark messages for future removal or trash them outright. But SpamKiller rarely pulled the trigger on even the most obvious spams. Of our ten test messages it caught only three—and those it merely marked, forcing us to do the dirty work ourselves. • **SpamKiller 1.61**; 1.7MB; \$30 shareware; www.spamkiller.com, sk161.exe

## 5 SPAM EXTERMINATOR 3.2

Spam Exterminator 3.2 boasts a huge list of known spammers' addresses—17,500—and you can get more with regular Web updates. Too bad it caught only three of our ten test messages. On top of that, it was time-consuming to set up, because of its multiple buttons and tabs. • **Spam Exterminator 3.2**; 1.5MB; \$28 shareware; Unisyn Software; www.unisyn.com.sxsetup.exe

## 6 SPAMMERSLAMMER

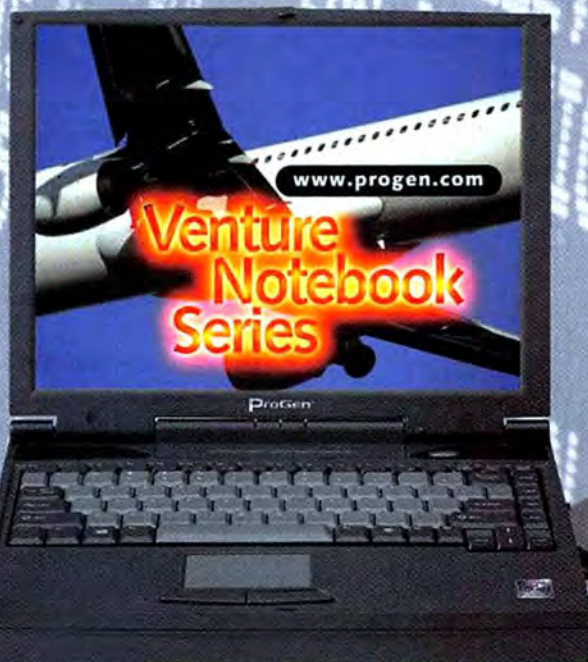
SpammerSlammer doesn't automatically delete junk messages. Heck, it doesn't even incarcerate them. Instead, it tags suspect dispatches with wishy-washy labels and makes you decide whether to whack them sight unseen or read the gory details first. Unjust or not, we've got better things to do than review the X-rated e-mails that this utility flags as "maybe" or "most likely." And SpammerSlammer caught only two of our ten test spams. 'Nuff said. • **SpammerSlammer**; 1.4MB; freeware; Now Internet Tools; www.spammerslammer.com, spammerslammer.exe

## 7 EFILTER 2.0

EFilter 2.0 crashed our PC during our first attempt at installation, and gave us an arcane error message the second ▶



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- Built-in Stereo Speakers and Microphone
- Infrared Module (including Utility) Supports FIR
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Spam Hater may detest spam, but it doesn't translate opinion into action very well. In fact, it doesn't block spam at all—rather, it analyzes mail headers and issues complaints to the specified return address. But responding to spams—even opening them—confirms your e-mail address, freeing the spammer to keep on spamming you. • **Spam Hater**; 806KB; freeware; Net Services; [www.cix.co.uk/~net-services/spam/spam\\_hater.htm](http://www.cix.co.uk/~net-services/spam/spam_hater.htm), [spamh.exe](#)

Millions of people use e-mail every day to share private data—payroll numbers, passwords, gripes about the boss—without realizing the security risks. Anyone who handles your e-mail—from a server administrator to a hacker—can read it. How can you protect yourself? An e-mail encryption program hides your messages from prying eyes by scrambling plain text into gobbledygook, which only the recipient of your e-mail can decrypt.

If your company conducts business over the Internet, you should probably arrange to sign your e-mail with a digital signature, too. A digital signature

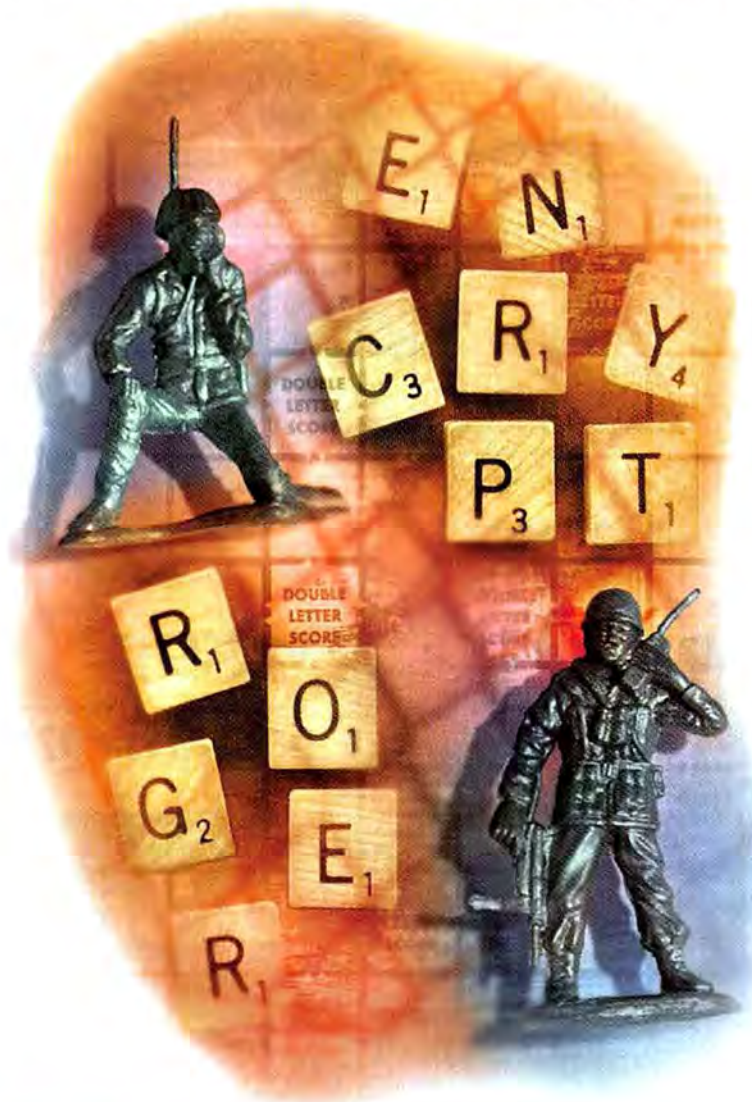
assures the recipient that the message came from you, eliminating the possibility that a mischief maker or criminal might successfully pose as you by forging your e-mail address. A digitally signed e-mail is as legally binding as a written contract signed by hand.

You could use an e-mail program with the S/MIME (Secure Multipurpose Internet Mail Extensions) encryption protocol to encrypt and sign messages, but there are tradeoffs: You have to pay a fee for your own permanent set of keys to use S/MIME. And early implementations of S/MIME weren't always interoperable. To you and me, that means e-mail encrypted with S/MIME by some versions of Messenger wasn't always decryptable by some versions of Outlook, for example. Though Netscape and Microsoft claim that S/MIME now works perfectly between the newest releases of their applications, you still might run into S/MIME problems with older e-mail programs.

To protect your e-mail from snoops, buy a third-party encryption program. Unlike browsers, these programs make their own encryption keys, so you don't obtain them from a third party. Another plus: If you and the people to whom you send e-mail have the same encryption package, you need not even use the same e-mail program.

Stand-alone utilities also beat your built-in e-mail encryption system by offering tougher security. Encryption experts claim that e-mail created with a 40-bit encryption scheme (which is what the browsers offer) can be cracked by a college computer lab in a couple of hours. According to the same experts, it would take a computer lab "until the end of the universe" to break a file scrambled with 128-bit encryption keys. All the packages discussed here offer at least 40-bit encryption. But some—including our Best Buy, PGP for Personal Privacy—can scramble e-mail with keys as long as 4096 bits, a level of mathematical complexity that makes messages virtually uncrackable.

PGP for Personal Privacy works with any e-mail package and any other type of application, another reason it's the pick of the litter among encryption ►





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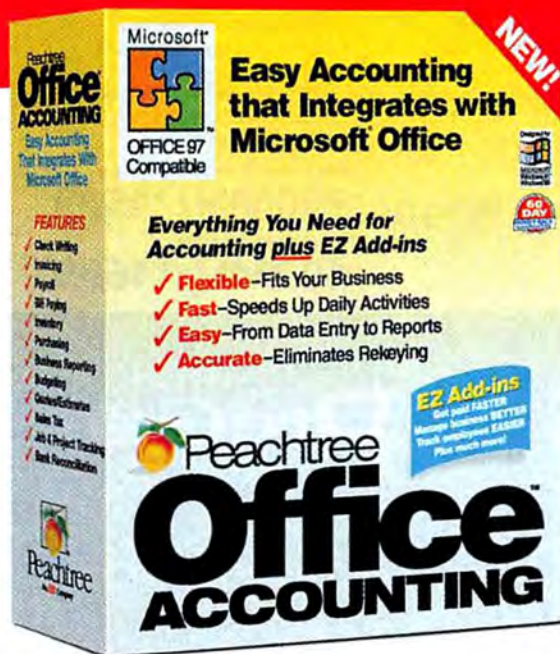
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packages. You just highlight and copy the text you want to encrypt. PGP is the best encryption option to use with AOL or an office e-mail system like Lotus Notes. The other utilities work only with e-mail packages based on the Simple Mail Transfer Protocol for Internet e-mail.

# 1 PGP FOR PERSONAL PRIVACY



For keeping your electronic correspondence private, we endorse PGP for Personal Privacy. It was the easiest of the four programs we tested to install and use, and it's free for nonbusiness purposes. (For busi-

ness use, Network Associates expects you to cough up \$40.) Like the other packages reviewed here, PGP uses a public key/private key encryption scheme (see "Security Speak" for definitions). To send another PGP user a private message, you must have that person's public key. If you do have it ►

## Security in the Wired Workplace

From recent news stories, a company might think its biggest security risk is a Web-surfing teen. Hackers do present a security threat to business, but they're small players in the overall picture. If your job is to ensure that your company's systems stay up, here are five steps you can take to provide maximum protection for your systems.

### CREATE A POLICY

**1** Your first priority should be to establish a concrete security policy. This involves, among other things, identifying what your company's security goals are. Typically, these include preventing the theft of computer equipment and the release of confidential information, and ensuring nonstop operation. A bank, for instance, has very different security needs from a small Web search engine company.

Once you have a policy that management approves, make copies of it and have every employee sign one affirming that he or she will adhere to it. Then keep those copies on file.

### PROTECT YOUR PCs

**2** Preventing the loss of expensive RAM or CPU chips is a central concern of businesses that have many

PCs. Computers kept in public places are especially vulnerable due to intermittent supervision, but you can lower the risk with locks and ID stickers.

Most portables have a lock slot on the back panel for cable locks. Kensington Micro-saver cables can't be removed without severely damaging a computer's case (and torpedoing the machine's value on the used-equipment market).

STOP (Security Tracking of Office Property) sells stickers (\$25 for one, or \$8.25 each in quantity) listing an ID number and a phone number to call when a lost or stolen computer is recovered. You

attach the sticky plate to the PC, and if a person peels it off, it leaves an indelible ID tattoo on the case.

•Kensington MicroSaver; \$25-\$50 street; Kensington; 800/280-8318; [www.kensington.com](http://www.kensington.com)

INFONET NO. 648 •Stop plates; \$8.25-\$25 list; STOP; 800/488-7867; [www.stoptheft.com](http://www.stoptheft.com)

INFONET NO. 649

### CONTROL SERVER ACCESS

**3** After theft-proofing your PCs, you need to concentrate on safeguarding the data they contain.

One useful device for pro-

tecting a network is SecurID, a credit-card-size computer with an LCD screen. Every minute, a different code number pops up on the card's display. To access a server, a would-be user must enter the standard username and password, as well as the correct SecurID code. •SecurID; price varies; Security Dynamics; 800/495-1095; [www.securid.com](http://www.securid.com) INFONET NO. 650

### ENCRYPT SENSITIVE DATA

**4** The very idea of encryption conjures up images of Cold War espionage replete with secret agents in trench coats. But in corporate life, scrambling your data can protect your company from

**Hackers do present a threat to business, but they're small players in the big picture.**

suffering harmful unauthorized information leaks.

Just as with e-mail and files, you can protect confidential information on a Web server using encryption. If you run a corporate intranet and your Web server software will encrypt data, change all of the URLs so they begin with <https>: instead of <http>:—this turns on the built-in encryption found in Web browsers and ensures that any data sent between server and browser can't be read by outsiders.

### DEVELOP BACKUP SYSTEMS

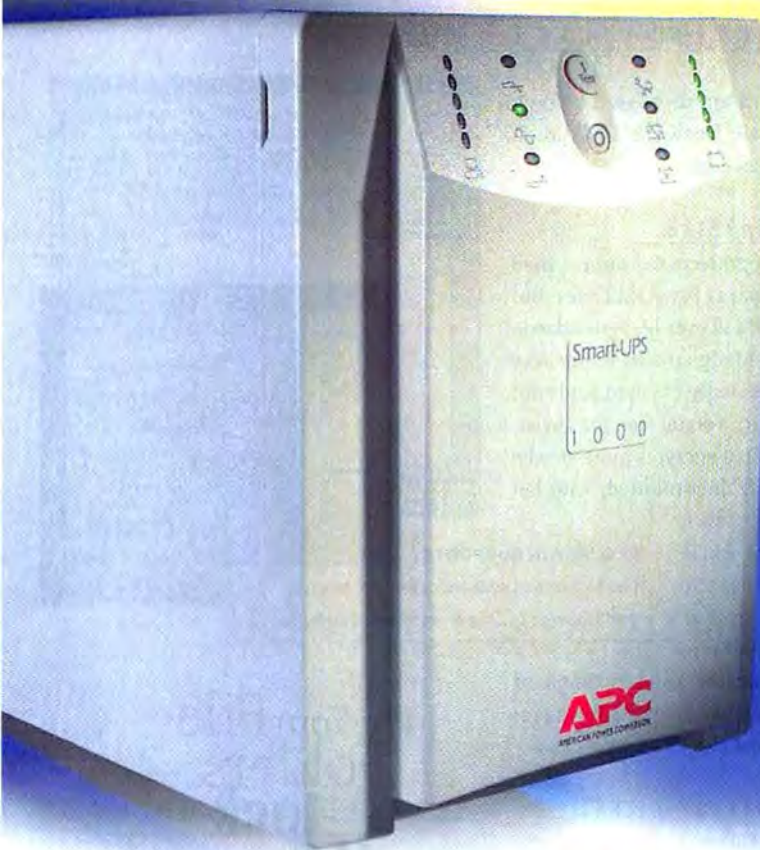
**5** All complex systems eventually fail, so you should maintain backup networking systems, as well as data. Last May, customers of PageNet lost all paging service for four days when the Galaxy IV satellite failed in orbit. In contrast, customers of PageNet's biggest competitor, SkyTel, enjoyed uninterrupted service. The reason: SkyTel's redundant network allowed it to operate without missing a beat.

One oft-overlooked area of vulnerability is the building's power supply. If you lost power for 10 seconds, how much data would your business lose? Besides buying an uninterruptible power supply for each server, make sure everyone in the office has one. Most employees neglect to save or back up files on their hard drives regularly.

The best way for a large company to protect against a corporationwide system failure is to build a redundant system at a different location. The site should have enough computing power, disk storage, and network connections to replace the primary office network. It should also receive frequent data transfers from the file servers, so the files will be up-to-date if you ever need to switch over to them.

—Simson L. Garfinkel





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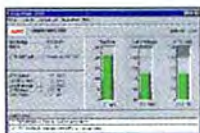
**Telecom Management**  
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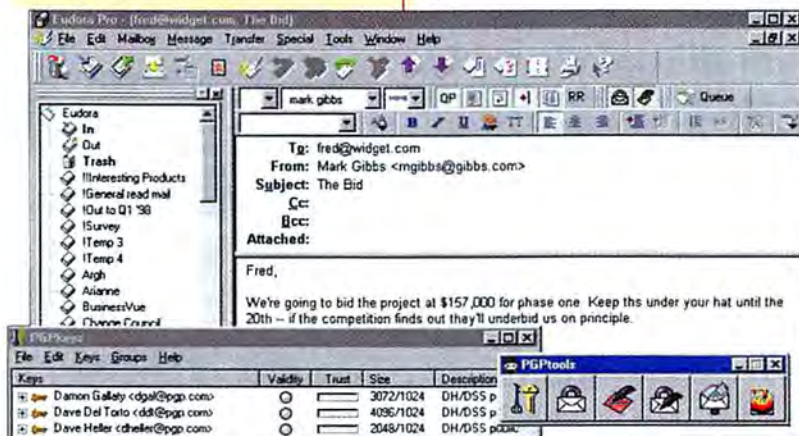
(people usually put their public key at the end of their e-mail messages), you can copy and paste it into the PGPKeys window. The PGPKeys program also lets you search special servers on the Internet that contain the public keys of everyone who posts one. When you find the public key you're looking for, you just select it from the list and click the *Add* button.

PGP works with any program. Encrypting is as easy as highlighting text, copying it, and clicking on the PGP icon in your system tray. PGP will encrypt or sign any text in the clipboard. • **PGP for Personal Privacy**; \$40 list (for business); Network Associates; www.nai.com; 800/764-3337 INFONET NO. 634

## 2 RPK INVISIMAIL

If you use Qualcomm's Eudora, Microsoft's Outlook or Exchange, or Netscape Messenger, RPK InvisiMail is an encryption option worth considering.

**PGP FOR PERSONAL PRIVACY'S simple icons enable you to quickly toggle e-mail encryption and/or authentication.**



RPK InvisiMail monitors all your incoming and outgoing e-mail messages, encrypting and decrypting them on the fly. Everything is automatic: RPK InvisiMail keeps a running list of other InvisiMail users' public keys by scanning the header of every incoming message. Later, when you send a message to the same address, the program encrypts the e-mail with the appropriate public key. In turn, RPK InvisiMail inserts your public key into the headers of outgoing messages. And best of all, the program didn't crash our system (as

did Mailguardian, discussed below). • **RPK InvisiMail**; freeware; InvisiMail; www.invisimail.com

## 3 MAILGUARDIAN

Mailguardian protects the same e-mail programs much as InvisiMail does. But picking InvisiMail over Mailguardian is a no-brainer. Mailguardian seems less stable (it repeatedly crashed Eudora); it's costly (\$69, versus free for InvisiMail and PGP); it encrypts more slowly; and it's poorly documented. And because the company's based in Israel, you'll have to schedule tech support calls around the time-zone differences. • **Mailguardian**; \$69 list; Vanguard Security Technologies; 972 4/855-1410; www.vguard.com INFONET NO. 635

## 4 WORLDSECURE CLIENT

WorldSecure Client integrates smoothly with Eudora, Outlook, and a mountain of other e-mail applications, and it functions similarly to the other programs here—automatically identifying

### SECUREWIN SUPPORTS

file, folder, and disk encryption, as well as a wide range of unique and useful features.



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How many times have you gone to lunch and kept your PC on? Or left your office on a Friday evening without locking the door? Even if you keep your PC under lock and key, someone could read or copy your important files. If you worry about intruders breaking into your PC, a file-encryption program can take a load off your mind.

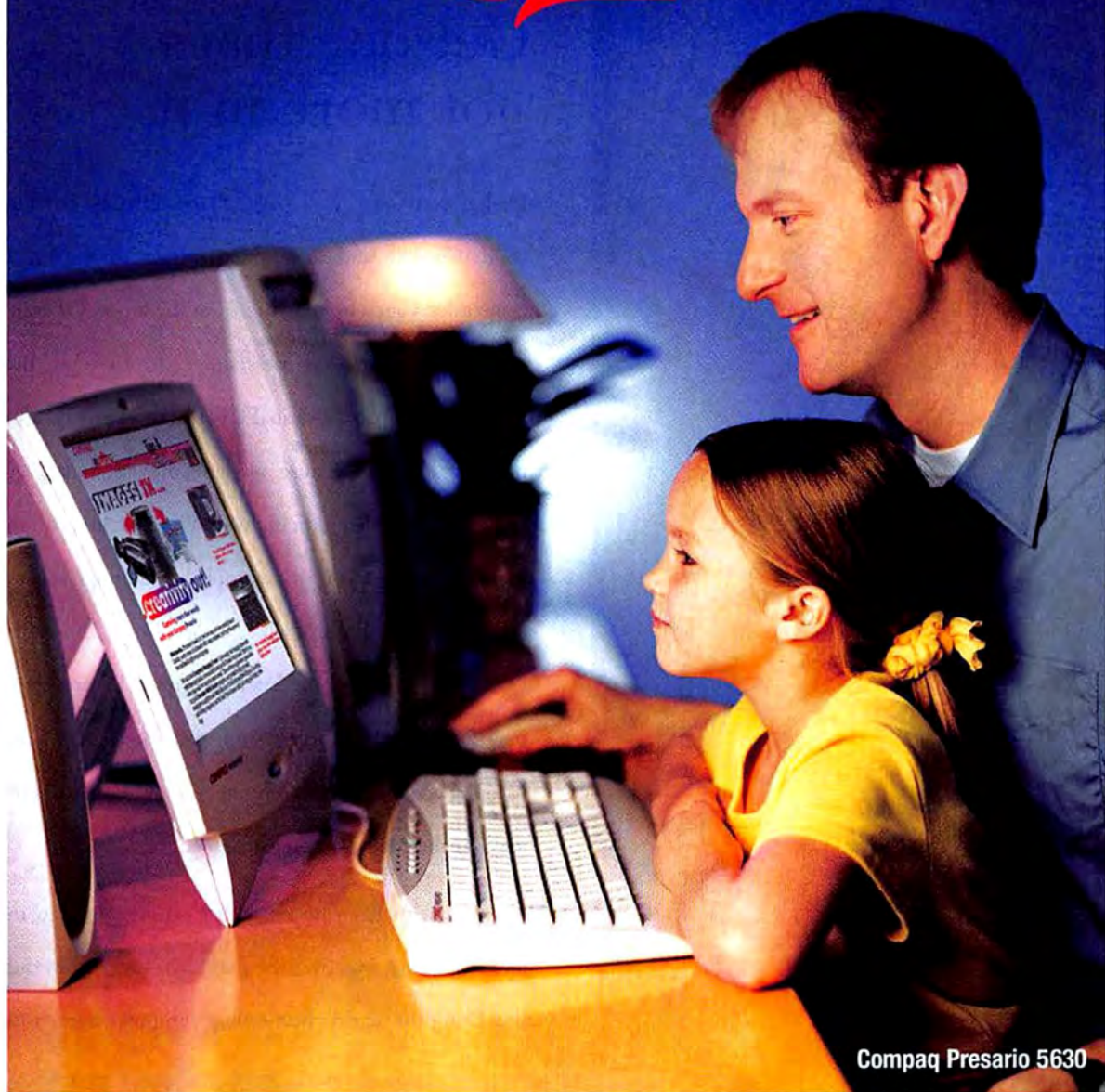
Like e-mail encryption programs, file-encryption software protects sensitive information by scrambling it so that even a hard disk thief armed with disk recovery tools can't read it. We looked at eight packages that encrypt and decrypt individual files, directories, or entire hard drives. The best deal is SecureWin Technologies' SecureWin, an arsenal of encryption and other safety features.

## 1 SECUREWIN

You can't get a more comprehensive data security package for the price than SecureWin. It offers multiple tools, from easy-encryption folders to digital signatures to a *Mission Impossible*-like deletion feature. Like Symantec's Norton Your Eyes Only and Encore Software's Security 98, SecureWin lets you create special quick-



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encryption folders in Windows Explorer. Just drop the file you want encrypted into the folder, and its contents are protected automatically. Paranoia fans will go for Secure Delete. The electronic equivalent of a paper shredder, it repeatedly overwrites deleted files with zeroes so data recovery tools can't read them. SecureWin's most unusual feature is Self Destruct: You set the criterion (such as entering the wrong password 10 times in a row), and the program automatically deletes specified files if an intruder triggers it. Need we say you should back up the files you tag for this feature? • **SecureWin**; \$50 list; SecureWin Technologies; 800/364-0692; www.securewin.com INFONET NO. 637

## 2 SECURPC 2.0

SecurPC has a number of high-end features for power users—yet even novices can pick it up quickly. Among its most useful capabilities: transforming encrypted files into self-decrypting mini-programs, a handy feature if you want to share scrambled files with other people. The only catch: Recipients have to use a password you give them to extract the contents, creating a bit of a security dilemma in itself. • **SecurPC 2.0**; \$59 list; Security Dynamics; 800/732-8743; www.securid.com INFONET NO. 638

## 3 SECURITY 98

If you need a basic encryption utility and don't own an antivirus program, Security 98 is a good choice. It's one of the least expensive packages of the lot, and it offers virus protection, a feature we'd have expected to encounter in Symantec's Norton Your Eyes Only. However, if you've already installed a different antivirus application on your PC, it may conflict with Security 98's built-in program. • **Security 98**; \$39 list; Encore Software; 800/507-1375; www.encoresoftware.com INFONET NO. 639

## 4 DATASAFE ENCRYPTION

DataSafe Encryption is an easy-to-use, basic program that shares one high-end feature with SecurPC: It can create self-decrypting files, making it a solid choice if you like to send scrambled files to other people. (To unencrypt the files,

recipients need only a password.) Data Safe can also compress files, but it does this at an agonizingly plodding pace. • **DataSafe Encryption**; \$40 list; Nova Store; 800/668-2786; www.novastor.com INFONET NO. 640

## 5 ENTRUST/SOLO

Want to give several people in your company access to a highly confidential file and then track their changes to it? Unique among the programs reviewed here, Entrust/Solo generates multiple passwords so it can audit the actions of multiple users who open an encrypted file (say, on a networked file server). It's one of two programs (SecureWin is the other) that lets you digitally sign an encrypted file. • **Entrust/Solo**; \$49 list; Entrust Technologies; 888/690-2424; www.entrust.com INFONET NO. 641

## 6 NORTON YOUR EYES ONLY 4.1

With its multiple interfaces and rather technical design, Norton Your Eyes Only is more like a set of spare parts flying in formation than a fully constructed airplane. Not only are its looks off-putting, you can find most of its features—a quick-encrypt folder, a paper shredder, and an auditor—in other programs that cost half as much. • **Norton Your Eyes Only 4.1**; \$75 list; Symantec; 800/441-7234; www.symantec.com INFONET NO. 642

## 7 KREMLIN ENCRYPTION SECURITY SUITE 2.1

Kremlin Encryption Security Suite is fairly inexpensive for a file-encryption application, but all it does besides encrypt files is compress them, and you can ►





do that with a freeware utility like PKZip. We recommend that you spend \$15 more for SecureWin, which has compression and other features. • **Kremlin Encryption Security Suite 2.21**; \$35 list; Mach5 Software; 888/201-7131; [www.mach5.com/kremlin](http://www.mach5.com/kremlin) INFONET NO. 643

## 8 ENCRYPT-IT

Encrypt-It offers less for the price than any other package here. Besides handling encryption, Encrypt-It shreds files with a Secure Delete-like tool, but there its feature set ends. • **Encrypt-It**; \$89 list; Mae Dae Enterprises; 888/683-3860; [www.maedae.com](http://www.maedae.com) INFONET NO. 644



You'll find more security advice at [www.pcworld.com/sep98/defenders](http://www.pcworld.com/sep98/defenders). Mark Gibbs is a columnist for Network World. Michael S. Lasky is a senior associate editor at PC World. Simson L. Garfinkel is a freelance writer. Testing designed and performed by Elliott Kirschling and Nancy Miller. ■

# Body Blocks: The Future of Security Is Biometrics

The day may come when your computer will look you in the eye and know who you are—literally. Just as the police use fingerprints to verify a person's identity, computer makers are using biometrics—the measure of physical characteristics such as retina prints, palm prints, face prints, and even DNA profiles—to make their systems more secure.

## BODY PARTS

How does it work? Your biometric signature—your retinal pattern, for example—is recorded by a reader and stored in a database. To identify you, a computer system tries to find a match for your signature in a database of profiles. If the system can verify that you are who you say you are, it grants you access.

Perhaps fortunately, not every part of the body works for this purpose. To serve as a biometric, a physical trait must be reliably measurable, unique in each person, and unvarying over time—your weight, for example, wouldn't work. And some biometrics are more dependable than others, with low rates of false positives (when the system mistakenly thinks it has a match) and false negatives (when it rejects someone who really is the person he or she claims to be). Voiceprints can reliably identify you 90 to 99 percent of the time. Advocates of fingerprint-based identification systems say they're foolproof, but people can wear down their fingerprints simply by the type of work they do. Face recognition in particular is new and still full of glitches. One face recognition product, FaceIt PC 3.0 from Visionics (\$100), failed to recognize our tester consistently (see *New Products*, March 1998).

Still, the use of biometrics is growing more common. The necessary reader or scanner costs from \$300 to \$5000, but more-affordable products are coming to market. The VeriVoice Internet Security System, for example, uses your PC's microphone and standard sound card, plus a browser plug-in, to identify voiceprints over the Web. In our informal tests, the technology worked without any



Digital Persona's U.are.U

hitches, but in our opinion both the registration process and the user interface could stand improving. Digital Persona ([www.digitalpersona.com](http://www.digitalpersona.com)), meanwhile, markets U.are.U, a

\$150 to \$190 package that includes a fingerprint reader that plugs into your USB port (pictured here) and supporting software. In our tests of a preproduction version of the product we found it easy to set up and use—and most important, quite reliable. • **FaceIt PC 3.0**; \$100 street; Visionics; 201/332-9213; [www.faceit.com](http://www.faceit.com) INFONET NO. 651 • **VeriVoice Internet Security System**; price depends on number of users; VeriVoice; 609/924-3000; INFONET NO. 652 • **U.are.U**; \$150 to \$190 (price depends on application used); Digital Persona; 650/261-6070; [www.digitalpersona.com](http://www.digitalpersona.com)

INFONET NO. 653

## EYE CONTACT

One of the most promising—yet disturbing—biometric technologies available today measures the pattern inside the human iris. Marketed by IriScan, this system creates a detailed profile for each eyeball it scans. The company claims the product's reliability level exceeds that of any other biometric system. Though it remains too expensive to be appropriate for personal use, the technology is showing up in various corporate implementations around the globe (as an alternative to personal identification numbers for automated teller machines and for collecting fares on public transportation, for instance).

**Advocates of fingerprint-based identification systems say they're foolproof, but people can wear down their fingerprints by the work they do.**


Many people find biometrics disquietingly futuristic or unduly invasive—ironic, considering that it was invented to prevent information tampering. The fact that biometrics companies are uniformly blasé about such concerns is a bit disconcerting as well. But these technologies aren't physically invasive, and they pose no known health risks. Hence, the concerns about them seem to be fundamentally ethical rather than physiological. Do people really want to be fingerprinted every time we shop? Regardless, we'll probably be seeing more of this technology—and it will be seeing more of us—in the near future. Best to keep an eye out. —S. L. G.



# Large Screens go Mainstream

*19+ inch monitors  
extend their presence across  
the enterprise*

*Today's operating systems have transformed the desktop into an environment where it's easy to work in many applications at once—if you've got the screen space to accommodate all the open windows.*

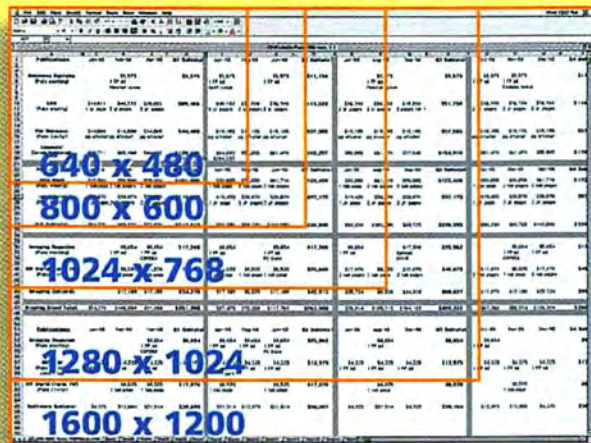


**T**oday's 32-bit architectures and networking capabilities have shifted the focus of the information age. Thanks to the Internet and the movement from DOS to Windows, what was once a text-based, one-application-at-a-time environment is now a visually rich space where a multitude of windows may be open at once. Today's systems let you routinely move among programs on the fly—from the browser to a spreadsheet and on to a database. These advances have changed the way we view and use information. They have also placed desktop real estate at a premium and increased the need for displays that can effectively handle visual detail.

## Big screens deliver big benefits

Because of these changes, people who spend their day looking square in the face of a monitor are recognizing the deficiencies of traditional displays. These "knowledge workers" are moving to large-format, 19-inch and larger displays for the benefits they offer. By working with high-resolution monitors they are discovering the increased productivity that comes with viewing multiple windows simultaneously and reading on-screen documents faster. This productivity boost lets people work longer and more comfortably and ultimately translates into faster time to market and better customer service. And because a quality, high-resolution monitor can eliminate the blurry and fuzzy text and images of





A larger and higher resolution screen increases productivity by letting you view more information at one time. This graph shows the increased portion of a spreadsheet that can be viewed when using higher resolutions on a large-screen monitor.

traditional models, there are fewer physical problems associated with eye strain and fatigue. Over time that can save money with less employee time off and fewer medical expenses.

Given these pluses, it's no surprise to learn that 19 to 21-inch monitors are the fastest-growing segment in the display market. And with prices coming down, large screens are now appearing in a broad variety of corporate settings.

## Seven features you should look for in selecting a large-screen monitor

Selecting a large-screen monitor that's appropriate for your business should go well beyond a simple

comparison of cathode ray tube (CRT) size and maximum viewable area. With so many monitors that appear comparable, how do you choose one that maximizes the productivity gains that the large-screen format promises?

**1 Consistent Image Quality**—When you go from a 15-inch screen to a 19-inch or larger version, you'll experience better image quality no matter what brand you choose. But does that quality drop off at the edges? The ability to generate consistent, sharp images from edge-to-edge depends on the quality of the gun that is used to fire electron beams at the CRT faceplate. With many monitors, the spots created by the electron beam grow larger and distorted at the edge—creating poor focus and decreasing the legibility of text. For edge-to-edge image quality, look for a monitor whose electron gun technology—such as Cornerstone's SuperFocus process—produces small, round spots and has the ability to dynamically correct the electron beam shape at the screen's edge.

**2 High Bandwidth**—Resolution and refresh rate are key specifications. As resolution increases, the refresh rate (the times per second that a screen is "repainted") falls inversely. So the higher the resolution, the lower the refresh rate, unless you have sufficient subsystem bandwidth. Anything below 85 Hz will produce screen flicker, causing eye fatigue. What's needed to support your desired resolution while achieving a minimum refresh rate of 85 Hz is sufficient subsystem bandwidth.

## Do you need a new graphics controller card?

All 19-plus-inch monitors deliver imagery superior to that of their smaller counterparts right out of the box. However, matching a monitor with an advanced graphics controller can increase the monitor's performance. For this reason, it's recommended that you evaluate your existing controller card to determine if it has the features that will get the most out of your new purchase. If you decide to replace your card, select one that handles resolutions of up to 1800 x 1440 for high

legibility as well as one with enough bandwidth to optimize the refresh rate. For better results, choose a card that was specifically designed to work with your monitor's subsystem. For instance, the new ImageAccel 4 controller card

from Cornerstone will work with any monitor to deliver speed, clarity, shift-on-the-fly resolution switching, and 250 MHz video bandwidth for flicker-free refresh rates. But when the ImageAccel 4 is teamed with a Cornerstone monitor, users also benefit from an expanded selection of resolution-refresh rate combinations plus increased ease of use.



The ImageAccel 4 graphics controller card is designed to maximize productivity. When optionally matched with a Cornerstone monitor, it provides ultimate performance and ease of use.



\*Horizontal Scan Frequency

Resolution	Refresh Rate	Bandwidth Required*
1856 x 1392	80 Hz	130 kHz
1600 x 1280	85 Hz	117 kHz
1600 x 1200	85 Hz	107 kHz
1280 x 1024	85 Hz	95 kHz
1024 x 768	85 Hz	70 kHz

Be sure to select a monitor with enough bandwidth to support your resolution needs.

**3 High Contrast**—There's nothing more legible than crisp, black text on bright, white paper. A monitor that's well designed can come very close—if it provides enough contrast. To deliver a level of contrast that replicates the readability of paper documents, Cornerstone uses high-contrast Direct Faceplate coatings on the inside of the screen and Crystal

**R**esult: a contrast ratio that exceeds non-coated monitors by nearly 10 percent, while delivering rich, vibrant colors.

**4 Tight Dot Pitch**—To pick up the finest gradations of color, tone, and texture requires tight dot pitch such as that provided by Cornerstone's shadow mask technology. For optimum viewing, choose a monitor with a phosphor dot pitch range of 0.25 - 0.27 mm and a horizontal dot pitch of 0.22 mm.

**5 Small Footprint**—Some large-screen monitors will take over your entire desktop.

With Cornerstone's Short Neck design, a 19-inch monitor (front) significantly reduces the desk space required as compared to a standard 19-inch (back).

If your space is limited, look for solutions such as Cornerstone's Short Neck design which utilizes a 100 degree deflection yoke to allow a 19-inch model to have the same depth as many 15-inch monitors. Additional innovations like beveled rear corners, right angle cables, and Short Depth Cabinet layouts have reduced the physical depth of 21-inch monitors by up to two inches which allows users to place them further back in their work space.

**6 Quality Components**—Many large-screen monitors have the same components in a 21-inch model as found in the 17-inch line. While the technology works, it does not achieve the best

results. That's why it's important to look for a monitor whose components have been designed to meet or exceed the requirements of the large-screen format. Also, look for technology that is frequently upgraded to take advantage of innovation. Ask about quality control procedures and check for ISO 9000 certification.

The best subsystems tend to be developed by companies that specialize exclusively in the large-screen format.

**7 Professional Service and Support**—If you're purchasing a monitor for business purposes, you'll

want service and support geared for the professional user. Many brands have a retail heritage that has equipped them to serve the needs of the consumer market very well. But for service that understands the impact that downtime can have on business-critical operations, look for a brand that is devoted to the professional market. That's the best way to assure you'll receive advanced support options like on-site service and overnight replacement.

For more information about Cornerstone high-resolution monitors and controllers, call (800) 562-2383 ext. 11 or find them on the Web at [www.BigMonitors.com](http://www.BigMonitors.com)



Cornerstone's SuperFocus electron gun technology corrects electron beam distortion to provide razor-sharp images up to the very edge of the screen.







## Nothing's fuzzy on a Cornerstone

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There's nothing cute about hard to read text, screen flicker, or images that get distorted near the edge of the screen. One look at a Cornerstone high resolution, high contrast monitor and you'll see why the critics at *PC World* acclaimed Cornerstone to have "the best overall picture (they've) ever seen." And it gets even better. When you can clearly see your work on screen, there's no need to reduce, enlarge, or scroll endlessly in search of your work, increasing productivity across the enterprise. And that's enough to make anyone all warm and fuzzy. Call for a free brochure.

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**Cornerstone**





Ignore the horror stories you've heard about teenage hackers—the real threat to your business is in the office down the hall.

# Inside Job

**JUST AFTER MIDNIGHT** on January 28, 1998, the e-mail blasted its way to the 400-plus employees of Pixar Animation. It listed the salary of every Pixar employee, from secretaries to executives. Indeed, the only person whose salary was not on the list was the man who seemingly sent the message: CEO Steve Jobs doesn't draw a paycheck.

Pixar, the high-tech company in Richmond, California, responsible for the movie *Toy Story*, had been hacked. Someone—not Jobs—had sent the message using Jobs' return e-mail address (a common trick known as "spoofing"). More seriously, that same person had broken into the company's confidential personnel files. Pixar's managers quickly dispatched a second e-mail, denying that Jobs had sent the first. But the damage was done: The privacy of Pixar's employees had been violated, and they now knew that confidential data critical to their careers could be exposed for all of Pixar's competitors to see.

When most people think about threats to network security, they remember news reports about malicious teenagers breaking into the Pentagon or stealing India's nuclear secrets. But according to the scant available evidence, the culprit in the Pixar case was probably a current or former employee—making this story a lesson about

the security threats facing today's networked businesses. The greatest threat to individual and corporate privacy comes not from outside the gates, but from inside company walls.

## DON'T BELIEVE THE HYPE

This lesson seems to be lost in the steady stream of Congressional hearings and press accounts trumpeting the dangers of hacker or terrorist Internet attacks. The media's obsession with images of teen hackers prowling the Internet distorts the real problem of network security. For one thing, the young hackers who get all the attention aren't a threat to the average business. Some—such as the two ►





ILLUSTRATION BY WILLIAM DUKE



teenagers from Cloverdale, California, who broke into a series of U.S. military sites—are joyriding. Others—such as those who hit India's military network shortly after that country tested five

government's case of hackerphobia. The FBI recently claimed that cases of computer-related security breaches have risen by 250 percent in the past two years. Computer security experts and privacy advocates question the content of these reports (most of the "attacks" cited by the bureau might

tion software, went public in March, its stock rocketed from an opening price of \$16 to \$40.75 in its first day of trading.

"People need to look at this with a cool head," says Dave Banisar, staff counsel with the Electronic Privacy Information Center. "There's a great deal of hype, sales promotion, and covert advertising going on here."

## The hackers you've read about may not pose a threat to your business, but that doesn't mean your network is safe.

nuclear bombs—ostensibly have political motives. Neither shows any interest in targeting random businesses.

Other hackers have more constructive motives. Many erstwhile pranksters now make a living breaking into their clients' networks, finding security holes that should be closed. And the Boston-based LOPht group, a bunch of responsible hackers turned security consultants, made headlines by telling a Senate subcommittee that they could bring down the Internet in the time it takes to watch a sitcom. They never threatened to demonstrate their prowess; they were just pointing out system vulnerabilities that they hoped would be fixed.

Such hearings have exacerbated the

more accurately be classified as "nuisances") and their timing. Deputy Secretary of the Defense John Hamre divulged news of the Pentagon hacks just two days before Janet Reno announced she was seeking \$64 million from Congress for an FBI National Infrastructure Protection Center force.

Software vendors stand to profit from all this nervousness. Companies spent \$6.9 billion on firewalls and other network security products in 1997, according to Dataquest of San Jose, California; those same analysts say that number will rise to \$13.1 billion annually by the year 2000. This has made some companies very rich: When, for example, ISS Group, a maker of intrusion detec-

## THE ENEMY WITHIN

The hackers you've read about may not pose a threat to your business, but that doesn't mean your network is safe. In a 1998 survey by the Computer Security Institute, some 70 percent of the organizations polled said that their network defenses had been breached. The crucial detail: About two-thirds of the attacks came from the inside. So when you're evaluating threats to your network, you should ignore the hype and focus on the two likeliest perpetrators: embittered employees and spying competitors who've managed to worm their way inside your doors.

First, your IT people should do a ►

# The Usual Suspect

On the surface he seems the perfect employee—a self-starter with entrepreneurial skills who works easily without supervision. But beware: He's just the sort to steal your corporate secrets.

Deny him the raise or the credit he thinks he deserves, and he may strike out on his own—with some of your files. "Disgruntled employees need to be observed closely," says Joan Feldman, president of Computer Forensics in Seattle. "I've seen cases where employees will rationalize theft."

Furthermore, after years of downsizing, "people are more apt to circumvent the rules," according to Scott Wilcox, managing director of the San Francisco office of Kroll Associates, an international corporate investigations and management consulting firm. "Loyalties have broken down."

## WARNING SIGNS

Kroll looks for pressure points—the financial and emotional crunch of a divorce, the threat of a gambling debt, the specter of substance

abuse. A sudden increase in secretiveness or erratic behavior may also signal trouble, says Wilcox, though he confesses that "too often you find people you can't read."

The standard profile has been "the 40- to 50-year-old white male who feels as if the company got rich off of his efforts," notes Wilcox. But in today's high-tech companies, he says, "It could be the 27-year-old working insane hours who doesn't feel his contribution is being recognized properly." Wilcox adds that a generous stock option policy may be the best insurance.

## TAKING PRECAUTIONS

Besides instituting rigorous physical and computer security, Kroll recommends drawing up strict confidentiality and nondisclosure contracts. Bonding—indemnifying yourself against losses caused by the bonded employee—is another approach. "If you're letting people handle tens of thousands of dollars, you usually ask for some bond on those people," notes Computer

Forensics' Feldman. "Here, you usually have a collection of midlevel managers with the key to nearly everything you own, especially if you're in the business of creating intellectual property. Do you do a background check on them? Do you ask them to be bonded?"

Few companies bond their employees, but many now run background checks. Christine Beck is a private investigator in Seattle. Her firm, C.D. Beck and Associates, runs felony background checks on many new hires at a major software maker. "The stuff that people don't disclose and don't think you'll find is pretty amazing," says Beck.

But in the high-pressure, tight-security world of high-tech, Beck notes, companies aren't just worried about someone stealing secrets: "They don't need somebody going postal." Feldman recalls a case where someone walked out of a company after encrypting everyone's password. The employee wanted to be paid to return the information and didn't understand that this was extortion. "When they are holding the life and heart of your company," says Feldman, "they can be pretty disruptive."



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basic risk assessment: What valuable information does your company have, and how much are you willing to pay to protect it? You don't have to be Intel to be at risk. Even small companies have sensitive information that needs to be shielded from prying eyes. The next question: Who would want that information? Start with your competitors. Then add to that list any current or former employees who have both the technical know-how and the motivation. (See "The Usual Suspect," page 165).

Once you've figured out who might want to penetrate your network, you have to figure out how they'd go about it. Start by looking at the security measures your company already has in place. According to Patrick Taylor, director of strategic marketing at ISS Group, "most business networks are not very secure"—despite the myriad tools available.

Naturally, companies buying network security products think they're well protected. But such tools aren't always used properly. Experts note that firewalls may

be improperly configured or not allocated a dedicated server. And executives or engineers often ask for special capabilities that create vulnerabilities. "All of a sudden the president doesn't want his Web access filtered, so you remove the Web filtering only for him," says Jeff Moss, director of professional services at Secure Computing, which tests clients' network defenses by attempting to break through them. "Or some engineers want to FTP into a workstation. Next thing you know, you have different rules for different people." Each time you make such exceptions or build new capabilities into the firewall (such as videoconferencing or streaming audio), you risk opening a security hole.

### TRUST NO ONE

More importantly, these tools can breed complacency. "If a company has a firewall or its Internet connection is separated from the network, it may assume it doesn't have to worry," says Steven Lee, a security consultant for Verio Northwest, a national

Internet service provider. Or as Mark Graff, a security architect at Sun Microsystems, puts it, "In terms of threats to an enterprise's security, most losses occur inside the company. The model where we put a moat outside to keep the bad guys out is not very useful."

"It's much tougher to break into a company [from the outside]," says Secure Computing's Moss. If disgruntled employees or unscrupulous competitors want to hack into your network, chances are they'll do it from the inside. Moss describes one case in which a company reaped "an information bounty" by planting a summer intern in a rival's office. Another security firm recently cracked the loan files of a major bank by sneaking in at night with the cleaning crew and installing keystroke monitoring tools on the bank's PCs. Verio's Lee recalls one company he worked with in which half the people who knew the passwords for core business routers were contract employees.

A more common tactic, "packet sniffing," involves surreptitiously embedding a program in a victim's network to grab passwords as they are sent across the network. "Someone might bring a laptop to work, plug it into the net, and have it out of the way in a bag where you wouldn't see it," says Moss. Traitorous techies can also install a sniffer on a desktop PC, run it during the workday, copy the resulting log files back to disk, and analyze these at home. The best defense against packet sniffers: Use switched hubs to divide your network into small segments, reducing the sniffer's potential catch.

Another big risk: those friendly folks preparing your business's computers for the 21st century. Warns Moss, "A lot of companies will fix your year 2000 problem and steal all your corporate data for one low, low price." The solution? Hire two companies you know and trust; have one company write the software, and the other test it with your data.

Companies often focus so narrowly on data and applications that they overlook the dangers of e-mail. As ►



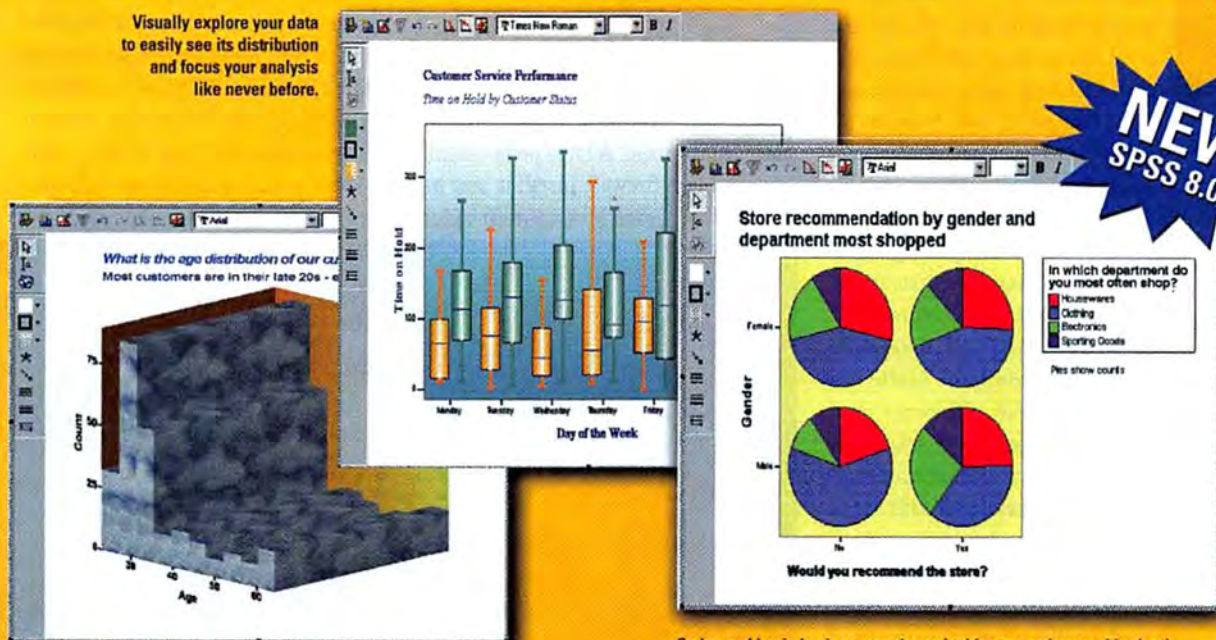
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intellectual property and trade secrets become increasingly important, ill-considered e-mail messages can present a serious hazard to your company's health. "People send things as attachments to e-mail that have no business going out of the company," says trade-secret theft expert Joan Feldman, president of Computer Forensics. Feldman recommends carefully limiting the number of recipients of e-mail concerning sensitive subjects such as competitive strategies and product announcements.

Even personalized e-mail services from Yahoo, Microsoft, or Excite can compromise security if they are used for business purposes. "If you know someone's user name, there are programs to guess passwords," says Moss. "Nobody logs these password attempts, so you can just keep cracking away." Even worse, many people use a single password for all their many accounts. If a hacker steals your Yahoo password, for example, and it's the same one you use to log on at work, that hacker has just gained entry to your network. The obvious solution: Vary your passwords.

Hardware, too, can be a risk. Sun Microsystems, for example, considers unauthorized modems so dangerous that an employee found with one is liable to be fired the same day. But Sun's Graff says that many big companies with strong firewalls overlook a more serious threat: huge banks of dial-in modems used to connect remote employees to the company network. "Some large companies have thousands of dial-in modems that have no security at all," says Graff—no password, authentication, or any other defenses. "You just dial the number and get a prompt."

Electronic eavesdroppers can also attack from an angle that computer-centric folks often overlook: the phone system. Hackers routinely crack the voice-mail box of a company's computer security official in order to monitor any ongoing investigations. At many large companies, an employee's phone number also serves as his or her universal communication number. Hack-

ers are capable of parlaying a phone call to that number (known in hacker circles as "social engineering") into access to the whole phone network.

## BUYING SECURITY?

Establishing dependable network security isn't like following a recipe for brownies. "A lot of people think you can buy a firewall, install it, and be done with it," says Moss. But in order

tury Fox have all used a company called Pilot Network Services of Alameda, California. Pilot offers a "dynamic" firewall, using its own experts to constantly update the system's defenses. Fox used Pilot to run the enormously popular *Titanic* Web site. All three companies say they've experienced no security problems since teaming up with Pilot.

Would outside experts have helped in the Pixar case? It's difficult to say. After



**The model where we put a moat outside to keep the bad guys out is not very useful.**

—MARK GRAFF, *Sun Microsystems*

for firewalls and other security tools to work correctly, the person setting them up must understand how networks work—and the ways in which they can be compromised. Moss warns that you can't just "have the person who knows the most [about computers] read the manual and do the job."

The best solution for many companies—especially those that don't have an IS department and those that are venturing into e-commerce—is to outsource security. Even large companies have decided that hiring experts makes more sense than relying on the in-house alternative. For example, Playboy Enterprises, PeopleSoft, and 20th Cen-

the company traced the intrusion back to a local ISP, the trail went cold. Though the ISP's electronic records pinpointed by name the user of the ISP services

associated with the offending e-mail, that user turned out to be a computer rental bureau, and the culprit could have been anyone who happened to pay for computer time. It's the final lesson of the Pixar case: Better to prevent someone from hacking your network in the first place, because catching them after the fact—and repairing the damage—may not be an option.

*Jonathan Littman is the author of The Fugitive Game: Online With Kevin Mitnick and The Watchman: The Twisted Life and Crimes of Serial Hacker Kevin Poulsen (both from Little, Brown and Company).*

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# Buyer Beware

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shop in cyberspace?

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in a warehouse district, Reel.com doesn't look like a showpiece for electronic commerce. Inside the online video store's loft-space office in Emeryville, California, every day is dress-down Friday. A popcorn machine has been ordered for the reception area. In a time of consumer wariness about on-

line shopping, Reel.com's no-frills operation doesn't exactly inspire confidence.

But looks aren't everything. Beneath Reel.com's

decidedly unconventional veneer lies a state-of-the-art enterprise with some top-notch security policies and procedures to protect credit card information from hackers and thieves. Renting a video from Reel.com is, indeed, as safe as walking into a Blockbuster store and whipping out your plastic.

## WINDOW-SHOPPING THE WEB

**O**nline shopping offers time-strapped consumers a seemingly unbeatable combination: a limitless selection of merchandise at stores open 24 hours a day, seven days a week. No more waiting in line for groceries. No more late-evening dashes to shop for gifts.

Business and financial analysts are predicting huge growth in the still-fledgling world of electronic commerce. Forrester Research in Cambridge, Massachusetts, for example, expects online sales to vault from \$4.8 billion in 1998 to \$17 billion in 2001—small change in the United States' vast economy, but an exponential leap nonetheless.

For all the hype and lofty predictions, however, online shopping remains a novelty for all but a few adventuresome cybernauts. Only 20 percent of wired adults—and only 5 percent of North Americans—have made even one online purchase, according to the nonetheless-bullish Forrester.

BY ROBERTA FURGER



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ILLUSTRATIONS BY KEVIN IRBY





Poor product selection, difficult site navigation, and slow connections can all keep shoppers offline. But the stumbling block cited most often by merchants and consumers alike is fear. "Consumers—particularly inexperienced surfers—worry about what might happen if they send their credit card data over the Internet," says Maria LaTour Kadison, Forrester senior analyst. "And they're concerned about dealing with an unknown merchant. They wonder if they'll ever get the goods."

Phil Polishook agrees. He's vice pres-

take very few precautions or be as safe as Fort Knox, but in most cases you must figure out the situation on your own. The safety of your credit card data depends on your being informed.

### WHERE RISK RESIDES

**A**sk online merchants if it's risky to send credit card data to their sites, and the response is uniform: It's chancier to hand your credit card to a waiter in an unfamiliar restaurant.

The comparison is compelling, but it doesn't give the full picture. It focuses attention on the transmission of data (where risk is negligible if the online merchant offers secure transactions based on the Secure Socket

Layer encryption standard) while ignoring the more pressing issue: What happens to your credit card information after it arrives at the merchant's Web site? That's when the information can be most vulnerable—both to hackers outside the firm and to disgruntled or dishonest employees inside.

In May 1997, the FBI arrested Carlos

Felipe Salgado, Jr., after he allegedly tried to sell a CD-ROM containing 100,000 credit card numbers harvested from Web sites of online merchants and Internet service providers. Salgado was caught, the FBI says, after he bragged online about how easy it was to bypass companies' security. The total credit limit carried by the "stolen" cards was estimated at nearly \$1 billion.

In July 1997, thousands of consumers who had recently purchased merchandise from the NBA and ESPN Web sites were shocked to receive an anonymous e-mail message that included portions of their credit card numbers and warned that their personal information had been retrieved from an unsecured server. The hacker-with-an-agenda who was responsible for the message apparently never made any actual purchases using the illegally obtained information. The Web sites, for their part, implied that the security meltdown had been an inside job.

With a little effort, you can avoid falling victim to a cyberheist. If you ►

### Half of all e-commerce sites don't even use encryption—the Web's bedrock security feature—to protect your credit card.

ident of marketing for EToys (www.etoys.com), a rising star of e-commerce. Despite EToys' many efforts to put new customers at ease—a money-back guarantee, a security pledge, even key employees' photos and first-person narratives—security concerns persist. "We held a focus group last spring and were amazed at how many people talked about security," he says.

To find out how justified this fear is, we talked with experts and combed the Web, analyzing e-commerce sites ranging from large businesses that pioneered online shopping to solo operations run out of the proprietor's home. (See "Which Sites Can You Trust?" on page 178 for an analysis of 14 major sites.) Most big sites—where roughly 80 percent of all e-commerce happens—take good care of your financial data. But even among them, some sites are safer than others, and smaller sites typically take far fewer security precautions or ignore the issue completely. Half of all e-commerce sites don't even use encryption—the online world's bedrock security feature—to scramble your credit card information as it traverses the Net. And just because a site displays a security certification seal doesn't mean you should trust it (see *Top of the News*, page 58).

An even bigger obstacle to worry-free shopping is the scarcity of sites, large or small, that fully inform consumers about their security practices. A Web site may

## Tips for Secure Web Shopping

- **GET THE BASICS.** Be sure to obtain a mailing address and telephone number for any online business you purchase from. This contact information will come in very handy should any problems arise with your order.
- **CHECK THE SOURCES.** If you have questions about a merchant, call the Better Business Bureau in the city where the merchant is located. You'll find local BBB phone numbers at [www.bbb.org/bureaus](http://www.bbb.org/bureaus). Also contact Internet Fraud Watch (800/876-7060, [www.fraud.org](http://www.fraud.org)) and ask if it has received any complaints about the merchant.
- **BE SECURITY-SAVVY.** Check your browser for a padlock symbol signifying that the merchant incorporates SSL encryption into its order process. Locate or request a security or privacy statement that spells out how the merchant handles sensitive data. If possible, find out who has access to credit card data within the company.
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know what security features to look for on the Web, and you aren't afraid to ask site proprietors a few pointed questions, you can ensure that your credit card information is as secure online as it is at your favorite eatery.

## SCRAMBLING THE DATA

It's easy to figure out whether your credit card data is secure as it travels from your PC to your Web merchant's server. Just check your browser: The URL of a secure (encrypted) page begins with 'https' rather than just 'http'; if you're using Microsoft Internet Explorer 2.1, Netscape Navigator 2.0, or a later version of either, you'll also see a closed-lock symbol in the status bar at the bottom of your browser screen.

Most major Web merchants—from Amazon.com to Wal-Mart—offer you the option of submitting credit card

data via a secure server. This should be your first choice anytime you use a credit card to purchase merchandise online. If you are using an older browser that does not permit SSL encryption (which you need in order to take advantage of a secure server), it's about time you updated your software.

You might also have trouble connecting to a secure server if you're logging on from the office: For internal security reasons, many corporations prohibit employees from establishing secure connections. In some instances, you may have the option of sending your order via a standard server (one that doesn't support encryption). To accommodate their corporate customers, many sites (including Amazon.com, CDNow, and Reel.com) allow consumers to choose the method of transmission they prefer. We recommend, though, that you opt for the secure server

whenever possible—even if that means waiting a few hours and placing your order from home.

Many smaller Web-based retailers do not offer encryption at all. Instead, customers send in their orders via unsecured forms or e-mail messages. Some merchants say that the volume of their business doesn't justify the cost and hassle of encryption. Others, like David Cutter, who sells rock-and-roll memorabilia on his Legends site ([www.concertposters.com](http://www.concertposters.com)), offer encryption as an option largely because of the media coverage about the dangers of Web shopping. But Cutter doesn't think it's absolutely necessary to protect credit card data, and finds that his customers continue to place orders on his unsecured server.

Even if the risks are small, an online merchant's neglect of security measures raises serious questions about its

## Which Sites Can You Trust?

When it comes to protecting your credit card security and privacy, none of the 14 major e-commerce sites we examined seemed airtight. But some do a better job than others of locking down your information.

COMPANY	Overall rating	SECURITY FEATURES			INFORMATION SHARING			STORE POLICIES			
		SSL encryption	Firewalls	Bars service reps' access to data	Contact information location	Security policy location	Privacy statement location	Offers security guarantee	Doesn't sell customer data	Doesn't put customer on mailing list	Take credit card data by fax/phone
1-800-Flowers <a href="http://www.1800flowers.com">www.1800flowers.com</a>	fair	●	●	○	fair	excellent	excellent	○	○	○	both
Amazon.com <a href="http://www.amazon.com">www.amazon.com</a>	good	●	●	1	fair	excellent	fair	●	●	○	phone
CDNow <a href="http://www.cdnow.com">www.cdnow.com</a>	fair	●	●	○	fair	good	good	○	●	○	both
Dell Computer <a href="http://www.dell.com">www.dell.com</a>	good	●	●	○	excellent	excellent	excellent	○	●	○	both
EToys <a href="http://www.etoys.com">www.etoys.com</a>	good	●	●	○	poor	excellent	excellent	●	●	○	neither <sup>2</sup>
First Auction <a href="http://www.firstauction.com">www.firstauction.com</a>	fair	●	●	○	excellent	fair	fair	○	●	○	neither
Gamestorm <a href="http://www.gamestorm.com">www.gamestorm.com</a>	fair	●	●	●	fair	poor	poor	○	○	○	phone
The Gap Online Store <a href="http://www.gap.com">www.gap.com</a>	good	●	●	○	good	excellent	excellent	○	●	●	both
Microsoft Expedia <a href="http://www.expedia.com">www.expedia.com</a>	fair	●	●	○	good	excellent	excellent	●	○	○	phone
Peapod <a href="http://www.peapod.com">www.peapod.com</a>	fair	●	●	○	excellent	fair	poor	○	●	○	both
Reel.com <a href="http://www.reel.com">www.reel.com</a>	fair	●	●	●	good	good	poor	○	●	●	both
REI <a href="http://www.rei.com">www.rei.com</a>	good	●	●	○	excellent	excellent	excellent	○	○	○	both
Virtual Vineyards <a href="http://www.virtualvin.com">www.virtualvin.com</a>	fair	●	●	○	excellent	fair	poor	○	●	○	both
Wal-Mart <a href="http://www.wal-mart.com">www.wal-mart.com</a>	good	●	●	○	good	excellent	poor	●	●	○	both

● Yes ○ No

<sup>1</sup> Information not available from company.

<sup>2</sup> Company says it will start accepting phone orders in September.

**HOW WE RATED THE SITES:** We evaluated sites as poor, fair, good, or excellent based on three major criteria: security features (whether the site uses SSL encryption and firewalls, and bars customer service representatives' access to data); information sharing (ease of finding contact information, security policy, and privacy statement); and store policies (whether it offers security guarantees, refrains from selling customer data, doesn't put customer on its mailing list by default, and accepts credit card information by phone and/or fax).





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commitment to trouble-free commerce. "[Encryption] is cheap and easy to implement," says Warren Rosenfeld, CEO of Anacom, an Internet transaction processing company in Dallas. "There's no good reason why they shouldn't use it."

### WHO SEES YOUR DATA?

**D**etermining whether credit card information is secure in transit is easy. Gauging security risks at the back end of the e-commerce site is not.

All of the major online merchants we spoke with, including Dell Computer and Microsoft Expedia, said the credit card data they collect is encrypted and stored on a server and behind firewalls (which sit between a private network and the Internet and block inappropriate connections). But the truth is, a talented hacker can bust through state-of-the-art firewalls and decipher encrypted data. However, the vast amount of time, computing power, and expense

that this piracy requires serves as an excellent deterrent, experts say.

The real threat resides at the e-commerce offices. Merchants exercise varying degrees of vigilance in guarding your credit card information. At some sites, such as Reel.com and Gamestorm, only top management accesses this data. Others, including CDNow and Dell, give customer service representatives regular access to credit card information.

Clearly, a more relaxed approach simplifies customer transactions. But it also poses a security risk. Customer service departments often have a high employee turnover rate—meaning that many people may have access to your credit card information within a short time.

In general, the wider the access, the higher the risk. But more-established mail-order companies that take orders by phone, like the outdoor outfitter REI, have managed complex databases of credit card and personal information for years. No doubt

their online divisions—and their customers—benefit greatly from the procedures and policies instituted for their phone-order business.

One potential solution is Secure Electronic Transactions, a system that separates order information (which goes to the merchant) from credit card information (which goes to a financial institution for verification). In SET, credit card data resides in the consumer's browser. In the browser, you just click on the picture of the card you want to use, without typing any credit card information or worrying about data falling into the wrong hands. The concept sounds promising, but so far SET has generated little enthusiasm outside the credit card companies promoting it. Most analysts and merchants agree ►

## The Fraud Factor

**I**t's a consumer's nightmare: You respond to a great offer online, only to discover that you've handed over your credit card data—and a lot of personal information—to a high-tech con artist. With just a few mouse clicks, you've gone from savvy shopper to sucker.

You're not alone. Internet fraud is on the rise. Internet Fraud Watch, a project of the National Consumers League in Washington, D.C., says reports of potentially fraudulent online incidents have tripled since the group began tracking complaints in 1996—from an average of 32 per month to nearly 100 per month.

The increase is disturbing, but hardly surprising. "The mere fact that so many more people are going online means more people will be exposed to fraudulent promotions and more people will get taken," says IFW director Susan Grant. The group serves as a clearinghouse for consumer complaints and funnels them to appropriate local, state, and federal law-enforcement agencies for possible action.

The most commonly reported form of Internet fraud involves bogus business

opportunities (phony investment schemes, multi-level marketing scams, and dubious franchise opportunities), says Paul Luehr, chair of the Federal Trade Commission's Internet Coordinating Committee. The number of FTC actions brought against companies for

failure to deliver goods (online shoppers' greatest concern) is actually rather small, says Luehr, noting that the most recent spate of complaints in this area has come from customers purchasing goods from Internet auction sites.

### AVOIDING SCAMS

Unfortunately, there's no foolproof way of telling whether a site or business pitch is legit, according to Luehr and others. But the following guidelines can help you avoid scam artists online:

- Investigate profit claims before you invest in a new business venture.

**REPORTS OF ONLINE SCAMS** have tripled in the last couple of years, warns Susan Grant of Internet Fraud Watch.

- Don't respond to pitches contained in unsolicited e-mail messages.
- Don't disclose any personal information that isn't integral to a transaction.
- Don't be swayed by outrageous offers that seem too good to be true.
- Take time to evaluate new business ventures. High-pressure tactics are a tip-off.

IFW's Grant says you should exercise caution even in small transactions. "If it's fraud and you fall for it, you've just put yourself on a sucker list that will get traded around. Don't be surprised if you start hearing from other people, too."



PHOTOGRAPH: KATHERINE LAMBERT



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SMC is the only networking vendor with products, service and support optimized for small to mid-sized networks.

*Affordable High Performance Technologies.*

Our aggressively priced switches, hubs, and NICs can help you improve network performance and manageability, preserve your existing investments, and increase price/performance.

*Guaranteed Service and Support*

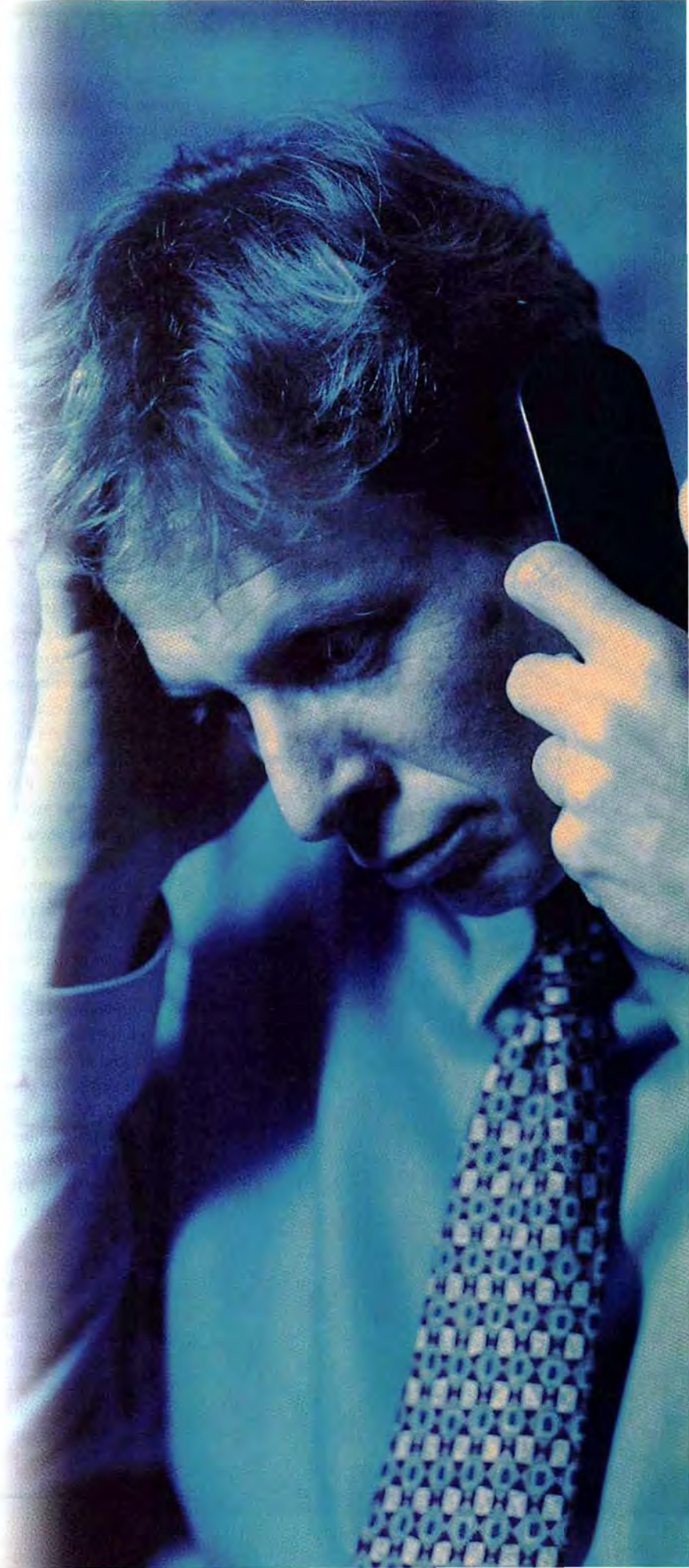
With 24-hour toll free tech support, 24-hour cross shipment, and a 30-day money-back guarantee, no one is more committed than SMC to managers of small to mid-sized networks. In fact, we live by a Customer Satisfaction Guarantee: we'll not only answer your calls, but we'll be there when you need us, with the right solution.

Contact us for more information.

**SMC<sup>®</sup>**

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**www.smc.com**

Circle 211 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)





that it will be years before SET technology becomes standard among online merchants.

## FULL DISCLOSURE

You shouldn't have to ask an online merchant about its security policy; that information should be posted on its Web page. Some sites offer customers clear explanations of how they handle security and privacy issues, and how to contact them for more information, but most don't.

The level of detail provided about security varies greatly across Web pages. Virtual Vineyards, for example, offers an inadequate few sentences on the subject, while some major online shopping sites devote pages and pages of text to it. Even sites with long explanations can leave out vital aspects of their security policies.

You should also have ready access to a privacy policy specifying how the site will use your personal data. Will it, for instance, sell the data to direct marketers? The most consumer-friendly companies never share personal data with

other merchants. At a minimum, companies should let you withhold your name from lists that may be sold.

Dell offers one of the best privacy policies of the sites we visited, noting reassuringly that "information regarding you or your order...will not be disclosed or sold to any outside organization." But other leading merchants—and lots of smaller ones—devote little space on their sites to the subject and make it unduly hard for you to protect your information. Microsoft's Expedia site tells you that your personal data may be shared with other Microsoft units and with "carefully selected" outside companies. You can elect to keep your data private, but only by selecting that as an option.

If you don't want your name to be sold to marketers, investigate a site's privacy policy before you disclose any personal information. And if you can't find an answer to your question on the site, ask by e-mail.

Most sole-proprietor sites fail to display their security and privacy policies adequately. But these small sites excel at sharing their postal addresses and phone numbers with customers, rather than burying this contact information under pages of material.

Merchants prefer the convenience of e-mail, but there are times we all need to speak to another human. The best firms, like Peapod and Dell, post phone numbers in conspicuous locations. In contrast, EToys and Amazon.com make you dig through multiple screens to find a simple phone number. Not surprisingly, elusive contact information tends to be more of a problem with firms that sell online exclusively; some have never hired anyone to handle calls.

## GOT A GUARANTEE?

Customer-friendly policies reduce the risks of buying from an unknown business. Look for security guarantees and money-back returns.

Of the major sites we looked at, only four (Amazon.com, EToys, Microsoft Expedia, and Wal-Mart) pledge that if a third party illegally obtains your data, the merchant will pick up expenses not covered by the credit card company.

Some sites provide other extras designed to take the fear out of shopping online. Wal-Mart, REI, and others let customers place orders by phone, fax, or mail. CDNow lets consumers submit

**You should know something about the company behind the Web page—it will wind up knowing a lot about you.**

orders using Pretty Good Privacy, a secure method of encrypting e-mail (see "The Defenders," page 140). Over time, other merchants will figure out that giving customers more options will lead to more business.

## TAKE CHARGE

Safe shopping in the anything-goes world of online commerce depends mainly on you. Despite the promise of effortless Web shopping, you need to aggressively seek information about security and privacy to protect your credit card and personal data.

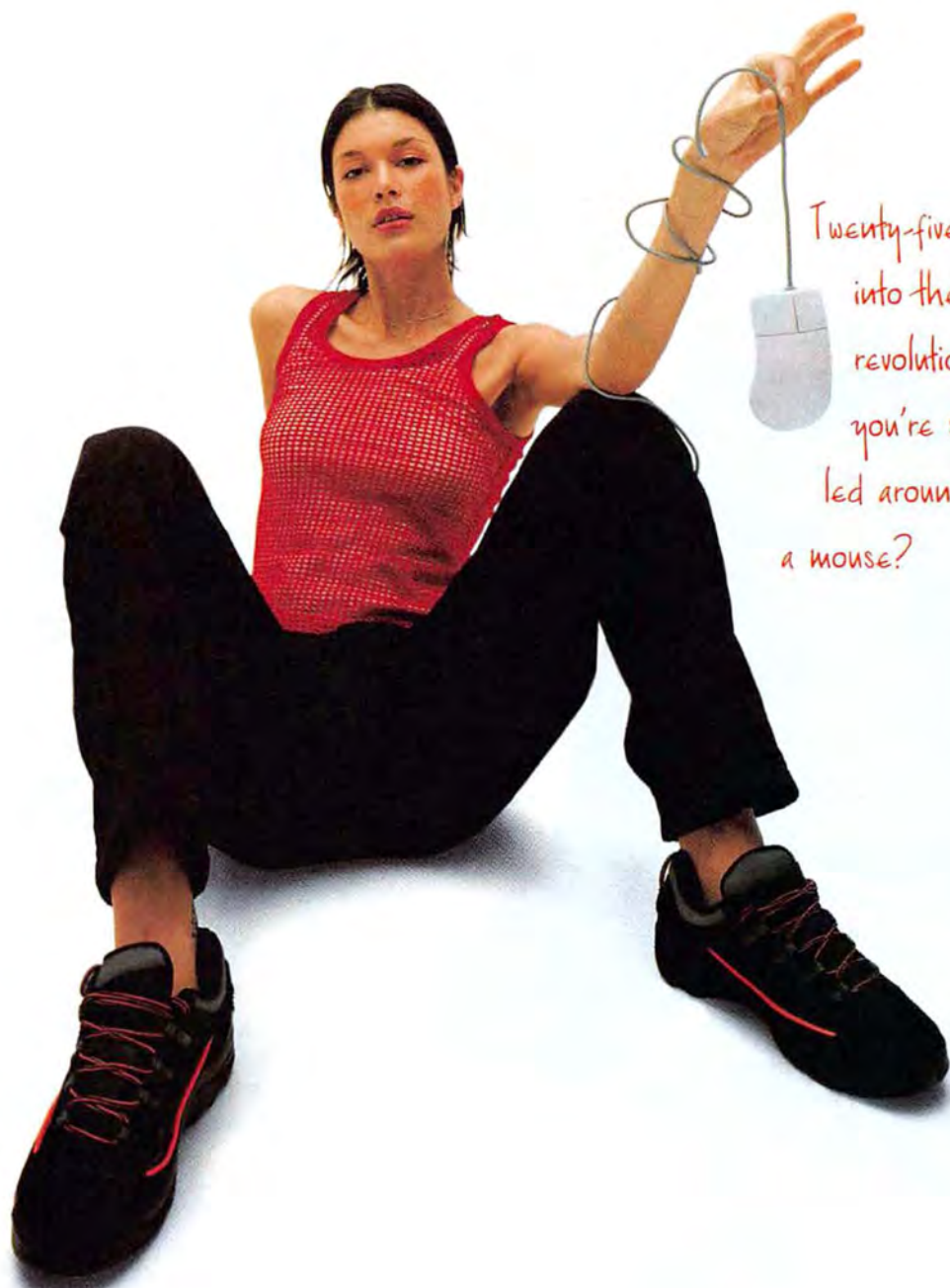
At a minimum, you should demand SSL encryption, storage of credit card data behind firewalls, and strict limits on employee access. Merchant sites should prominently display security and privacy statements, as well as an address and a phone number. Many merchants are getting the message. But too many smaller sites refuse to use encryption or firewalls, or they don't disclose their policies.

Do these concerns mean you should avoid shopping online? Not at all. But they make it all the more important that you know something about the company behind the Web page. It will, after all, wind up knowing a lot about you.

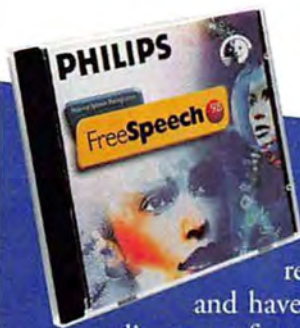
Roberta Furger is a PC World contributing editor.







Twenty-five years  
into the computer  
revolution and  
you're still being  
led around by  
a mouse?



I understand. You really like the gunk that collects on the bottom of the mouse. Well, I really like being able to talk to my computer and have it listen. Have it take dictation, open files, edit, create faxes and e-mails—all with just a word or two from me. Philips FreeSpeech '98 software makes it possible. Call, toll free, 1-877-856-4154 or visit **[www.freespeech98.com](http://www.freespeech98.com)**.

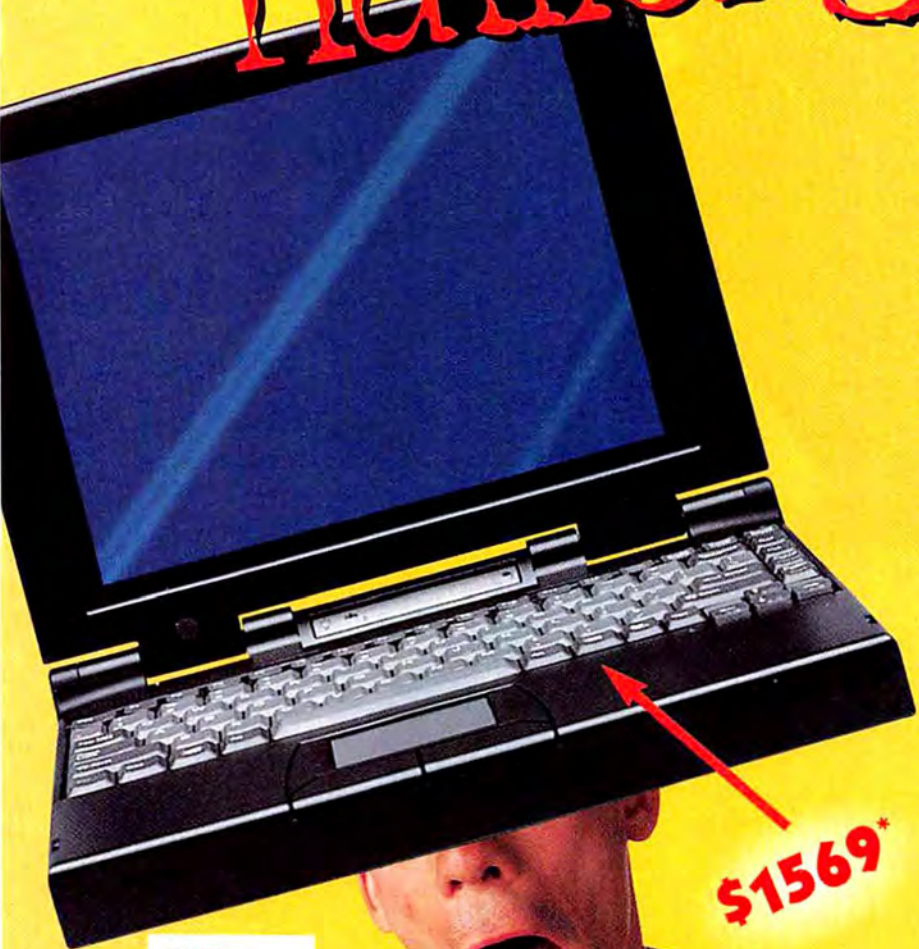


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# This deal's humongous!



Incredible. Super colossal. Bigger than heck. Hey, the EzBook™ 700E Series gives you so much for so little money, that plain words just don't do it justice.

For starters, you get a souped-up Intel® Pentium® processor with MMX™ technology 233 or 266MHz. A TFT display for sharper, clearer graphics. And built-in speakers that add crisp stereo sound to presentations and multimedia environments.

Of course, all this makes the 700E Series an even more stupendous value than its predecessor, which won three PC World Best Buy awards. (OK, that's pretty big.)

So call 800-888-9052 and get the 700E Series notebook. Proof once again that when it comes to value and performance, CTX is, well, really huge.

#### EzBook Model 7PJ233-2

233MHz CPU
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# Top Security and Privacy Sites

## Watchdogs and Advocates

**AMERICAN CIVIL LIBERTIES UNION** ([www.aclu.org](http://www.aclu.org)) Civil rights leader reports on privacy, security, and freedom of speech.

**CENTER FOR DEMOCRACY AND TECHNOLOGY** ([www.cdt.org](http://www.cdt.org)) Nonprofit promotes civil liberties and democratic values in a technology-based society.

**COMPUTER PROFESSIONALS FOR SOCIAL RESPONSIBILITY** ([www.cpsr.org](http://www.cpsr.org)) Advocates the public interest in matters of Internet governance.

**ELECTRONIC FRONTIER FOUNDATION** ([www.eff.org](http://www.eff.org)) Rallies support for liberty on the Net through forums, articles, and action alerts.

**ELECTRONIC PRIVACY INFORMATION CENTER** ([www.epic.org](http://www.epic.org)) Lobbies for individual privacy online and off. Extensive article library.

**INTERNET PRIVACY COALITION** ([www.privacy.org/ipc](http://www.privacy.org/ipc)) Promotes widespread use of encryption tools. News, legislative alerts.

## Privacy Defenders

**ANONYMIZER** ([www.anonymizer.com](http://www.anonymizer.com)) Software hides your IP address when you surf. "Snoop" demonstrations illustrate why you need this.

**COOKIE CENTRAL** ([www.cookiecentral.com](http://www.cookiecentral.com)) Explains what cookies can and can't do. Edit your cookie files, download anticookie utility.

**DEJA NEWS** ([www.dejanews.com](http://www.dejanews.com)) Find and delete your posts from Usenet discussion archives.

**PRIVACY, INC.** ([www.privacyinc.com](http://www.privacyinc.com)) Sells a consumer guide to who is monitoring you and why.

**W3C'S PLATFORM FOR PRIVACY PREFERENCES** ([www.w3.org/P3P](http://www.w3.org/P3P)) Industry standard would let users control their data's privacy.

## Security Tools and Tactics

**CERTICOM** ([www.certicom.com](http://www.certicom.com)) News, white papers, and product descriptions. Interactive tutorial introduces cryptography.

**COMPUTER AND NETWORK SECURITY REFERENCE INDEX** ([www.telstra.com.au/info/security.html](http://www.telstra.com.au/info/security.html)) FAQs on firewalls, PGP, cryptography, more. Launchpad to security info and products.

**INTERNET MAIL CONSORTIUM** ([www.imc.org](http://www.imc.org)) Explore e-mail security issues, including PGP, MIME, and spam. Peruse news, reports, and recommended e-mail safety standards.

**RSA DATA SECURITY CRYPTOGRAPHY FAQ** ([www.rsa.com/rsalabs/newfaq](http://www.rsa.com/rsalabs/newfaq)) Searchable collection of cryptography-related content, including definitions, techniques, protocols, and more.

## Hackers and Crypto-Rebels

**ANTIONLINE** ([www.antionline.com](http://www.antionline.com)) Hacker community exposes security flaws in technologies. Stresses public awareness.

**CODEx** ([www.thecodex.com](http://www.thecodex.com)) Hacker hangout with numerous links provides information on both how to snoop and how to hide.

**CYPHERPUNKS HOME PAGE** ([ftp://ftp.csua.berkeley.edu/pub/cypherpunks/Home.html](http://ftp.csua.berkeley.edu/pub/cypherpunks/Home.html)) Archives software and source code, cryptography papers, rants about crypto-anarchy, more.

**INFOWAR** ([www.infowar.com](http://www.infowar.com)) Author Winn Schwartau delivers security-related news and features.

**VINCE CATE'S CRYPTOREBEL AND CYPHERPUNK PAGE** ([www.csie.nctu.edu.tw/htcheng/Security\\_README.html](http://www.csie.nctu.edu.tw/htcheng/Security_README.html)) Scripts for sending PGP-protected e-mail, essays on encryption, links list.

## Seals of Approval

**BETTER BUSINESS BUREAU ONLINE** ([www.bbbonline.org](http://www.bbbonline.org)) Approved sites display a seal linking to the BBB's evaluation of the company's security.

**INTERNATIONAL COMPUTER SECURITY ASSOCIATION** ([www.ncsa.com](http://www.ncsa.com)) Certifies products and services that meet security standards.

**TRUST-E** ([www.truste.com](http://www.truste.com)) Awards seals to Web sites that meet privacy criteria. Requires members to post privacy policies.

**CPA WEBTRUST** ([www.cpawebtrust.org](http://www.cpawebtrust.org)) CPAs verify security systems of member sites every 90 days, awarding icons of approval where appropriate.

## Government Resources

**FEDERAL TRADE COMMISSION'S CONGRESS ON PRIVACY ONLINE** ([www.ftc.gov/opa/9806/privacy2.htm](http://www.ftc.gov/opa/9806/privacy2.htm)) Shows that most Web sites lack basic privacy policies, protections.

**U.S. HOUSE OF REPRESENTATIVES INTERNET LAW LIBRARY: PRIVACY AND INFORMATION ACCESS** ([law.house.gov/107.htm](http://law.house.gov/107.htm)) Numerous links to primary and secondary sources: laws, court decisions, and government publications.

**NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION** ([www.ntia.doc.gov](http://www.ntia.doc.gov)) U.S. government agency seeks to increase public access to phone, cable, and Internet services.

**U.S. CONSUMER GATEWAY** ([www.consumer.gov](http://www.consumer.gov)) Consumer protection clearinghouse reports privacy issues, product recalls, legislation, and lawsuits.

## Check Your Credit Report

**ASSOCIATED CREDIT BUREAUS** ([www.acb-credit.com](http://www.acb-credit.com)) Professional trade organization for mortgage brokers, consumer credit agencies, and collectors tracks legislative action on freedom of information and credit reporting.

**EQUIFAX** ([www.equifax.com](http://www.equifax.com)) Order your credit profile online or off. Fraud FAQ advises you on how to protect your credit cards from theft.

**EXPERIAN** ([www.experian.com](http://www.experian.com)) Learn about credit risk scores and order your report. Also offers a behind-the-scenes look at direct-mail marketing.

**TRANSUNION CORPORATION** ([www.tuc.com](http://www.tuc.com)) Order credit reports and read about the credit reporting industry. Fraud Victim Information page has information on credit card scams; Marketing List Opt-Out section tells you how to get off junk mail lists.

## Junk Mail and Telemarketing

**ADVO MAILBOX VALUES** ([www.advo.com](http://www.advo.com)), **METROMAIL** ([www.metromail.com](http://www.metromail.com)), and **HARTE-HANKS** ([www.harte-hanks.com](http://www.harte-hanks.com))

Direct-mail pros reveal their strategies and services. They don't tell you how to get off mailing lists; go through the Direct Marketing Association to do so.

**CHILTON MAILING LIST INDEX** ([www.chilton.net/lists/toc.htm](http://www.chilton.net/lists/toc.htm)) Index of mailing lists shows where companies get your address.

**DIRECT MARKETING ASSOCIATION** ([www.the-dma.org](http://www.the-dma.org)) Consumer section tells how to delete your name from mailing and telemarketing lists.

## Join the Discussion

**INTERNET LAW AND POLICY FORUM** ([www.ilpf.org](http://www.ilpf.org)) Offers a neutral place to discuss and develop Internet law and policy.

**PRIVACY FORUM** ([www.vortex.com](http://www.vortex.com)) Moderated discussion group and radio program, with news and analysis related to privacy topics.



# CyberMax has won more awards than anyone in its class.

## Performance and service that fit your life.

We make computers one at a time and to order. That's the only way we know how. Tell us what you want to do, and we'll create unique solutions customized to fit your life.

Being a direct vendor, CyberMax is able to offer you more of the very latest in technology and the most current pricing when compared to any retail store. One example is the new 100MHz Bus with CPU speeds up to 400 MHz. The new BX chipset from Intel and the Aladdin V chipset from ALi have enabled CyberMax systems to break speed records. CyberMax systems increase productivity, no matter how demanding your work load gets.

### CyberMax named in Top-5 Technology listing\*

1	NEC
2	Gateway 2000
3	Micron
4	Dell
5	CyberMax

Awards tell the world CyberMax builds a computer every bit as good as the big names. We just happen to sell them at a lower price. At CyberMax, we don't build computers to win awards. We build computers to solve the problems you face in life, in business or at home.

*"If only the best will do, you want to shop at the direct companies that offer the latest technologies... CyberMax continues to provide consumers with plenty of choices."*

\*PC Computing "The Direct 100" February '98

### Web Surfer GXM-233

- ❖ Cyrix MMX-Enhanced MediaGX™ 233MHz Processor w/ Integrated Sound and Video
- ❖ 32MB SDRAM
- ❖ 2.1GB Hard Drive
- ❖ CyberMax 15" (.28dp-13.8" VA) Color Monitor
- ❖ 24x Max EIDE CD-ROM
- ❖ K56flex™ Voice/Fax Modem w/ Speakerphone (V90-ready)
- ❖ Altec Lansing ACS90 Speakers
- ❖ Corel WordPerfect Suite 8 & Max's Multimedia Pack

D901 **\$799**

Upgrade to 4.3 HDD.....\$49

### Home Organizer CII-333

- ❖ Cyrix MII™-333 Processor w/ MMX™
- ❖ 64MB SDRAM
- ❖ 4.3GB Hard Drive
- ❖ Cirrus Logic Laguna 3D PCI Graphics w/ 4MB RDRAM
- ❖ CyberMax 17" (.28dp-15.7" VA) Color Monitor
- ❖ 32x Max EIDE CD-ROM
- ❖ K56flex™ Voice/Fax Modem w/ Speakerphone (V90-ready)
- ❖ Ensoniq AudioPCI™ 32-bit Sound
- ❖ Altec Lansing ACS90 Speakers
- ❖ Corel WordPerfect Suite 8 & Max's Multimedia Pack

D902 **\$1199**

6x86MX™-266.....\$1049  
Cyrix MII™-300.....\$1099

### Home Theater AII-333

- ❖ AMD K6™-2/333 w/ 3DNow!™ Technology
- ❖ 64MB SDRAM
- ❖ 8.4GB Ultra ATA Hard Drive
- ❖ Mpx2 AGP Multimedia Accelerator (2D/3D/DVD) w/ 8MB RDRAM
- ❖ 3Dfx Voodoo2 3D Accelerator w/ 12MB
- ❖ CyberMax 19" (.26dp-18"VA) Color Monitor
- ❖ Toshiba DVD-ROM III (32X CD-ROM)
- ❖ K56flex™ Voice/Fax Modem w/ Speakerphone (V90-ready)
- ❖ Aureal A3D™ PCI Sound Card
- ❖ Altec Lansing ACS490 Tower Speakers & Subwoofer
- ❖ Corel WordPerfect Suite 8 & Max's Multimedia Pack

D903 **\$1899**

business lease \$66

AMD K6™-2/266.....\$1799  
AMD K6™-2/300.....\$1849

### WorkStation PII-400

- ❖ Intel Pentium® II 400MHz Processor w/ MMX™
- ❖ 64MB SDRAM
- ❖ Intel BX Chipset
- ❖ 16.8GB Ultra ATA Hard Drive
- ❖ Intel 740 3D AGP Graphics w/ 8MB SDRAM
- ❖ CyberMax 17" (.25dp-15.7"VA) Color Monitor
- ❖ 32x Max EIDE CD-ROM
- ❖ Your choice of: K56flex™ Voice/Fax Modem w/Speakerphone OR Intel EtherExpress Pro 100 PCI Ethernet Card
- ❖ Ensoniq AudioPCI™ 32-bit Sound
- ❖ Altec Lansing ACS45 Powercube Speakers & Subwoofer
- ❖ Microsoft NT 4.0 Workstation\*\*
- ❖ Microsoft Office 97 SBE & Max's Productivity Pack

D904 **\$2499**

business lease \$87

Pentium® II 333MHz.....\$2149  
Pentium® II 350MHz.....\$2299

**Standard on CyberMax desktop systems:** ❖ 1.44MB 3.5" FDD ❖ 2 USB Ports ❖ MS Windows® 98\*\* ❖ 104-Key Keyboard

❖ Microsoft PS/2 Mouse ❖ Limited 3-Year Warranty ❖ 30 Day Money Back Guarantee ❖ Toll-free Telephone Technical Support ❖ 1-year On-site Service (subject to approval)\* ❖ 10-Minute Quick Setup Guide

Every CyberMax system is *Year 2000 Compliant* to fit your life in the next millennium.

CyberMax Computer, Inc. 133 N. 5th Street Allentown, Pa. 18102 ♦ (610) 770-1808 Fax 800-599-7576 In Canada, dial 800-695-4991 CyberMax accepts Visa, MasterCard, Discover, American Express, C.O.D. (bank cashier's checks) and electronic wire transfers. Purchase orders from government agencies, universities, and Fortune 500 companies can also be accepted. Prices and product descriptions are subject to change without notice. \*\*Systems with MS NT 4.0 Workstation will not include Windows 98. Some CyberMax products are custom engineered to CyberMax specifications which may vary from the retail versions of the software and/or hardware in functionality, performance, or compatibility. The Intel LX chipset is not available on any systems configured with Cyrix 6x86MX or AMD processors. All returned items must have an RMA number and must be in original packaging. The cost of returned freight is not included with any money back guarantee; shipping charges are not refundable. Products may differ from image shown. Please call or write to us for more details on our limited warranty. Microsoft and Windows 95 are registered trademarks of Microsoft Corporation. Pentium and MMX are registered trademarks of Intel Corporation. AMD, the AMD logo, and combinations thereof, and 3DNow! are trademarks and AMD-K6 is a registered trademark of Advanced Micro Devices, Inc. Cyrix 6x86MX, MediaGX and MII are registered trademarks of the Cyrix Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. \*On-site service is available for hardware replacement only and may not be available in certain remote areas (on these occasions, cross-shipping a system for repair is paid for and arranged by CyberMax or Philips Magnavox). On-site service is subject to approval, a diagnostic determination for on-site service must first be made by a CyberMax or Philips Magnavox technician. Leasing terms: 36 month/10% FMV option, taxes and shipping additional. Leasing arranged by independent leasing companies to qualified commercial customers.



*"If you're looking for speed in everyday Windows applications, but don't want to spend the money for a 266MHz PII system, check out the CyberMax."*

- Home PC Lab Winner/Home PC

*"PowerMax outpaced Dell's... Dimension XPS... the PowerMax makes an excellent bridge for that long migration to Windows® NT... tremendous bang for the buck."*

- PC Computing MVP Finalist  
Fall Comdex 1997

*"The Max C6 233... stacks up well against those of the more expensive Pentium II 266 MHz systems... lots of room for expansion... a great balance of performance and price."*

- Windows Stellar September 1997

To win this system and learn more about the new AMD-K6-2 "The Smart Choice for 3D" visit [www.games.net/CyberMax](http://www.games.net/CyberMax)

For the second time, in a few short months, CyberMax received PC Computing's 5StarAward. This time it was for our Cyrix 6x86MX, which offers exceptional value and performance when compared to the Pentium II. "You won't find a better deal for Windows NT at these speeds."

- PC Computing 5 Star Award September 1997

For 17 of the last 18 months, CyberMax has appeared on PC World's Top-20 Budget Desktop list. As one analyst wrote, "CyberMax delivers a lot of bang for the buck."

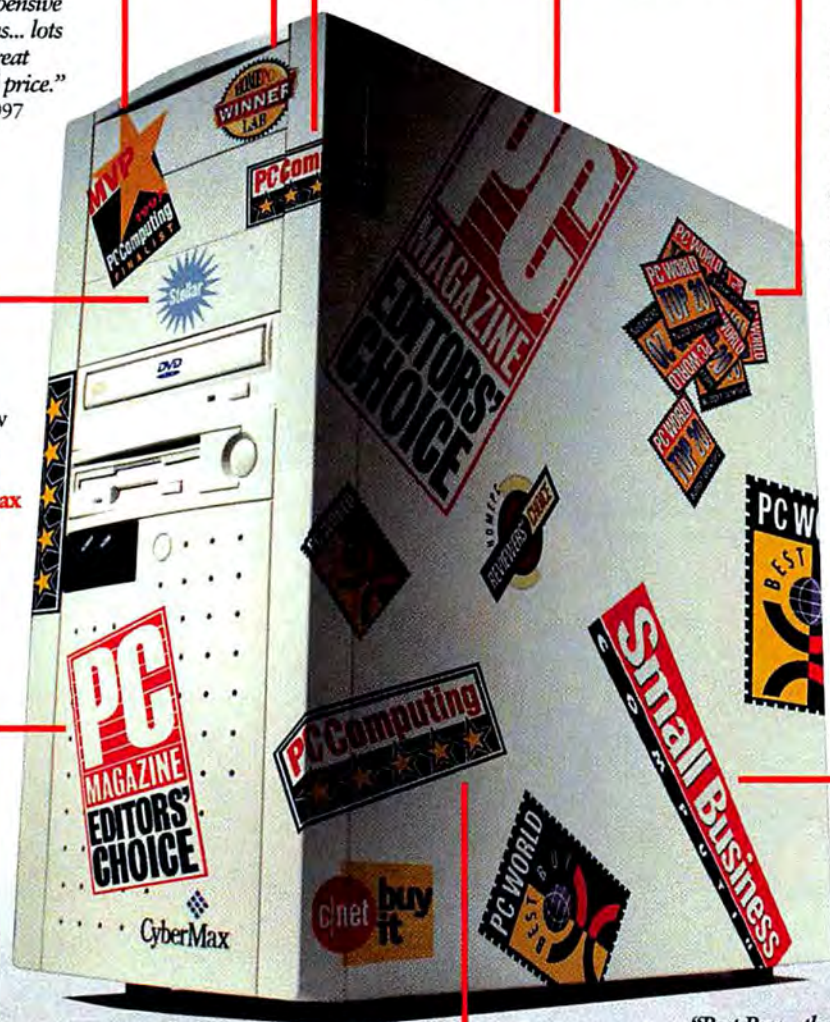
- PC World Top 20 List

*"The Max C6 233... earns our Editors' Choice because it offers the best balance of price, performance and features."*

- PC Magazine: Editors' Choice September 1997

*"AMD's K6 chip strikes again, this time inside the multimedia wise CyberMax PowerMax, a Best Buy for the third month. Multimedia enthusiasts and game players will want to take a close look at this sturdy and expandable bargain-price tower."*

- PC World Best Buy February 1998



*"... an incredible bargain... ideal for the cost-conscious yet demanding SOHO user... the PowerMax was nothing short of a great performer; it achieves such status without sacrificing a thing."*

- PC Magazine Editors' Choice Award June 1997

*"CyberMax's PowerMax delivers faster performance... for hundreds less."*

- PC Computing 5 Star Award June 1997

*"Best Buy... the CyberMax 6x86MX, an admirably well-rounded machine with a bargain basement price."*

- Small Business Computing November 1997

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Computer, Inc.  
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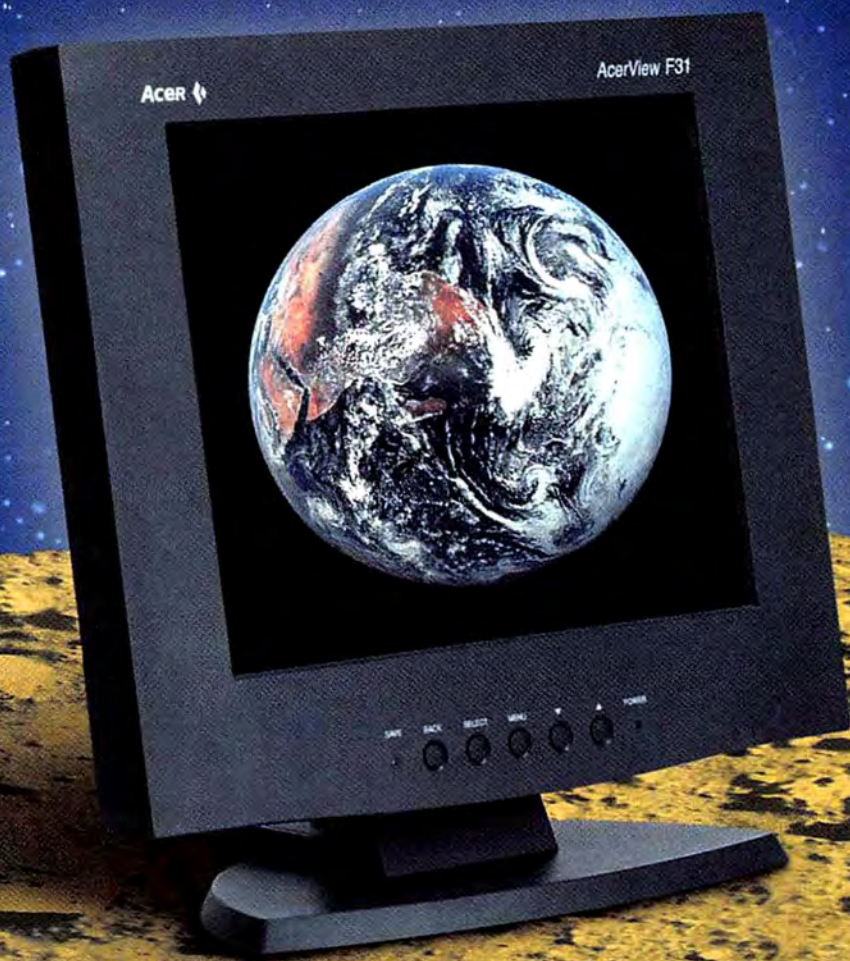




Introducing the award-winning AcerView F31 LCD Monitor. Its advanced, stylized design gives you a sharper picture with 75% less footprint on your desktop than standard CRTs. That will open up vast new realms of uncharted space on your desk. And Acer is one of a few companies that can plant its flag on a monitor – and truthfully say they built it. To discover more about the impressive line of AcerView LCD monitors, call 1-800-379-2237 ext.124 or go to [www.acerperipherals.com](http://www.acerperipherals.com).

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Monitors

One small footprint for man,  
**ONE GIANT LEAP** for MONITORS.



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AcerView LCD monitors / AcerView F51 (15.0" TFT LCD) / AcerView F31 (13.3" TFT LCD) / AcerView S20 (12.1" DSTN LCD)

Circle 2 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)



# TOP 100

194 Power Desktops



206 Budget Desktops



214 Notebooks



220 Home PCs



223 Printers



227 Monitors



229 Graphics Boards



231 Modems



Pentium II-400s

## CRASH THE \$2000 BARRIER

EDITED BY MICHAEL DESMOND  
AND CAMERON HEFFERNAN



GETTING DOWN THERE: The Quantex  
QP6/400 SM-4x is the cheapest PII-400  
Best Buy on our Power Desktops chart.



A CHICKEN IN EVERY POT, a car in every garage, and a Pentium II-400 in every desktop PC. It may sound like a campaign promise, but the latest round of price cuts from Intel has transformed PII-400 systems from boutique purchases into populist fare. For the first time, PCs based on Intel's fastest PII CPU enjoy a majority on the power desktops chart—12 of the 20 systems there use the 400-MHz CPU. What's more, the PII-400 this month makes its first appearance on the budget chart, in the form of the \$1999 TigerDirect Tiger Pro 400.

You could sum up Intel's marketing campaign with a simple phrase: "It's the price, stupid." Even though no competing CPU poses a performance threat to the fastest Pentium II models, system makers pay significantly less for PII-400 and PII-350 CPUs than they did a month ago. And those savings are being passed on to you in the form of lower system costs. The average price for reviewed PII-400 systems plummeted from \$2920 last month to \$2598, a reduction of \$322. PII-350 systems fell even further—a whopping \$355—from an average of \$2618 in August to \$2263 in September.

In our review of seven new PII-400 systems this month, we found that even the least expensive models pack enough features to stave off expensive upgrades down the road. Two PII-400s we tested

this month came in at under \$2000—the Comtrade Professional AGP GC6/400 at \$1975 and the Tiger Pro 400—and come with 64MB of RAM, 17-inch monitors, and respectable hard disks that store 6GB or more of data. The Comtrade Professional AGP GC6/400 fell short due to Comtrade's brief one-year warranty as well as a dismal showing in our anonymous technical support calls. The TigerDirect Tiger Pro 400 places 14th on the budget chart, thanks in large part to improved support policies that include a three-year warranty on parts and labor.

More significantly, TigerDirect seems to be cleaning up its act. The company has a long history of service complaints from *PC World* readers, but officials there say they have addressed the problem. Our anonymous calls to TigerDirect's technical support seem to confirm this claim: We received prompt and courteous answers to our questions—a big change

from earlier calls. If TigerDirect has indeed solved its service woes, the company's systems may warrant further consideration from budget-minded users.

#### LUXURY FOR LESS

SHELL OUT THE BIG BUCKS—say \$2500 or more—and you can get a system with a 19-inch monitor, a 10GB or larger hard disk, and DVD-ROM and Zip drives. The Quantex QP6/400 SM-4x grabs one of the



**BACK IN BLACK:**  
IBM's sharp-looking P72  
delivers a great display.

## YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

**How do the charts work?** The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. System charts are divided by price. Power desktops cost \$2250 or more; power notebooks cost \$2750 or more. We compare new products to previously reviewed hardware, updating the charts to reflect price cuts and other changes.

**Where do you get your prices?** We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

**What does the overall rating mean?** This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

**What does the PC WorldBench 98 score mean?** It's a measure of how fast a PC is in relation to our baseline machine, a Gateway

PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

**Where do the scores for reliability, support quality, and support policies come from?** Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

**What do all those word scores mean?** Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

**Check out PC World's Top 400 reviews online.** Go to PC World Online ([www.pcworld.com/hardware/top400](http://www.pcworld.com/hardware/top400)) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 categories. You'll also find reviews not available in print.



last power desktop Best Buy slots by combining a \$2449 price with the company's impressive support policies. It doesn't hurt that the system comes equipped with a bright 19-inch monitor and this month's second-place AGP graphics accelerator, the Real3D StarFighter AGP. Meanwhile, Gateway's E-4200 400 includes a 100-mbps ethernet card, a 56-kbps modem,

number one Gateway G6-333, the Micro Express MicroFlex-F300f, and the Tagram Thunderbolt H2630—are discounted \$300 from August, while three other PCs boast price cuts of \$200 or more.

Swimming against the Intel tide is the CyberMax ValueMax B8, the first Cyrix M II-300-based PC we've tested and the only one with a non-Intel CPU to make

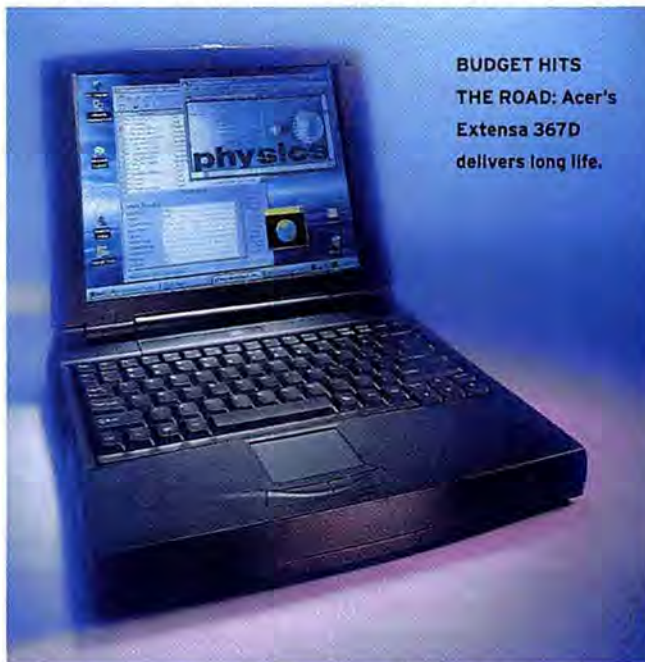
*With two Pentium II-400s coming in at under \$2000 this month, it's no surprise that average prices on these high-performing machines have dropped \$322 since August.*

and a generous 128MB of system RAM—enough to ensure smooth performance even when multitasking five or more heavy-duty applications. However, the stiff \$2838 price and relatively slow PII-400 performance keep this new Gateway down around the middle of the chart.

Stunning price cuts have dramatically reordered the power chart. Micron lopped \$676 off the price of its Millennia 400 (now \$2599) and \$506 from the Millennia 350 (now \$2349). Compaq did some serious chopping of its own, reducing the tag on its corporate-minded DeskPro EP Model 6400X 6400/CDS from \$3079 all the way down to \$2579. Hewlett-Packard's Vectra VL Series 7 also took a dive: At \$2669, it's a full \$430 cheaper than in August.

On the budget chart, we are seeing greater diversity than ever before in new value-oriented PCs. At number two, the \$2249 Quantex QP6/350 M-4x proffers a 19-inch monitor, an internal Zip drive, and the second-place Real 3D StarFighter AGP graphics board, plus superior PII-350 performance. Further below it, the Micro Express MicroFlex-B350b is a fast and well-configured PII-350 box that costs only \$1699 and comes with Windows NT 4.0. Here, too, rampant price cuts have made the chart look like a K-Mart red tag sale. A trio of systems—the

either chart this month. At \$1449, the ValueMax B8 delivers performance typical of Pentium II-300 systems in our PC World-Bench suite and comes well-appointed with a 17-inch monitor, 64MB of RAM,



**BUDGET HITS**  
**THE ROAD:** Acer's  
Extensa 367D  
delivers long life.

and the outstanding 3D Labs Permedia 2 graphics chip with 8MB of SGRAM. A less happy result awaited the one Celeron-based system we tested, the Unicent Avanta L266. Powered by a cacheless Celeron-266 processor, the L266 struggled to match the typical performance of a Pentium MMX-200 PC. The \$1049 price may be tempting, but unless you're wedded to the Intel brand, you'll get better value out of a low-priced AMD K6— or Cyrix M II—based system.

## MONITORS AND NOTEBOOKS MAKE A SPLASH

IT'S POSSIBLE to pick up a pretty nice \$1000 desktop PC, but the picture for notebook buyers hasn't been so rosy. Until recently, you were lucky if you could find a decent portable for under \$2000, much less \$1000. This month's top-rated budget notebook may be just what you've been waiting for.

Not only is the \$1499 Acer Extensa 367D the least expensive system on the budget notebooks chart, but it impressed us with its polished design and terrific battery life (over 6 hours in our lab tests). No, the 367D won't set any land-speed records with its Pentium MMX-200 CPU, but the lightweight 7.2-pound frame makes it an appropriate choice for those accustomed to rushing through airports and stewing in cab lines. The 367D may finally make mobile computing affordable to the masses.

If you're shopping for a 17-inch monitor, and appearance, not price, is your object, check out this month's *Top 10 Monitors*. The IBM P72 impressed us with its jet-black chassis, and its Trinitron tube produced terrific image quality, with deep color contrast and ultracrisp text. On-screen controls are extensive. You'll pay a premium for this eye-catching package, however—at \$589, it's the third most expensive monitor on this month's chart.

*Michael Desmond is a senior associate editor and Cameron Heffernan an associate editor*

*for PC World. Senior Associate Editor Bryan Hastings, Associate Editors Vince Bielski and Karen Silver, Staff Editor Grace Aquino, Assistant Editor Mick Lockey, and freelance writers Nancy Canning, Adam Liberman, JoAnne Robb, and Susan Silvius contributed to the Top 100. Testing for the Top 100 was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeffrey Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 14 for contact information.*



## TOP 20 POWER DESKTOPS

	SYSTEM	Last month	Month tested	Street price (6/15/98)	CPU	Comments
1	 Micron Millennia 400 888/634-8799 www.micronpc.com	2	Jul 98	\$2599	Pentium II-400	Staggering \$676 price cut on fastest Windows 95 PC; DVD-ROM drive.
2	 Gateway GP6-400 800/846-2000 www.gateway.com	1	Jul 98	\$2470	Pentium II-400	\$150 price drop keeps this PII-400 among cheapest in its CPU class.
3	 Micron Millennia 350 888/634-8799 www.micronpc.com	4	Jul 98	\$2349	Pentium II-350	\$506 slashed off impressive PII-350 with 10GB hard drive.
4	 Quantex QP6/400 SM-4x 800/896-4898 www.quantex.com	n/a	NEW	\$2449	Pentium II-400	Affordable PII-400 a terrific value with 19-inch monitor, great support.
5	 Dell OptiPlex GX1 400 800/289-3355 www.dell.com	5	Aug 98	\$2819	Pentium II-400	Powerful corporate desktop's modular design makes upgrades easy.
6	Dell Dimension XPS R400 800/388-8542 www.dell.com	3	Jul 98	\$2999	Pentium II-400	PII-400 with DVD-ROM drive, huge 14.4GB hard disk still pricey after \$100 cut.
7	Compaq Deskpro EP Model 6400X/6400/CDS 800/345-1518 www.compaq.com	8	Jul 98	\$2579	Pentium II-400	Whopping \$500 off corporate speedster with network features.
8	Dell Dimension XPS R350 800/388-8542 www.dell.com	7	Jul 98	\$2829	Pentium II-350	\$120 less on slower, slightly cheaper, virtually identical sibling of R400.
9	Gateway E-4200 400 800/779-2000 www.gateway.com	n/a	NEW	\$2838	Pentium II-400	One of three power systems with 19-inch monitor; great support, 128MB of RAM.
10	NEC Direction SP B400 888/863-2669 www.necnow.com	12	Aug 98	\$2298	Pentium II-400	\$617 off fast system with huge 14.4GB hard drive; reliability a question.
11	HP Vectra VL Series 8 800/322-4772 www.hp.com	9	Jul 98	\$2750	Pentium II-400	Easy-access design, great performance in affordable PII-400; no toll-free support.
12	Premio Apollo BX 350 800/677-6477 www.premiopc.com	n/a	NEW	\$2250	Pentium II-350	Affordable, DVD-equipped PII-350 lacks adequate phone support.
13	NEC PowerMate 8000 888/863-2669 www.necnow.com	15	May 98	\$2448	Pentium II-333	Quick PII-333 includes ethernet card, but reliability could be a problem.
14	NexTrend NexStar 409W 888/838-7827 www.nextrendpc.com	n/a	NEW	\$2639	Pentium II-400	Short warranty on generic PII-400, but tech support is helpful.
15	Sys Performance Pro 400BA 800/613-9963 www.systechology.com	17	Aug 98	\$2716	Pentium II-400	Fastest PC on power chart now \$83 less; has large 8.4GB hard drive.
16	Netis Starburst PII-333 800/577-7526 www.netistech.com	n/a	Aug 98	\$2636	Pentium II-333	\$486 price drop; good audio and graphics, limited support.
17	Sys Performance Pro 333H2 800/613-9963 www.systechology.com	19	Jun 98	\$2608	Pentium II-333	Well-configured, very fast PII-333 comes with Windows NT 4.0; \$19 off.
18	HP Vectra VL Series 7 800/322-4772 www.hp.com	n/a	May 98	\$2669	Pentium II-333	Fast Windows NT business machine now costs \$430 less; no toll-free support.
19	Compaq Deskpro 6000T 800/345-1518 www.compaq.com	n/a	May 98	\$3275	Pentium II-300	\$152 off expensive corporate PC; tested with Windows NT 4.0.
20	Compaq Deskpro 2000 6300X 800/345-1518 www.compaq.com	n/a	May 98	\$2280	Pentium II-300	Chart defections to the budget list push NT machine onto power chart.



Best Buy

See features chart, page 196; test report, page 198.

n/a = not applicable

<sup>1</sup>A system's performance word score is relative to scores of other PCs running the same operating system. For more details, see "Our Guide to the Top 100."<sup>2</sup>For more information about all products in this table, circle InfoNet no. 907.

FALLING PRICES HAVE MOVED Pentium II-400 machines into the majority on our Power Desktops chart—several systems have experienced huge price cuts of \$500 or more. Three PCs with Intel's fastest processor join the list this month, including a \$2449 Best Buy from Quantex.

Just off the chart lurks yet another new PII-400, the Maximus Wide SCSI-3. As its name suggests, this system comes with a SCSI controller and hard disk, and it boasts a slightly better-than-average PC WorldBench score for the PII-400 class. But Maximus's weak support policies, combined with a recent spate of complaints about the company's service, helped to keep this machine off our charts.



## SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Performance <sup>1</sup>	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	InfoNet number <sup>2</sup>
90	210/Win 95	outstanding	very good	above average	average	above average/best	692
89	204/Win 95	very good	outstanding	average	inexpensive	above average/best	693
89	194/Win 95	very good	very good	above average	inexpensive	above average/best	694
87	199/Win 95	very good	outstanding	average	inexpensive	average/best	695
86	244/Win NT 4.0	very good	very good	above average	average	above average/best	696
86	199/Win 95	very good	very good	above average	expensive	above average/best	697
86	200/Win 95	very good	very good	average	average	average/best	698
85	187/Win 95	good	very good	above average	average	above average/best	699
85	190/Win 95	very good	outstanding	average	average	above average/best	700
85	207/Win 95	outstanding	very good	below average	inexpensive	average/good	701
82	207/Win 95	outstanding	very good	average	average	average/poor	702
79	179/Win 95	good	very good	<sup>3</sup>	very inexpensive	<sup>3</sup> /fair	703
79	175/Win 95	good	very good	below average	inexpensive	average/good	704
78	196/Win 95	very good	very good	<sup>3</sup>	average	<sup>3</sup> /fair	705
77	252/Win NT 4.0	outstanding	good	<sup>3</sup>	average	<sup>3</sup> /good	706
76	176/Win 95	good	very good	<sup>3</sup>	average	<sup>3</sup> /fair	707
74	220/Win NT 4.0	good	very good	<sup>3</sup>	average	<sup>3</sup> /good	708
74	218/Win NT 4.0	good	very good	average	average	average/poor	709
72	202/Win NT 4.0	satisfactory	very good	average	very expensive	average/best	710
71	182/Win NT 4.0	satisfactory	satisfactory	average	very inexpensive	average/best	711
Scorecard weightings		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

<sup>3</sup> Insufficient data to give a rating.

## This Month's Best Buys

### 1 MICRON MILLENNIA 400

**PRO:** Fastest Windows 95 PC we've tested; has DVD-ROM drive, superior reliability and service

**CON:** Uninspiring sound and monitor



What a difference a month makes. Micron slashed \$676 off the Millennium 400, turning this swift,

powerhouse PII-400 midtower into a performance-minded bargain that costs just \$2599—less than many competing systems. A fine blend of power and style, the Millennium 400 sets the performance standard among Windows 95-configured Pentium II-400 machines, with a PC WorldBench 98 score of 210. Besides blazing speed, it has a load of features and comes from a company with an enviable

record of service and system reliability.

The Millennium even looks fast, with its chiseled curves and molded slots for each internal drive: floppy, Iomega Zip, and slot-fed DVD-ROM. The back of the system features color-coded ports, while the case opens easily to reveal a tidy interior with plenty of open drive bays, card slots, and DIMM (memory) sockets.

Multimedia enthusiasts will welcome the second-generation DVD-ROM drive, though you won't find any titles for it in the box. An internal Iomega Zip drive and a fast 10GB hard



**Micron Millennium 400**

disk provide plenty of storage space. The Millennium's sound and monitor, however, are unimpressive. The integrated Crystal sound chip, accompanied by Altec Lansing's AV390 speaker/subwoofer, produced surprisingly little bass until we cranked the volume. The Diamond Viper V330 AGP card delivers snappy graphics for business software and 3D games alike, but the picture supplied by the 17-inch Micron 700 FGx monitor appeared washed out.

Micron's documentation consists of little more than individual component manuals. But its service and support policies are first-rate, with a three-year parts and one-year labor warranty and 24-hour toll-free phone support seven days a week.

### 2 GATEWAY GP6-400

**PRO:** Excellent performance, affordable for its class, great sound system, ethernet card

**CON:** Weak airflow, poor labeling



At \$2470, the Gateway GP6-400 costs \$150 less than it did last month, and this network-ready

Pentium II-400 system remains a Best Buy thanks also to its swift performance, excellent features, and Gateway's stellar support policies. With a PC WorldBench score of 204, the GP6-400 delivers typical Windows 95 performance for its CPU class, just a notch slower than Micron's Millennium 400, the fastest Win 95 PC we've ever tested. Bundled with a 100-megabits-per-second SMC EtherPower II 10/100 ethernet adapter and Intel's ►



	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Modem speed (kbps)
1	Micron Millennia 400*	Pentium II-400	Windows 95	64	512	10	Diamond Viper V330	4/SGRAM	17/16	56 <sup>2</sup>
2	Gateway GP6-400*	Pentium II-400	Windows 95	64	512	10	STB Velocity 128	4/SGRAM	17/15.9	not included
3	Micron Millennia 350*	Pentium II-350	Windows 95	64	512	10	Diamond Viper V330	4/SGRAM	17/16	56 <sup>2</sup>
4	Quantex QP6/400 SM-4x*	Pentium II-400	Windows 95	64	512	11	Real 3D StarFighter	8/SGRAM	19/18	56 <sup>3</sup>
5	Dell OptiPlex GX1 400*	Pentium II-400	Windows NT 4.0	64	512	6.4	integrated ATI 3D Rage Pro	8/SGRAM	17/15.9	not included
6	Dell Dimension XPS R400	Pentium II-400	Windows 95	64	512	14.4	STB Nvidia Plus	4/SGRAM	17/15.8	56 <sup>2</sup>
7	Compaq Deskpro EP Model 6400X/6400/CDS	Pentium II-400	Windows 95	64	512	6.4	Diamond Viper 330 AGP	4/SGRAM	17/16	56 <sup>2</sup>
8	Dell Dimension XPS R350	Pentium II-350	Windows 95	64	512	14.4	STB Nvidia Plus	4/SGRAM	17/15.8	56 <sup>2</sup>
9	Gateway E-4200 400	Pentium II-400	Windows 95	128	512	10	ATI Xpert@Work	8/SGRAM	19/17.9	56 <sup>2</sup>
10	NEC Direction SP B400	Pentium II-400	Windows 95	64	512	14.4	Diamond Viper V330	4/SGRAM	17/15.8	56 <sup>2</sup>
11	HP Vectra VL Series 8	Pentium II-400	Windows 95	64	512	10	Matrox Productiva G-100	4/SGRAM	17/15.9	not included
12	Premio Apollo BX 350	Pentium II-350	Windows 95	64	512	6.2	Matrox Millennium II	4/WRAM	17/15.7	56 <sup>2</sup>
13	NEC PowerMate 8000	Pentium II-333	Windows 95	64	512	6.4	ATI 3D Rage Pro	8/SGRAM	17/16	not included
14	NexTrend NexStar 409W	Pentium II-400	Windows 95	64	512	8.4	CardExpert Intel i740	8/SGRAM	17/16.1	56 <sup>2</sup>
15	Sys Performance Pro 400BA	Pentium II-400	Windows NT 4.0	64	512	8.4	Matrox Millennium II	8/WRAM	17/15.9	56 <sup>2</sup>
16	Netis Starburst PII-333	Pentium II-333	Windows 95	64	512	9	Matrox Millennium II	4/WRAM	17/15.7	56 <sup>2</sup>
17	Sys Performance Pro 333H2	Pentium II-333	Windows NT 4.0	64	512	8.4	Matrox Millennium II	8/WRAM	17/15.9	56 <sup>2</sup>
18	HP Vectra VL Series 7	Pentium II-333	Windows NT 4.0	64	512	6.4	Matrox Millennium II	8/WRAM	17/15.9	not included
19	Compaq Deskpro 6000T	Pentium II-300	Windows NT 4.0	64	512	4.3	Matrox Millennium II	4/WRAM	19/18	not included
20	Compaq Deskpro 2000 6300X	Pentium II-300	Windows NT 4.0	32	512	8	integrated Matrox Mystique	2/SGRAM	17/15.6	56 <sup>3</sup>

\* Best Buy <sup>1</sup> PC World defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

<sup>2</sup> Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

LANDesk Client Manager software, the GP6-400 comes ready to connect to your office network. A 10GB hard disk, 13X-32X CD-ROM drive, and built-in Iomega Zip drive provide ample storage.

After hours, the GP6-400 doubles as a first-class entertainment system. Audio is outstanding: The Boston Acoustics Micro-Media System, consisting of a subwoofer and two palmsize satellite speakers, delivers terrific sound from high treble to low bass. The STB Velocity 128 Accelerated Graphics Port card teams with a sharp EV700 17-inch monitor to deliver knockout graphics, including accelerated 3D for games. Color-coded audio ports on the back of the system help to simplify setup.



Gateway GP6-400

While the GP6-400's case is attractive and easy to open, its curvy lines prevent you from resting external drives or disks on top—as well as such no-nos as a soda can or coffee cup.

Gateway's documentation includes an entire volume on maintenance and troubleshooting, plus a diagnostic CD-ROM and manual. The bundled discs—among them Microsoft's Office 97 SBE—are nicely organized in a compact binder instead of in separate jewel cases.

Gateway's support policies are top-notch, including a three-year warranty on parts and labor and toll-free technical support 24 hours a day. The company has long received high marks from our

readers for its service. For the money, the GP6-400 is a whole lot of computer; and though it has slipped to the runner-up spot, it remains an excellent Best Buy.

### 3 MICRON MILLENNIA 350

**PRO:** Fast and loaded, good service and support

**CON:** No DVD-ROM drive, so-so monitor



Micron's Millennium 350 has a great deal in common with its sibling, the number one Millennium 400—including a big price cut. The \$2349 Millennium 350 costs \$506 less than it did just a month ago, yet retains its admirable features and the fastest performance we've seen in the PII-350 processor class.

With a PC WorldBench score of 194, this Millennium is slightly faster than the slowest Pentium II-400 system, but it lags



## EXPANDABILITY

## CUSTOMER SUPPORT

CD/DVD-ROM drive speed	Sound board	Case style <sup>1</sup>	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	integrated Crystal PnP	midtower	384	2	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	2/2	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	integrated Crystal PnP	midtower	384	2	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-32X	Ensoniq Audio PCI	midtower	384	2	3/3	3	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	Crystal 4236B	midtower	384	2	2/1	7	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	TBS Montego	midtower	384	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	ES1869	desktop	384	2	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
2X DVD-ROM	TBS Montego	midtower	384	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	integrated Crystal Audio	midtower	384	2	3/0	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	HP Audio (AZT 1008)	midtower	768	1	2/1	4	3/3	11	none	AOL, BBS, CIS, WWW
2X DVD-ROM	Sound Blaster SB AWE64	midtower	512	3	3/2	3	3/3	9	none	BBS, WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	2	2/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Sound Blaster SB AWE64	midtower	768	2	2/1	4	varies */3	24	Sat., Sun.	none
14X-32X	Sound Blaster AWE64	midtower	1024	2	3/2	4	varies */5	24	Sat., Sun.	WWW
12X-24X	Sound Blaster AWE64	midtower	384	2	2/3	2	1/3	10	Sat.	BBS, WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	3	varies */5	24	Sat., Sun.	WWW
12X-24X	Aztech AZT2320	midtower	384	2	2/1	4	3/3	11	none	AOL, BBS, CIS, WWW
12X-24X	integrated ESS ES1869	midtower	384	1	2/0	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-24X	ESS Model X071	midtower	384	2	2/0	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW

<sup>1</sup> Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

<sup>2</sup> One year peripherals, CPU, and main memory, three years on other parts.

<sup>3</sup> Six years on CPU and main RAM, three years on other parts.

behind its fleet-footed sibling by about 8 percent. Still, for those used to an older PC, its crisp response is like trading in a pair of rusty metal skates for rollerblades. The large 10GB hard disk and Iomega Zip drive provide ample storage, and we also like the disc-loading mechanism on the trayless 12X-32X CD-ROM drive (though a DVD-ROM drive would let you watch DVD movies, too).

The Millennium 350 includes plenty of perks for home-office users. Whereas the Millennium 400 comes with Microsoft Office SBE, the 350 has the Audio Works Pro Studio sound-editing package. The 17-inch Micron monitor provides an ample viewable area, but its display looked a bit



Micron Millennium 350

fuzzy and slightly bowed in our tests—those who spend a lot of time in front of their monitor might want something crisper. The Altec Lansing speaker system isn't bad once you crank it up, but the subwoofer sounds muddy at low volume.

We found the Millennium 350's off-white midtower case to be sturdy, stable, and easy to open. Inside, a whisper-quiet fan blows air directly over the enormous heat sink on the processor. The keyboard, while slightly spongy, is comfortable, as is the Microsoft IntelliMouse.

Micron backs its systems with a standard three-year parts, one-year labor warranty. Its system documentation isn't flashy, but it's quite thorough. In our

anonymous phone calls, we've found Micron's round-the-clock toll-free technical support to be outstanding.

#### 4 QUANTEX QP6/400 SM-4X

**PRO:** Excellent monitor, good business software bundle, lots of expandability

**CON:** Poor response to our tech support calls, slightly below-average performance for PII-400



The Quantex QP6/400 SM-4X doesn't break any new ground in either performance or features, but this PII-400 does so many things well, it should be near the top of anyone's list of choices for a new office PC. Affordable at \$2449, the QP6/400 SM-4X is a sensible choice, though it lacks the flash of systems outfitted with a DVD-ROM drive or Iomega Zip drive. But Quan-



tex's outstanding support policies and the included Microsoft Office 97 SBE bundle help make this PII-400 a power Best Buy.

With a PC WorldBench score of 199, the Qp6/400 SM-4x runs a bit behind the PII-400 herd, but it's still fast enough for demanding tasks. While it offers nice equipment and plenty of upgrade opportunities, software remains the SM-4x's strong suit. In addition to



Quantex QP6/400 SM-4x

Office SBE, the PC comes with a Softkey calendaring and forms application, as well as RingCentral's communications package to turn the included 56-kbps modem into a speakerphone, a fax machine, and a voice mail system. The Altec Lansing ACS45 speakers with subwoofer won't win awards in *Stereo Review*, but they pack enough punch to carry your presentation or play your favorite audio CDs.

The QP6/400 SM-4x's 11GB hard drive should hold you for a while. We found the keyboard comfortable and the pointing device—the increasingly ubiquitous Microsoft IntelliMouse—easy to use. Both devices have cables long enough to reach the back of the system, even when it's tucked away in a far corner. Our favorite part of the package, though, is the big, beautiful 19-inch Hitachi monitor included at this price. The monitor that came with our system had a razor-sharp pic- ▶

## TOP 20 POWER DESKTOPS

## TEST REPORT

SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score	◀ Faster Slower ▶	Average of tested Pentium II-400s <sup>1</sup>
1 Micron Millennia 400*	Pentium II-400	Win 95	64	512	210		
2 Gateway GP6-400*	Pentium II-400	Win 95	64	512	204		
3 Micron Millennia 350*	Pentium II-350	Win 95	64	512	194		
4 Quantex QP6/400 SM-4x*	Pentium II-400	Win 95	64	512	199		
5 Dell OptiPlex GX1 400*	Pentium II-400	Win NT 4.0	64	512	244		
6 Dell Dimension XPS R400	Pentium II-400	Win 95	64	512	199		
7 Compaq Deskpro EP 6400X/6400/CDS	Pentium II-400	Win 95	64	512	200		
8 Dell Dimension XPS R350	Pentium II-350	Win 95	64	512	187		
9 Gateway E-4200 400	Pentium II-400	Win 95	128	512	190		
10 NEC Direction SP B400	Pentium II-400	Win 95	64	512	207		
11 HP Vectra VL Series 8	Pentium II-400	Win 95	64	512	207		
12 Premio Apollo BX 350	Pentium II-350	Win 95	64	512	179		
13 NEC PowerMate 8000	Pentium II-333	Win 95	64	512	175		
14 NexTrend NexStar 409W	Pentium II-400	Win 95	64	512	196		
15 Sys Performance Pro 400BA	Pentium II-400	Win NT 4.0	64	512	252		
16 Netis Starburst PII-333	Pentium II-333	Win 95	64	512	176		
17 Sys Performance Pro 333H2	Pentium II-333	Win NT 4.0	64	512	220		
18 HP Vectra VL Series 7	Pentium II-333	Win NT 4.0	64	512	218		
19 Compaq Deskpro 6000T	Pentium II-300	Win NT 4.0	64	512	202		
20 Compaq Deskpro 2000 6300X	Pentium II-300	Win NT 4.0	32	512	182		

\*Best Buy

Application test times in minutes

Word 97

Word Pro 97

Excel 97

1-2-3 97

Paradox 8.0

Picture Publisher 7.0

**TEST HOW WE TEST** All systems are tested with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online ([www.pcworld.com/testing](http://www.pcworld.com/testing)). <sup>1</sup>Under Windows 95.



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Six Time Winner  
Jan 1997, Feb 1997, March 1997,  
April 1997, May 1997, June 1997  
VisionMaster Pro 21



October 7, 1997  
VisionMaster Pro 17



March 1997  
VisionMaster Pro 21



Seven Time Winner  
July 1996, Jan 1997, March 1997,  
July 1997, Sept 1997, Jan 1998, May 1998  
VisionMaster Pro 17  
April 1998  
VisionMaster 450

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ture that we found easy to tweak using an intuitive dial and on-screen controls. The graphics card, an 8MB Real 3D StarFighter board, offers fast refresh rates, even at a resolution of 1600 by 1200.

The QP6/400 SM-4x's tan metal case lifts off easily after you remove three thumbscrews. Inside, it's as neat and spacious as a five-star hotel room. Both 3.5- and 5-inch drive bays are available, with externally accessible bays for adding tape or DVD-ROM drives. Numerous open ISA, PCI, and DIMM slots are provided, too.

So what's not to like about this system? Aside from relatively pedestrian PII-400 performance, not much. Quantex's documentation is a bit slim on upgrade information but covers technical issues extensively. We did have a problem with the company's technical support—the representative we talked to during our anonymous calls seemed to lack training and provided inaccurate or incomplete answers to our queries. The three-year parts and one-year labor warranty is competitive with the support policies offered by some of the larger top-tier vendors.

## 5 DELL OPTIPLEX GX1 400

**PRO:** Inexpensive; ethernet card, nice monitor

**CON:** Slower than the other 400-MHz Windows NT system on our chart

A perfectly engineered machine deserves your respect and admiration. After spending only a few minutes with Dell's OptiPlex GX1 400, you'll appreciate that you're working with the power of Windows NT—and great ergonomics to boot. At \$2819, this mid-tower is a corporate user's dream, scoring 244 in our PC WorldBench 98 tests—a scant 8 points slower than the other Windows NT-based Pentium II 400 desktop system that made our chart (Sys Technology's Sys Performance Pro 400BA).

With the OptiPlex's modular case, every part of the PC swivels, glides, or swings open for easy access and room to grow. But with so much supplied, upgrading shouldn't be in the cards for some time. Even the modest 6.4GB hard disk should suffice for most uses.



Dell OptiPlex GX1 400

Dell's Ultrascan 1000HS, one of the best 17-inch Trinitron displays, offers excellent image quality. Though the graphics chip is integrated on the motherboard, you can upgrade to an AGP card later. It's literally a snap: Press a button on the PC's front, flick the case-lock switch at the back, and the cover swings up and out of the way. Expansion cards are mounted on a separate chassis that slides out as you press a lever—no scraped knuckles here. Similarly, the power supply swivels up and away to provide you full access to the CPU and memory.

Like all Dell OptiPlex models, the GX1 400 includes a network adapter—3Com's Etherlink card. The spartan software bundle is limited to Windows NT Workstation and driver floppies. Dell's warranty policy is excellent: three years on parts as well as three years coverage for labor. The company also staffs tech support phone lines around the clock.

## New This Month

The following PCs made our power desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page ([www.pcworld.com/top400](http://www.pcworld.com/top400)).

## 9 GATEWAY E-4200 400

**PRO:** Crisp 19-inch monitor, both network card and modem, great support

**CON:** Slow compared with like-configured PCs  
More is better. At least, that's the message that comes through loud and clear from some quality time spent with Gateway's business-minded E-4200 400. This well-appointed midsize tower comes loaded with more RAM, a bigger monitor, and more connectivity options than most of the other power systems you'll find on our charts. Unfortunately, though, at \$2838, it costs substantially more, too: The E-4200 400 will set you back about \$120 more than a typical PII-400 PC.

One thing that you definitely won't get more of with this Gateway is performance. The E-4200 400's PC World-

Bench 98 score of 190 gives it the dubious distinction of being the slowest PII-400 we've tested to date. In fact, its performance trails that of the two swiftest PII-350s we've tested—the Micron Millennia 350 and the NEC Direction SP B350.

Otherwise, however, the E-4200 400 is one terrific system.

While not everyone needs the massive 128MB of RAM included in the E-4200 400, the large pool of system memory is a significant advantage for those who use extremely demanding applications or multitask many programs. The additional RAM boosts performance by enabling more programs and files to stay resident in fast memory at all times, instead of being relegated them to the hard disk when memory space gets tight. The extra RAM will also be welcomed by those running Windows NT, although this PC came with Windows 95 installed.

The crisp 19-inch monitor provides 25 percent more viewable area than a typical 17-inch model, and the installed 8MB ATI Xpert@Work graphics card can push high resolutions that take advantage of the big screen. Unlike most desktop systems, the E-4200 400 includes both phone and network connectivity—in the form of a 56-kbps x2-compatible Gateway Telepath modem and an SMC EtherPower II 100-mbps network card.

The E-4200 400's gray case, though attractive, features the trademark Gateway curves, which means the only thing that can rest safely on top is a cat. Available space is a bit limited on the system's interior but the motherboard still provides two free PCI slots and five free drive bays (including three externally-accessible bays for Zip and backup drives). Setup is made easier by color-coded keyboard and mouse plugs. In our opinion, the documentation was a bit confusing, however. The printed manuals were actually written for the older E-3000 series, while the on-screen help listed specifications for a different system and overwhelmed us with technical specs for six (count 'em) different CD-ROM and DVD drives.



Gateway E-4200 400



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Gateway protects your investment with a long three-year warranty for both parts and labor and 24-hour technical support seven days a week. Despite its relatively slow PII-400 performance, this well-equipped system should make a fine addition in the workplace.

## 12 PREMIO APOLLO BX 350

**PRO:** Fair price for its processor class; includes DVD-ROM drive

**CON:** Slow for a PII-350, very fuzzy monitor, no speakers, weak support

With a sluggish PC WorldBench 98 score of 179, the Premio Apollo BX 350 runs nearly 5 percent behind the average for PII 350 systems running under Windows 95. At \$2250, it's just a few dollars cheaper than an average Pentium II-350, but a strong bundle of office and home software help the system climb the power chart.

The Apollo BX 350 bundles not one but two full office suites—Lotus SmartSuite 97 and Microsoft Office 97—and it adds attractive CD-ROMs such as Microsoft Money 98, Encarta 98, and several games to the software mix. The 2X DVD-ROM drive is another nice perk. Regrettably, the system does not include speakers, and the 17-inch monitor that came with our test unit yielded fuzzy images that could lead to eyestrain or headaches.

The 64MB of RAM and 56-kbps modem are standard issue on chart-making power desktops these days, but the 6.2GB hard disk is one of the smallest on the list. Still, the disk should be more than enough for most users. The case is fairly easy to remove, permitting upgrades to the five free drive bays, but unlike with the best-designed PCs, you'll have to remove several tiny screws.

Premio's support is a mixed bag. The three-year parts and labor warranty matches policies offered by top vendors such as Gateway and Hewlett-Packard, but toll-free technical support is available for just nine hours per day, excluding weekends. Premio ships the PC with individual component manuals, which can be a bit intimidating to novices. The Apollo BX 350 provides some unique tweaks, not

the least of which is the dual bundle of software suites, but you'll want to pitch in for a better monitor.

## 14 NEXTTREND NEXSTAR 409W

**PRO:** Reasonable price for PII-400, and good phone service around the clock

**CON:** Slower-than-average performance, no online support, skimpy documentation

How quickly times have changed. A scant two months ago, the \$2639 NexStar 409W from NexTrend would have absolutely astounded us with its terrific price and respectably speedy Pentium II-400 performance. Today, though, this generic midtower's price is only \$80 less than the average for all the PII-400s we've reviewed, and its PC WorldBench 98 score of 196 means that this Windows 98 desktop is a bit sluggish compared to similarly configured peers.

But the NexStar 409W still has enough positives going for it on the whole to chug to a creditable 14th-place finish on our power list. For further incentive, NexTrend throws in the Microsoft Office 97 Small Business Edition application suite and a preinstalled version of Norton AntiVirus. Both of these top-notch packages would make valuable additions to anybody's software library.

Otherwise, the system features a middle-of-the-road power configuration, including an 8.4GB hard drive, 64MB of RAM, and a 14X-32X CD-ROM drive. Inveterate gamers should like the 8MB CardExpert graphics card, which is based on the Intel740 chip. Although we haven't tested this board, others based on the Intel-740 graphics chip have proved to be capable 2D and 3D accelerators in our reviews. The 17-inch monitor offers a decent viewable area (16.1 inches) and produces bright, crisp images. Likewise, NexStar's Creative Labs Sound Blaster AWE64 sound board and Altec Lansing speakers deliver good audio quality.

Like many systems we've reviewed lately, the 409W has a rear power switch that must be set to the on position before the

front power button will work—something novices can easily overlook. Another potential trap for newbies is the system documentation, which includes diagrams of back ports that don't match those found on the NexStar's case. The individual component manuals make finding information a bit difficult as well.

Inside, you'll find two available DIMM sockets, three open PCI slots, and a single open ISA slot. The case is equipped to accept two externally accessible drives and a single internal drive—adequate for an additional tape drive and a removable media device such as an Iomega Zip drive.

Perhaps the most serious drawback to this system is NexTrend's support, which is inconsistent. NexTrend's unusual warranty package covers the CPU, RAM, monitor, and keyboard for only one year—too short a guarantee on these key components, when you consider that most other vendors on our chart offer three years of coverage for all parts. The company does provide a three-year warranty guarantee on other components, such as disk drives. Labor is covered for three years. NexTrend lacks online support, but the company's toll-free technical support is available 24 hours a day. Our anonymous calls to NexTrend revealed prompt, knowledgeable, and helpful technical support representatives.

Despite the good telephone support and reasonable price, the sparse documentation makes it difficult to recommend the NexStar 409W to novice buyers. But PC veterans looking for a deal on a PII-400 would do well to consider this PII 400 system, which comes well stocked with both features as well as useful business-oriented software. ▶



NexTrend NexStar 409W



Premio Apollo BX 350

## BEYOND THE TOP 20



We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online ([www.pcworld.com/t20pcs](http://www.pcworld.com/t20pcs)).

- ◆ Digital PC 5510 6333LP
- ◆ Maximus Wide SCSI-3



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\* Brightness in ANSI lumens may vary up to 10% depending on room lighting and lamp conditions.  
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## TOP 20 BUDGET DESKTOPS

	SYSTEM	Last month	Month tested	Street price (6/15/98)	CPU	Comments
1	 Gateway G6-333 800/846-2000 www.gateway.com	n/a	June 98	\$2098	Pentium II-333	\$300 drop moves fast, DVD-equipped PC from power chart to top of budget chart.
2	 Quantex QP6/350 M-4x 800/896-4898 www.quantex.com	n/a	NEW	\$2249	Pentium II-350	19-inch monitor and internal Zip drive on software-laden PII-350.
3	 Gateway GP6-300b 800/846-2000 www.gateway.com	n/a	NEW	\$2033	Pentium II-300	Extremely fast, network-equipped PII-300 replaces G6 300b.
4	 Quantex QP6/333 SM-3x 800/896-4898 www.quantex.com	3	Aug 98	\$1899	Pentium II-333	Upgradability and \$100 cut help make for one of best PII-333 deals on chart.
5	 Micro Express MicroFlex-B350b 800/989-9900 www.microexpress.net	n/a	NEW	\$1699	Pentium II-350	NT 4.0 on a budget; includes 128MB of RAM and DVD-ROM drive.
6	Gateway E-3110 300 800/779-2000 www.gateway.com	5	May 98	\$1979	Pentium II-300	Networked Windows 95 PII-300 with 8.4GB hard disk sheds \$110.
7	Dell Dimension XPS D300 800/388-8542 www.dell.com	n/a	May 98	\$2229	Pentium II-300	\$270 price cut moves well-supported PII-300 to budget list for the first time.
8	Micro Express MicroFlex-F300f 800/989-9900 www.microexpress.net	11	May 98	\$1399	Pentium II-300	\$300 off on PII-300 with V.90 modem and tweaked model name, great warranty.
9	CyberMax ValueMax B8 800/437-4596 www.cybermaxpc.com	n/a	NEW	\$1449	Cyrix M II-300	Great graphics and PII-300 performance from first Cyrix M II-300 PC.
10	Quantex QP6/266 M-2x 800/896-4898 www.quantex.com	n/a	July 98	\$1399	Pentium II-266	\$100 off sluggish but affordable PII-266 with gobs of software, nice monitor.
11	CyberMax PowerMax H3 800/437-4596 www.cybermaxpc.com	n/a	Aug 98	\$2060	Pentium II-333	Graphics powerhouse is a bargain, with 128MB of RAM and a great 3D video card.
12	CyberMax PowerMax B2 800/437-4596 www.cybermaxpc.com	n/a	May 98	\$1759	Pentium II-300	Renamed system includes Zip drive; \$51 price cut this month.
13	Quantex QP6/333 SM-4x 800/896-4898 www.quantex.com	n/a	Aug 98	\$2099	Pentium II-333	\$200 off PII-333 with top video card; fast budget performer.
14	TigerDirect Tiger Pro 400 800/830-0056 www.tigerdirect.com	n/a	NEW	\$1999	Pentium II-400	Competitive features and performance from first PII-400 on the budget chart.
15	Unicent Avanta L333 800/308-3614 www.unicent.com	9	June 98	\$1949	Pentium II-333	Another \$50 off slowest PII-333 on chart; phone support could be better.
16	Royal Computer Xpert SE 800/486-0008 www.goroyalpc.com	n/a	NEW	\$999	Pentium II-300	DVD-ROM drive in this inexpensive PII-300, but support policies are poor.
17	Tagram Thunderbolt H2630 800/824-7267 www.tagram.com	20	June 98	\$1899	Pentium II-333	\$300 price drop on PC with Zip drive and updated 32X CD-ROM drive.
18	ProGen Polaris PII-350 888/776-9595 www.progen.com	15	July 98	\$1799	Pentium II-350	Another \$200 off this PII-350, but support policies are only so-so.
19	Quantex QP6/300 SB-4x 800/896-4898 www.quantex.com	n/a	May 98	\$1949	Pentium II-300	\$50 skimmed off powerful NT system with good support policies.
20	Sys Technology Sys Performance Pro 300LA 800/613-9963 www.systechology.com	n/a	May 98	\$2093	Pentium II-300	Fast NT-based PII-300 with top components, good support policies.



Best Buy

See features chart, page 208; test report, page 210.

n/a = not applicable

\* A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100."

\* For more information about all products in this table, circle InfoNet no. 908.



A HORDE OF CHEAP Pentium II-300, -333, and -350 PCs takes over almost the entire chart this month. We also see our first PII-400 PC, the TigerDirect Tiger Pro 400. It's not an all-Intel game, though. The new CyberMax ValueMax B8, the first PC we've tested that's based on the Cyrix M II-300 chip, is an impressive alternative. At \$1449, it offers PII-300-like speed at a bargain price. Another non-Intel offering, TigerDirect's AMD-K6 300 system, failed to make our charts despite its \$1399 price—low for a system with a 17-inch monitor. Holding it back: a PC WorldBench 98 score of 153 that is slightly below the average for PII-300 systems, and less-than-helpful documentation. Still, it looks like a terrific bargain.



# SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Features and design	Price	Performance <sup>1</sup>	Vendor's system reliability	Vendor's support quality/policies	InfoNet number <sup>2</sup>
88	179/Win 95	very good	average	outstanding	average	above average/best	712
86	186/Win 95	very good	expensive	outstanding	average	average/best	713
86	174/Win 95	very good	average	outstanding	average	above average/best	714
85	164/Win 95	very good	average	very good	average	average/best	715
85	228/Win NT 4.0	very good	average	outstanding	<sup>3</sup>	<sup>3</sup> /best	716
85	172/Win 95	good	average	outstanding	average	above average/best	717
85	157/Win 95	very good	expensive	very good	above average	above average/best	718
83	161/Win 95	very good	inexpensive	very good	<sup>3</sup>	<sup>3</sup> /best	719
83	161/Win 95	very good	inexpensive	very good	<sup>3</sup>	<sup>3</sup> /best	720
83	138/Win 95	very good	inexpensive	good	average	average/best	721
83	171/Win 95	outstanding	average	outstanding	<sup>3</sup>	<sup>3</sup> /best	722
82	152/Win 95	outstanding	average	very good	<sup>3</sup>	<sup>3</sup> /best	723
82	173/Win 95	very good	average	outstanding	average	average/best	724
81	194/Win 95	good	average	outstanding	<sup>3</sup>	<sup>3</sup> /good	725
81	158/Win 95	very good	average	very good	<sup>3</sup>	<sup>3</sup> /best	726
81	160/Win 95	good	very inexpensive	very good	<sup>3</sup>	<sup>3</sup> /worst	727
80	171/Win 95	very good	average	outstanding	<sup>3</sup>	<sup>3</sup> /fair	728
80	181/Win 95	very good	average	outstanding	<sup>3</sup>	<sup>3</sup> /fair	729
77	198/Win NT 4.0	good	average	very good	average	average/best	730
77	213/Win NT 4.0	very good	average	outstanding	<sup>3</sup>	<sup>3</sup> /good	731
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

<sup>1</sup> Insufficient data to give a rating.

## This Month's Best Buys

### 1 GATEWAY G6-333

**PRO:** Fast PII-333 performance, DVD-ROM drive, lots of software

**CON:** Can't stack items on rounded case



The Gateway G6-333 is a speedy Pentium II-333 with all the horsepower you need to run apps in

your home office or small business. This well-designed, generously configured PC moves over to our budget desktops chart after a \$300 price cut to \$2098. The G6-333's PC WorldBench 98 score of 179 is among the best of the PII-333 pack.

Included in the package is a 2X DVD-ROM drive and a sampler of movie previews. The STB Velocity 128 Accelerated Graphics Port video card offers resolu-

tions up to 1600 by 1200, though the 17-inch Gateway EV700 monitor is not large enough for comfortable viewing at that setting.



**Gateway G6-333**

Enjoy listening to music while you work? The Ensoniq AudioPCI card feeds to good, basic Altec Lansing ACS41 speakers, which sound fine despite the lack of a subwoofer. Other bonuses include a 56-kilobits-per-second x2 modem, a hefty 8.1GB hard drive, and a multifunction keyboard that lets you adjust the sound level and control audio CDs.

The dove-gray case is well designed, but you won't be able to stack components on its curved top. Inside, you'll find minimal cable clutter: We were easily able to reach and fill the two available expansion slots and the one empty DIMM socket.

Gateway's documentation is detailed, and the company offers around-the-clock toll-free technical support. We didn't wait long on hold when we called anonymously, and the techs offered good advice.

### 2 QUANTECH QP6/350 M-4X

**PRO:** Quality design, hefty software bundle

**CON:** Basic speakers, skimpy warranty



It's hard to imagine getting much more PC for the price than the Quantech QP6/350 M-4x delivers. This \$2249 midtower PC comes packed with attractive peripherals and software, making it a terrific choice for people who want to satisfy all their computing needs with one purchase.

With a PC WorldBench score of 186, the QP6/350 M-4x delivers typical PII-350 performance. But the real story lies elsewhere, beginning with the software bundle: You get Corel's WordPerfect 8 office suite and titles such as Bodyworks, an anatomy reference, and Compton's American Heritage Talking Dictionary and Interactive Encyclopedia. Ring Central's software turns the 56-kbps modem into a custom voice mail system and call forwarding service.

If you crave hardware, too, you've come to the right place. The large 19-inch ▶



	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Modem speed (kbps)
1	Gateway G6-333*	Pentium II-333	Windows 95	64	512	8.1	STB Velocity 128	4/SGRAM	17/16.1	56 <sup>2</sup>
2	Quantex QP6/350 M-4x*	Pentium II-350	Windows 95	64	512	8.1	Real 3D StarFighter	4/SGRAM	19/17.9	56 <sup>4</sup>
3	Gateway GP6-300b*	Pentium II-300	Windows 95	64	512	8.1	AccelStar II 3D	8/SGRAM	17/16	not included
4	Quantex QP6/333 SM-3x*	Pentium II-333	Windows 95	64	512	6.4	STB Velocity 128	4/SGRAM	17/16.1	56 <sup>4</sup>
5	Micro Express MicroFlex-B350b*	Pentium II-350	Windows NT 4.0	128	512	6.2	ATI Xpert@Work	4/SGRAM	17/15.9	56 <sup>3</sup>
6	Gateway E-3110 300	Pentium II-300	Windows 95	64	512	8.4	ATI 3D Rage Pro Turbo PC2TV	8/SGRAM	17/18	not included
7	Dell Dimension XPS D300	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128	4/SGRAM	17/15.8	56 <sup>2</sup>
8	Micro Express MicroFlex-F300f	Pentium II-300	Windows 95	64	512	6	ATI Xpert@Work	8/SGRAM	17/15.8	56 <sup>3</sup>
9	CyberMax ValueMax B8	Cyrix M II-300	Windows 95	64	512	8	3Labs Permedia 2	8/SGRAM	17/15.7	56 <sup>4</sup>
10	Quantex QP6/266 M-2x	Pentium II-266	Windows 95	32	512	4.1	STB Velocity 128	4/SGRAM	17/16.1	56 <sup>4</sup>
11	CyberMax PowerMax H3	Pentium II-333	Windows 95	128	512	8.4	Symmetric GlyderMax-2	8/SGRAM	19/18	56 <sup>4</sup>
12	CyberMax PowerMax B2	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128	4/SGRAM	17/16.1	56 <sup>4</sup>
13	Quantex QP6/333 SM-4x	Pentium II-333	Windows 95	64	512	8.4	Diamond Fire GL 1000 Pro	8/SGRAM	17/16	56 <sup>4</sup>
14	TigerDirect Tiger Pro 400	Pentium II-400	Windows 95	64	512	6.6	Number Nine Revolution 3D	8/SGRAM	17/15.8	56 <sup>4</sup>
15	Unicent Avanta L333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work	4/SGRAM	17/15.9	56 <sup>2</sup>
16	Royal Computer Xpert SE	Pentium II-300	Windows 95	64	512	6.2	ATI Xpert@Work	4/SGRAM	15/14	56 <sup>2</sup>
17	Tagram Thunderbolt H2630	Pentium II-333	Windows 95	64	512	6.4	Matrox Productiva G-100	8/SGRAM	17/16.1	56 <sup>4</sup>
18	ProGen Polaris PII-350	Pentium II-350	Windows 95	64	512	8.4	Intel Express 3D	4/SGRAM	17/16	56 <sup>2</sup>
19	Quantex QP6/300 SB-4x	Pentium II-300	Windows NT 4.0	64	512	6.4	Diamond Viper 330	4/SGRAM	19/16.1	56 <sup>4</sup>
20	Sys Performance Pro 300LA	Pentium II-300	Windows NT 4.0	64	512	6.4	Matrox Millennium II	8/WRAM	17/15.7	56 <sup>2</sup>

\* Best Buy <sup>1</sup> PC World defines towers as taller than 20 inches; midtowers as 15.5 inches to 20 inches; and minitowers as shorter than 15.5 inches.

<sup>2</sup> Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

<sup>3</sup> Downloads only, uploads at 33.6 kbps; uses V.90 industry standard technology.

Hitachi monitor produced crisp, bright, and faithful graphics even at the edges of the flat screen—no ugly bowing or fuzzies. An intuitive, mouselike dial and a set of buttons drive the on-screen controls. You should find the 8.1GB hard disk big enough, and an internal Iomega Zip drive makes for easy backups. The Real3D StarFighter AGP graphics board—the second-place winner in this month's *Top 10 Graphics Boards* on page 229—utilizes the Intel740 graphics chip to provide balanced 2D and 3D acceleration for both gaming and business software.

The system design makes good sense. Clear case labeling and extensive start-up documentation make setup easy.



Quantex QP6/350 M-4x

The system has plenty of open drive bays, along with one free ISA slot and three free PCI slots, and we had no trouble removing the metal case from the sturdy chassis. The Altec Lansing ACS90 speakers produce decent sound quality, but audiophiles may want to pay something extra for a more powerful set.

Quantex's 24-hour toll-free technical support and three-year parts warranty help protect your investment, but you'll pay labor charges after the first year. And

if you need to send your system in for repairs, you'll foot the shipping costs. Still, these are minor quibbles for a system that delivers such a raft of hardware and software at such a reasonable price.

### 3 GATEWAY GP6-300B

**PRO:** Fastest Windows 95 performance for a PII-300, top-notch support policies

**CON:** Slightly wobbly case



The new Gateway GP6-300b replaces the G6-300b, our top budget desktop system last month. Like the G6-300b, this overachieving mid-tower gets the most out of its processor, with a PC WorldBench score of 174, tops among Pentium II-300s running Windows 95. And like its older sibling, it comes complete with Microsoft Office 97 Small Business Edition, Microsoft Bookshelf, and a solid multimedia configuration. This fleet-footed PII-300 computer also adds an updated graphics card and a 100-megabits-per-second network card, making it an excellent option for those



CD/DVD-ROM drive speed	Sound board	Case style <sup>1</sup>	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	Ensoniq AudioPCI	midtower	384	1	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	Ensoniq AudioPCI	midtower	384	2	2/3	4	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	768	1	3/0	4	4/4	24	Sat., Sun.	WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Turtle Beach Montego	midtower	384	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Super Sound32 32W-3D	midtower	512	2	3/0	4	4/4	24	Sat., Sun.	WWW
14X-32X	Ensoniq AudioPCI	midtower	256	5	3/3	3	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	Ensoniq AudioPCI	midtower	384	1	2/3	4	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-32X	OEM	midtower	384	2	3/0	4	3/3	24	Sat., Sun.	WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/1	4	3/3	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Yamaha OPL3-Sax	minitower	384	1	3/0	5	1/1	11	Sat.	BBS, WWW
14X-32X	S3 Sonic Vibes PCI Audio	midtower	384	2	3/0	4	3/1	24	Sat., Sun.	BBS, WWW
12X-32X	Aureal Vortex PCI Audio	midtower	384	2	3/1	3	3/1	9	none	BBS, WWW
14X-32X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Sound Blaster AWE54	midtower	1024	2	3/2	4	varies */5	24	Sat., Sun.	WWW

\* Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

† Five years on CPU and system memory, three years on all other parts.

who need a fully configured computer for a small network.

At \$2003, the GP6-300b costs a bit more than many budget systems, but it provides the goods to justify the premium. The 8.1GB hard disk is one of the largest on the budget chart, and the 13X-32X CD-ROM drive is among the fastest you can buy. We found the PC's 8MB AccelStar II 3D graphics accelerator to be well matched with the bright 17-inch display. The powerful Altec Lansing GSC-100 speakers are driven by an Ensoniq AudioPCI sound board to provide superior audio output.

Gateway color-codes the port and cable connectors on all its PCs, taking much of

the guesswork out of setup. The large keyboard is solidly built, with plenty of feedback in the keys and handy buttons for putting the PC into sleep mode, launching your Internet browser, and other everyday tasks. The GP6-300b has a rounded top; a greater concern is that we felt the system could easily be tipped over.

Inside, you will find three expansion slots (two PCI, one ISA), as well as three externally accessible drive bays and two internal bays.

PC World readers consistently say they value good product support, and Gateway delivers plenty of it, with three years of coverage on both parts and labor, as well as technical phone support around the clock.



Gateway GP6 300b

#### 4 QUANTEX QP6/333 SM-3X

**PRO:** Affordable, lots of room to upgrade

**CON:** Case is hard to open, internal cables are not well organized



The Quantex QP6/333 SM-3x hangs on to a Best Buy slot, thanks to a \$100 price cut that nudges it ahead of Micro Express's MicroFlex-B350b. At \$1899, this affordable Pentium II-333 desktop has plenty of room for expansion. The system also benefits from Quantex's top-notch support policies.

The QP6/333 SM-3x doesn't come with an Iomega Zip drive, but it should be a while before you need to offload data from its generous 6.4GB Seagate Medalist Pro hard drive. If you ever do need to increase storage, there's lots of space inside to mount additional hard disks or a Zip ►





**Quantex QP6/333 SM-3x** free bays are 5.25 inches high, however, so you'll probably need special rails to mount smaller internal or external drives.

Thanks to the single 64MB RAM module on the QP6/333 SM-3x, if you wish

drive, provided you can manage to navigate all the haphazardly scattered cables and power cords. The only

you can add on two more DIMMs without being forced to remove the original one.

Quantex guarantees the QP6/333's hardware for three years and will fix the system for free during the first year. The company has its own support BBS; you can download updated drivers or technical support information from the BBS or from Quantex's Web site. You can call the company's around-the-clock technical support phone line for help in case you're having late-night computer troubles.

## 5 MICRO EXPRESS MICROFLEX-B350B

**PROS:** DVD-ROM drive, lots of RAM, excellent video card, 24-hour technical support

**CONS:** Fuzzy monitor image; disappointing speakers accompany excellent sound card



If Bill Gates wants everyone to use Windows NT, he's got to get more vendors to sell systems like the Micro Express MicroFlex-B350b. One of only three systems on the Budget Desktops chart to include Windows NT 4.0. ▶

## TOP 20 BUDGET DESKTOPS

## TEST REPORT



**TEST HOW WE TEST** All systems are tested with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online ([www.pcworld.com/testing](http://www.pcworld.com/testing)). <sup>1</sup>Under Windows 95.



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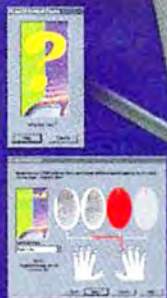


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the MicroFlex-B350b costs only \$1699 yet includes 128MB of RAM and a DVD-ROM drive. Just watch out for gotchas. Poor display quality and disappointing speakers could sour users expecting better components from this PII-350 PC.

Still, there's a lot to like about this generic-looking machine. A WorldBench score of 228 makes it one of the fastest NT-based system we've tested (only the Sys Performance Pro 400BA and Dell OptiPlex GX1 400 are faster), and its 2X Toshiba DVD-ROM drive means that you'll be able to run future multimedia titles. The 4MB ATI Xpert@Work AGP video card includes jacks for connecting to a TV or VCR. You may not like the 17-inch Princeton EO17 monitor, however—



MicroFlex-B350b

the picture on ours was fuzzy in the corners. And the speakers on our test unit did not do justice to the Sound Blaster AWE64 sound board; bass was distorted even at lower volume settings. A generic 56-kbps voice modem is included, along with the Bitware for Windows communications package.

It's easy to get inside the MicroFlex-B350b—just don't lose any of the four small case screws you must remove. Inside, there's unhampered access to the processor, memory, and four open PCI expansion slots, while three free externally accessible bays let you add drives and backup devices. The large keyboard has a slightly mushy feel, but the Microsoft Mouse is comfortable to use, though you don't get the scroll wheel of the popular IntelliMouse.

Micro Express's support policies get top marks; they include a generous four-year parts and labor warranty and one year of on-site service. Toll-free phone support is available around the clock; support representatives, however, did not answer our question about modems, referring us instead to the modem vendor. Still, this affordable NT system has enough welcome perks to become a Best Buy.

## New This Month

The following PCs made our budget desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page ([www.pcworld.com/top400](http://www.pcworld.com/top400)).

### 9 CYBERMAX VALUEMAX B8

**PRO:** Very good performance, solidly built, great support policies

**CON:** Documentation is generic and disorganized, case is hard to open

CyberMax has been cranking out fast and affordable PCs for a few years now, and the ValueMax B8 is no exception. With a Cyrix M II-300 CPU, the system has Pentium II-300-level speed, but costs hundreds less. At \$1449 and with a PC WorldBench score of 161, the B8 is a bargain.

The boxy case lacks conveniences like a quick-release cover and color-coded port labels, but the system is sturdy. The confusing system manuals may baffle rank newcomers, but tech support reps, available around the clock, handled our anonymous calls in a helpful manner. CyberMax's warranty covers parts for three years and labor for one.



CyberMax ValueMax B8

### 14 TIGERDIRECT TIGER PRO 400

**PRO:** Blazing performance for the price

**CON:** Substandard monitor

Full-featured and powerful, the Tiger Pro will appeal to budget buyers not willing to compromise on performance. At \$1999, it's the first Pentium II-400 to claw its way onto our Top 20 budget chart. A PC WorldBench score of 194 puts it slightly behind the average of PII-400s—but it's the best-performing PC on the chart.



Tiger Pro 400

The fast CPU is backed up by a 6.6GB ultra DMA hard drive and an 8MB Number Nine Revolution 3D AGP graphics card. But the picture on the 17-inch monitor we tested was fuzzy along the left edge. We found the on-screen controls to be cumbersome, too.

Two free PCI slots and two free ISA slots provide room to upgrade, and three externally accessible drive bays are open, as are two RAM sockets.

TigerDirect's user guide is thin, but it does a good job of describing the PC and how to set it up.

The company recently bolstered its parts and labor warranty from one year to three. Its technical support is available 16 hours a day on weekdays, and 7 hours on Saturdays. In the past, we received numerous complaints regarding TigerDirect's service, but those grievances seem to have abated. Our anonymous calls to the company's technical support revealed prompt and helpful personnel. If TigerDirect can keep delivering adequate service, this system is a great option for performance-minded budget users.

### 16 ROYAL COMPUTER XPERT SE

**PROS:** Terrific price, includes DVD-ROM drive and excellent video card

**CONS:** Mediocre monitor, short warranty, poor manuals, tech support hard to reach

Still doubt that the sub-\$1000 PC market is for real? Check out Royal Computer's Xpert SE, a Pentium II-300 system that sells for just \$999, including a 15-inch monitor (albeit a **Royal Computer Xpert SE** crummy one). With a PC WorldBench score of 160, this PC is a typical PII-300 performer, yet costs hundreds less than the average PII-300 we've tested. But significant flaws keep this system near the bottom of the chart. Audio quality is poor, as are Royal's support policies and limited documentation.



Royal Computer Xpert SE

## BEYOND THE TOP 20



We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online ([www.pcworld.com/t20pcs](http://www.pcworld.com/t20pcs)).

- ◆ Comtrade Office PC OC6/300
- ◆ Comtrade Professional AGP GC6/400
- ◆ Kingdom Pinnacle 350
- ◆ Maximus DVD Graphics Media 333
- ◆ TigerDirect AMD-K6 300
- ◆ Unicent Avanta L266



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## TOP 10 NOTEBOOK PCs

	POWER NOTEBOOK	Last month	Month tested	Street price (6/10/98)	CPU	Comments
1	 <b>Dell Latitude CPI D266XT</b> 800/388-8542 www.dell.com	3	July 98	\$3399	Pentium II-266	\$300 off puts thin, fast, top-of-the-line notebook in first place.
2	<b>Dell Inspiron 3200 D266XT</b> 800/388-8542 www.dell.com	2	June 98	\$2899	Pentium II-266	\$200 reduction on inexpensive SOHO notebook with poor battery.
3	<b>Quantex H 1331</b> 800/896-4898 www.quantex.com	1	June 98	\$2999	Pentium II-266	\$100 price cut on desktop alternative with port replicator, second battery.
4	<b>WinBook XLI 266</b> 800/965-9349 www.winbook.com	n/a	Aug 98	\$3408	Pentium II-266	Very fast desktop alternative, high-end multimedia features, skimpy support.
5	<b>Gateway Solo 9100LS</b> 800/846-2000 www.gateway.com	n/a	NEW	\$3664	Pentium II-266	High-end notebook with 14.1-inch screen and optional DVD-ROM drive.
<b>BUDGET NOTEBOOK</b>						
1	 <b>Acer Extensa 367D</b> 800/733-2237 www.acer.com/aac	n/a	NEW	\$1499	Pentium MMX-200	Great price on light notebook with long-lasting battery.
2	<b>Dell Latitude CP M200SD</b> 800/388-8542 www.dell.com	n/a	NEW	\$2199	Pentium MMX-200	Fast and lightweight travel notebook with strong battery.
3	<b>Quantex H 1330</b> 800/896-4898 www.quantex.com	2	Mar 98	\$2299	Pentium MMX-233	\$50 drop on fast notebook for presenters.
4	<b>CTX EzBook 774 MT-FK</b> 800/888-9052 www.ctxintl.com	5	May 98	\$1649	Pentium MMX-200	Inexpensive tote-along great for students' homework and surfing.
5	<b>Compaq Armada 1571DM</b> 800/345-1518 www.compaq.com	3	Aug 98	\$1999	Pentium MMX-200	Great sound, reasonable price, strong battery.
	 <b>Best Buy</b> See features chart, page 216.					

n/a = not applicable \* Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. \* For more information about all products in this table, circle InfoNet no. 902.



THE DELL LATITUDE CPi D266XT takes the top spot on the power chart this month, as the Texas-based mail-order computer maker gains notebook market share. In the first quarter of 1998, Dell surpassed IBM as the number three supplier of portables in the United States, according to market research firm International Data Corporation. Top-notch performance, solid but not extravagant features, and good support policies—all at a reasonable price—have contributed to the growing popularity of Dell's notebooks.

Among the ten notebooks we tested this month, the Gateway Solo 9100LS—a fully loaded desktop alternative that weighs 9.6 pounds—captures the number five position on the power chart. The Pentium II-266-powered notebook comes with a spacious 14.1-inch screen and an optional DVD-ROM drive.

On the budget side, two new notebooks leap onto the chart. The light Acer Extensa 367D, our Best Buy for September, gives you plenty of battery power for the road. It's also nicely priced at \$1499. The

other new arrival on the budget chart, the Dell Latitude CP M200SD, is an even lighter traveler and has a longer battery life. But you'll pay \$700 more for the Dell.

## This Month's Best Buys

### POWER NOTEBOOKS

#### 1 DELL LATITUDE CPi D266XT

**PRO:** Great design, stable platform

**CON:** Only adequate battery life



The Dell Latitude CPi D266XT, one of the best-designed notebooks we've seen, didn't dominate our power chart in the past because of its

hefty price. Now, with a \$300 price drop to \$3399, the Latitude roars to the top.

You'll like the look of this sleek, charcoal-gray notebook. The front has swept curves instead of the flat bulldog face that you find on most portables. At 1.5 inches, the Latitude is slightly thinner than the standard 2-inch-thick portable, too.



**Dell Latitude CPi D266XT**

Lifting the screen reveals a spacious keyboard whose tall keys are easy to use. The Latitude's typing action feels pleasantly crisp despite some detectable side-to-side wiggling. We also found the touchpad responsive and accurate.

Fire up the notebook and you see a sharp 13.3-inch active-matrix screen. The placement of speakers on each side of the notebook produces better-than-usual audio with a remarkable amount of sound separation. Other nice touches include a Yamaha wavetable synthesizer that en-



# SCORECARD

★ Overall rating	PC WorldBench 98 score/performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/rating	Traveling weight <sup>1</sup>	InfoNet number <sup>2</sup>
85	146/outstanding	average	average	outstanding	average/good	3:44/adequate	average	624
85	145/very good	inexpensive	average	outstanding	average/fair	2:58/poor	average	625
83	142/very good	inexpensive	<sup>3</sup>	outstanding	<sup>3</sup> /fair	2:54/poor	average	626
82	148/outstanding	average	average	outstanding	average/poor	2:56/poor	heavy	627
80	149/outstanding	expensive	average	very good	below average/fair	5:02/good	very heavy	628
<b>Power scorecard weightings</b>	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
86	102/good	very inexpensive	<sup>3</sup>	good	<sup>3</sup> /fair	6:15/very good	light	629
83	107/very good	average	average	satisfactory	average/good	7:46/outstanding	very light	630
83	113/very good	average	<sup>3</sup>	outstanding	<sup>3</sup> /good	5:46/good	average	631
82	100/good	very inexpensive	<sup>3</sup>	good	<sup>3</sup> /poor	5:38/good	average	632
82	94/satisfactory	average	average	good	above average/fair	5:22/good	average	633
<b>Budget scorecard weightings</b>	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	

<sup>1</sup> Insufficient data to give a rating.

hances the sound of MIDI files and a 4GB hard drive set in shock-absorbing mounts.

Equipped with a Pentium II-266 processor and 64MB of SDRAM, the CPI D266XT is extremely fast. But like all the other PII notebooks we've tested, the Latitude quickly drains a battery—its battery life was just 3 hours and 44 minutes in our tests. That's about 45 minutes better than the next three finishers on our power chart, though well short of the Gateway Solo 9100LS's 5-hour score. For \$169 you can buy a second battery for the Latitude, put it in the modular bay (instead of the CD-ROM or floppy drive), and run two power packs at once.


Corporate buyers fed up with the short shelf life of most notebooks will like Dell's promise not to significantly change its Latitude CP line until 1999. Dell's usual classy on-screen and hard-copy documentation is included. For times when you need human contact, the vendor's technical support is open around the clock; unfortunately, we found the tech staff's advice to be off the mark occasionally.

## BUDGET NOTEBOOKS

### 1 ACER EXTENSA 367D

**PRO:** Lowest price on chart, light

**CON:** External floppy drive, mushy keyboard

 This starter-home of notebook computers makes a fine travel companion—and it won't empty your bank account in the meantime.

For \$1499, you don't get the niceties, like an active-matrix screen, found in higher-end portables. Nor does this notebook accept an internal floppy drive: You have to connect it externally to the parallel port. (That in turn introduces another inconvenience—you can't use a printer at the same time. But it's not a huge problem to switch devices.)

At 7.2 pounds, the Extensa 367D is low-fat for a general-purpose model and the second lightest notebook on the entire chart. Another plus is the battery's stamina: over 6 hours—a good thing, since this portable can't use two

batteries at once. An integrated K56flex modem lets you send e-mail from the road. International travelers will appreciate the availability of service in more than twenty countries.

The Extensa is dressed conservatively in dark gray with a curved front. Thanks to the notebook's unusual bay placement, the battery pack and hard drive are easy to access from the side of the notebook rather than from the bottom.

The portable's 12.1-inch dual-scan screen is more than adequate for word processing, but heavy graphics users will do better with an active-matrix screen. The large keyboard feels a bit mushy. The touchpad

responds well, but the mouse buttons are too small. Your fingers will have to fumble around to find them.

Overall, the Extensa 367D is sturdy enough. Acer provides a one-year warranty, which is standard for the industry, and around-the-clock technical support. ►



The Acer Extensa 367D's mouse buttons are small.



	POWER NOTEBOOK	CPU	Traveling weight (pounds) <sup>1</sup>	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude CPi D266XT*	Pentium II-266	7.6	64	4	active	13.3	1024 x 768	65,536	lithium ion	touchpad
2	Dell Inspiron 3200 D266XT	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
3	Quantex H 1331	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
4	WinBook XLi 266	Pentium II-266	8.6	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	eraserhead
5	Gateway Solo 9100LS	Pentium II-266	9.6	48	4	active	14.1	1024 x 768	262,144	lithium ion	touchpad
BUDGET NOTEBOOK											
1	Acer Extensa 367D*	Pentium MMX-200	7.2	32	2.1	dual-scan	12.1	800 x 600	16.8 million	NiMH	touchpad
2	Dell Latitude CP M200SD	Pentium MMX-200	6.1	32	2.1	dual-scan	12.1	800 x 600	16.8 million	lithium ion	touchpad
3	Quantex H 1330	Pentium MMX-233	7.6	64	3.2	active	13.3	1024 x 768	65,536	lithium ion	touchpad
4	CTX EzBook 774 MT-FK	Pentium MMX-200	8.2	40	2	active	12.1	800 x 600	65,536	NiMH	touchpad
5	Compaq Armada 1571DM	Pentium MMX-200	8.0	32	3	dual-scan	12.1	800 x 600	16.8 million	lithium ion	touchpad

\*Best Buy ● Yes ○ No

<sup>1</sup> Includes computer, adapter, power cord, and floppy drive or CD-ROM drive.<sup>2</sup> Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

In our several anonymous calls to Acer, the company once put us on hold for an unacceptable 22 minutes and once gave us wrong information. These problems, unfortunately, are widespread among notebook vendors.

## New This Month

The following PCs made our power and budget notebook charts for the first time this month. To find original reviews of previously tested notebooks on the charts, visit [www.pcworld.com/top400](http://www.pcworld.com/top400).

### POWER NOTEBOOKS

#### 5 GATEWAY SOLO 9100LS

**PRO:** Decent battery life, excellent performance

**CON:** Expensive, boat-anchor weight

You could say that Gateway's Solo 9100LS is "livin' large." It's got more screen acreage, speed, and battery life than any of its competitors on the power chart. But such extravagance in a desktop alternative doesn't come cheap. The notebook's \$3664 price tag helps explain its low position on the chart.

For the money, you get a heavy but pleasurable-to-use notebook that will serve you best when you're sitting at your desk. As we typed on the crisp and spacious

keyboard, we found the 14.1-inch active-matrix screen wonderfully easy on our eyes. The touchpad functioned smoothly after we adjusted it to suit our tastes.

The Solo 9100LS also gives you desktoplike speed. With its Pentium II-266 processor, 48MB of SDRAM and 4GB hard drive, the notebook earned a mark of 149 on our PC WorldBench 98 test suite, one of the highest scores a portable has ever achieved and equal to those of similarly configured desktops.

If you hook up the notebook to an optional port replicator (\$100) or full docking station (\$599) connected to an external monitor and keyboard, you probably won't need a desktop PC.

The Solo 9100LS's boxy, medium-gray countenance won't turn many heads, but the construction is extremely solid. The stacked CD-ROM and floppy-drive module fits into a bay on the front of the notebook—a convenient design touch. If you wish, you can replace the standard-issue floppy drive with an LS-120 SuperDisk drive (priced at \$100 more) for storage. And in lieu of the CD-ROM drive, you can opt for DVD (for an additional \$300).

We did notice a few annoying but non-

fatal design flaws. The PC Card slots are recessed to a depth that makes removing the cards unnecessarily difficult. And Gateway's decision to situate the notebook's speakers where your palms rest while typing is a bit problematic—you can forget about hearing handy system cues in a noisy environment.

Other multimedia features, however, won't disappoint. Gamers will love the MIDI/game port, and presenters can use the video input/output jacks.

Unless you're a bodybuilder, though, the Solo 9100LS is portable in name only. At an intimidating 9.6 pounds, it's a muscle strain waiting to happen. Some of the extra weight is due to the fact that the CD-ROM and floppy drives must be installed together. You can't put in just one or the

other, as you can with lighter notebooks. So don't try to use this machine for trade shows or doing inventory. But shuttling it between office and home is feasible.

If you do occasionally lug the Solo on a trip, you might appreciate its 56-kbps x2 PC Card modem. With an analog cell phone and a cable connected to the modem, you can communicate wirelessly. And you'll definitely like the 5



The Gateway Solo 9100LS stacks its peripheral drives.



## EXPANDABILITY

## CUSTOMER SUPPORT

CD-ROM drive speed	Modem speed (kbps)
12X-20X	not included
12X-24X	not included
12X-24X	56 <sup>2</sup>
8X-20X	56 <sup>2</sup>
8X-20X	56 <sup>4</sup>
16X-20X	56 <sup>2</sup>
12X-20X	not included
12X-24X	56 <sup>2</sup>
12X-20X	56 <sup>2</sup>
12X-20X	56 <sup>2</sup>

Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port
128	1	●	●	●
144	1	●	○	●
144	1	●	○	●
128	0	●	○	●
192	1	○	●	●
80	0	●	○	●
128	1	●	●	●
144	1	●	●	●
40	2	●	○	●
96	1	●	●	●

Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
1/1	24	Sat., Sun.	BBS, WWW
varies 1/1	24	Sat., Sun.	BBS, WWW
1/1	13	Sat.	BBS, WWW
1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
1/1	24	Sat., Sun.	BBS, WWW
3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
varies 1/1	24	Sat., Sun.	BBS, WWW
1/1	12	none	WWW
1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW

<sup>2</sup> Three years on CPU and main RAM, one year on other parts.

<sup>4</sup> Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

hours of battery life—excellent for a power-hungry Pentium II notebook.

Gateway's user guide is the best in the business, sporting full-color photos and intelligible instructions. You also get an industry-standard warranty of one year for both parts and labor and around-the-clock technical support.

But in our most recent anonymous calls for help, Gateway's responses were none too accurate. The staff wrongly answered our questions about a troubled hard drive and battery, resulting in a below average rating for the quality of technical support.



Dell's Latitude CP M200SD has a comfortable keyboard.

Plus, you don't have to worry about this portable quitting on you just when you need it most—in our tests, it computed sans cord and power outlet for a remarkable 7 hours and 46 minutes.

Another strength of the M200SD is performance. It racked up a fine PC World-Bench 98 score of 107 with 32MB of EDO memory and a 2.1GB hard drive—average allotments for a \$2199 budget system.

This elegant-looking, medium-gray notebook is solidly built and well designed with nice touches such as Dell's "Strike-Zone"—a shock-absorbing bump on the bottom of the machine that helps prevent damage to the hard drive. The Latitude CP M200SD has two bays, both readily accessible from the front of the machine. One houses the main battery, and the other accepts the included 12X-20X CD-ROM drive, the floppy drive, or an extra-cost second battery.

The keyboard on the Latitude has crisp action, a well-spaced layout, and full-size keys. Touch-typists will have no problem using it. The trackpad's response is smooth and easy to adjust from the Windows 95 Control Panel.

If the M200SD has any weakness, it's

the dual-scan screen. It provides as good a picture as the technology can give and serves well for word processing and spreadsheets. But it looks washed out compared with an active-matrix screen.

The documentation includes an easy-to-use reference and troubleshooting manual. Dell covers the cost of parts for three years and labor for one. The technical support staff—available around the clock—generally responded to our calls within 7 minutes, which isn't bad in the PC industry. But as with many other computer companies' support, the advice often proved inaccurate. When we asked Dell a simple question about the battery, a rep told us to replace it rather than to drain and recharge it (the correct response). ■

## BEYOND THE TOP 10



We evaluated these systems along with the others, but they didn't score high enough to reach the Top 10 Notebook PCs chart. For write-ups, see PC World Online ([www.pcworld.com/top400](http://www.pcworld.com/top400)).

- ◆ Chem USA ChemBook 3300T
- ◆ Compaq Armada 1700
- ◆ Gateway Solo 2500SE
- ◆ HP OmniBook 2100
- ◆ MAG Portables Verity 233VLT
- ◆ NEC Versa LX

## BUDGET NOTEBOOKS

## 2 DELL LATITUDE CP M200SD

**PRO:** Lightweight for travel, longest battery life on the chart

**CON:** A bit pricey for a notebook with a dual-scan passive screen

The Dell Latitude CP M200SD is a fine choice if you need to write on the road. To begin with, gadding about with the Latitude won't remind you of going for a hike with a ball and chain. It's only 1.5 inches thick—half an inch thinner than standard—and weighs a mere 6.1 pounds.



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# TOP 10 HOME PCs

POWER SYSTEM		Last month	Month tested	Street price (6/10/98)	Comments
1	 <b>Micron Millennia 400</b> 888/634-8799 www.micronpc.com	n/a	NEW	\$2648	<b>PRO:</b> Fastest home system yet, meaty hardware bundle, first-class reliability and service ratings. <b>CON:</b> So-so software package, on the expensive side.
2	<b>Dell Dimension XPS R400</b> 800/388-8542 www.dell.com	1	Aug 98	\$2872	<b>PRO:</b> \$327 off, great performance, excellent reliability and support ratings, improved setup rating. <b>CON:</b> Still pricey, has skimpy software bundle.
3	<b>Gateway G6-333h</b> 800/846-2000 www.gateway.com	n/a	NEW	\$1999	<b>PRO:</b> Cheapest PC on power list, very good performance for a PII-333 machine, great setup. <b>CON:</b> Software documentation lacks detail.
4	<b>IBM Aptiva E76</b> 800/426-7235 www.ibm.com	3	July 98	\$2098	<b>PRO:</b> Very low price for fast system, second cheapest PC on power chart. <b>CON:</b> Only power system with a 15-inch monitor, scanty software bundle.
5	<b>Quantex QP6/333 SM-4x SE</b> 800/896-4898 www.quantex.com	4	May 98	\$2249	<b>PRO:</b> Good performance, reasonable price, great value, 21-inch monitor. <b>CON:</b> Setup documentation is not comprehensive.
BUDGET SYSTEM					
1	 <b>Micron Millennia 266</b> 888/634-8799 www.micronpc.com	n/a	May 98	\$1797	<b>PRO:</b> Very fast for a budget PC, Zip drive, top-notch reliability and service ratings. <b>CON:</b> Second most expensive machine on budget chart, bundled apps are not preinstalled.
2	<b>Gateway G6-266</b> 800/846-2000 www.gateway.com	1	Aug 98	\$1513	<b>PRO:</b> Bargain price for terrific starter PC, comes with color printer, lots of home software. <b>CON:</b> Not enough power for demanding apps, software documentation is lacking in some cases.
3	<b>Quantex QP6/266 M-1x</b> 800/896-4898 www.quantex.com	4	July 98	\$1199	<b>PRO:</b> Decent performance for the price, recent \$299 drop. <b>CON:</b> Range of software titles is unimpressive, so-so setup rating.
4	<b>Gateway G6-300h</b> 800/846-2000 www.gateway.com	2	July 98	\$1848	<b>PRO:</b> This month's fastest budget system; great range of fun, family software programs. <b>CON:</b> The most expensive budget system this month.
5	<b>HP Pavilion 3265</b> 800/724-6631 www.hp.com	n/a	NEW	\$1098	<b>PRO:</b> Supercheap with easy setup, great choice for first-time PC owners. <b>CON:</b> Poor performance, slowest system on our entire chart by far.
 <b>Best Buy</b>		n/a = not applicable		On July's Top 20 Power Desktops chart.	



EVER AGONIZE OVER BUYING an almost-perfect car that was the wrong color? Or didn't have a sunroof? Well, when you wander the aisles of your local electronics superstore in search of the perfect PC, odds are you won't find exactly what you want there either. Some stores carry only a limited selection of brand-name computers in fixed configurations. Finding a system with the processor, memory, hard disk space, and peripherals you need can be tough. But new ordering programs in stores can make it easier.

Until now, customizing your purchase meant buying sight unseen from a mail-order company like Gateway or Dell. Also, mail order is often cheaper than retail. But if you like to squeeze the melons before you buy them, consider this: Compaq and Hewlett-Packard have recently set up retail programs that let you configure your own machine with the features you want.

Now you can get your hands on the standard display models at your local retailer, interrogate a salesperson, and then order your custom PC at a kiosk located in the store. Compaq, for example, says it

will have kiosks in 4000 locations, including Circuit City and RadioShack, by year's end. Of course, you'll have to wait one to two weeks to receive your PC. And don't expect any price breaks if you buy a machine this way—you'll still be paying the more expensive retail prices.

## MAIL-ORDER MONSTERS

IF YOU WANT top speed at a fair price, it's no secret that mail order is still the way to go—and a big reason why

machines from Micron, Dell, and Gateway dominate our power charts. Computers from Micron and Dell are the only home systems to feature Pentium II-400 CPUs that run on the new 440BX chip set. Because the new chip set moves data between the memory and processor at 100 MHz instead of 66 MHz (the bus speed found in older Pentium IIs), you get superior performance.

Debating as top dog is Micron's brand-new Millennia 400. With a whopping PC WorldBench 98 score of 209, it's the fastest home system we've seen. Besides being fast enough to run the apps of the future, the Millennia 400 won't need a storage upgrade anytime soon; tons of data can be socked away on the built-in Zip drive and the huge 10GB hard drive.

You get a pair of Advent AV390PL speakers, a 2X DVD-ROM drive, and a TV connector, so you can watch DVD movies on your TV screen without having to buy a stand-alone DVD player.



Micron Millennia 400



# SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Reliability/support	Setup	Features	InfoNet number
85	209/outstanding	expensive	above average/above average	good	Pentium II-400, 64MB of SDRAM, 10GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 17-inch monitor, Iomega Zip drive, AGP graphics card.	615
83	199/outstanding	very expensive	above average/above average	good	Pentium II-400, 64MB of SDRAM, 14GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 20-inch monitor, Turtle Beach Montego sound card, AGP graphics card.	616
81	178/very good	very inexpensive	average/above average	outstanding	Pentium II-333, 64MB of SDRAM, 8GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	617
77	165/very good	very inexpensive	average/average	good	Pentium II-300, 64MB of SDRAM, 8GB hard drive, 12X-24X CD-ROM drive, 56-kbps modem, 15-inch monitor.	—
76	163/good	inexpensive	average/average	fair	Pentium II-333, 64MB of SDRAM, 6GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 19-inch monitor, AGP graphics card.	618
<b>Power scorecard weightings</b>	Performance 30 percent	Price 15 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	
85	151/very good	expensive	above average/above average	good	Pentium II-266, 32MB of SDRAM, 6.4GB hard drive, 12X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, Iomega Zip drive, AGP graphics card.	619
84	145/very good	inexpensive	average/above average	outstanding	Pentium II-266, 32MB of SDRAM, 2GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 15-inch monitor, Canon BJC-4300 color bubble jet printer.	620
83	141/very good	inexpensive	average/average	fair	Pentium II-266, 32MB of SDRAM, 3.2GB hard drive, 12X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	621
83	159/very good	expensive	average/above average	good	Pentium II-300, 32MB of SDRAM, 4.3GB hard drive, 2X DVD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	622
81	83/fair	very inexpensive	average/average	outstanding	Pentium MMX-200, 32MB of SDRAM, 2GB hard drive, 8X-16X CD-ROM drive, 56-kbps modem, 15-inch monitor.	623
<b>Budget scorecard weightings</b>	Performance 15 percent	Price 30 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	All products: 901

But is the Millennia 400 really worth \$2648? If demonic speed and top-of-the-line multimedia are important to you, then, yes. And by the time you read this, the premium for technology like the 440BX chip set should already be dropping, pushing down prices on all high-end systems. If you can't afford the 400 model, consider its cheaper sibling, Micron's \$2247 Millennia 350. This Pentium II-350 system comes with the same new chip set, though its performance is roughly 9 percent slower. It also has a slightly smaller 8GB hard disk and a standard 12X-32X CD-ROM drive.

Dell's comparable 400-MHz machine, the \$2872 Dimension XPS R400, costs \$224 more and is a little bit slower than Micron's Millennia 400—but it's still an impressive system. There's no Zip drive, but with the R400's enormous 14GB hard drive you can download the Library of Congress (well, almost) and still have room to spare. The included 20-inch mon-



Dell Dimension XPS

itor is a huge plus for anyone who has to grapple with gargantuan graphics or sprawling spreadsheets. Dell has also improved its setup instructions: First-time buyers especially will appreciate the

greater detail and helpful use of color in the setup documentation.

## NOT ALWAYS THE LATEST AND GREATEST

IF SPEED ISN'T everything to you, save a few bucks and get a Pentium II-333 system. They're still plenty fast—only about 15 to 20 percent slower than the 400-MHz models—and they cost a lot less, typically a little over \$2000.

One affordable choice, in the third power spot, is Gateway's G6-333h. With its 8GB hard drive, 2X DVD-ROM drive, and 17-inch monitor, this \$1999 system can handle serious number crunching and intensive games. It certainly gives similarly configured systems from Dell (Dimension XPS 333, \$2149) and Micron (Millennia

333, \$2098) a run for their money.

Even though Quantex is a smaller mail-order company, you'll still get more bang for your buck with its QP6/333 SM-4x SE. It offers a hardware bundle similar to the three PII-333 systems just mentioned, except that for \$2249 you get a 19-inch monitor. The downside? Quantex's service and reliability scores have yet to match the lofty ratings of Dell and Micron.

Next month: The budget home PC.

—Kirk Steers

Kirk Steers is a contributing editor for PC World. Testing performed by Ulrike Diehlmann of the PC World Test Center. ■

## BEYOND THE TOP 10



We also evaluated the following systems this month, but they did not score high enough to make the Top 10 Home PCs list. For write-ups, see PC World Online ([www.pcworld.com/t10homepcs](http://www.pcworld.com/t10homepcs)).

- ◆ HP Pavilion 8290
- ◆ Packard Bell Multimedia 710



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## TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTER	Month tested	Street price (6/1/98)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	InfoNet number
1	 <b>HP LaserJet 4000 TN</b> 800/752-0900 www.hp.com	retested this month	\$1599	94	12.4	4.5	<b>FEATURES:</b> Laser, rated 17 ppm. Standard 8MB of RAM, 1200-by-600-dpi resolution, 600 sheets input, 300 output. <b>SUMMARY:</b> Fast text and graphics speeds, outstanding text quality, and extensive features keep it at the top, though you'll need special settings to achieve the best graphics quality.	664
2	<b>HP LaserJet 5000</b> 800/752-0900 www.hp.com	retested this month	\$1449	93	11.9	5.0	<b>FEATURES:</b> Laser, rated 16 ppm. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 300 output. <b>SUMMARY:</b> The HP LaserJet 5000 boasts the fastest graphics speed here and can print 11-by-17-inch documents. But as with the 4000 TN, graphics are mediocre at default settings.	665
3	<b>Xerox DocuPrint P12</b> 800/832-6979 www.xerox.com	retested this month	\$699	92	9.1	3.7	 <b>FEATURES:</b> Laser, rated 12 ppm. Standard 2MB of RAM, 600-by-600-dpi resolution, 330 sheets input, 250 output. <b>SUMMARY:</b> Inexpensive model comes with a three-year warranty and prints outstanding text. However, it doesn't match the speeds of our Best Buy.	666
4	<b>Lexmark Optra S 1855</b> 800/358-5835 www.lexmark.com	NEW	\$1129	86	13.8	4.0	 <b>FEATURES:</b> Laser, rated 18 ppm. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 250 sheets output. <b>SUMMARY:</b> Its speedy text printing, price, top-notch paper-handling options, and great manual impressed us. Unfortunately, print quality is spotty, especially with gray-scale graphics.	667
5	<b>Okidata OkiPage 10i</b> 800/654-3282 www.okidata.com	NEW	\$679	81	8.5	2.5	 <b>FEATURES:</b> LED, rated 10 ppm. Standard 2MB of RAM, 1200-by-600-dpi resolution, 250 sheets input, 150 output. <b>SUMMARY:</b> It's the cheapest printer on our chart, and you'll like its text quality and easy setup. But meager paper capacity and dark graphics keep it at the bottom.	668
COLOR WORKGROUP PRINTER								
1	 <b>Epson Stylus Color 1520</b> 800/463-7766 www.epson.com	retested this month	\$799	87	3.3	1.0	 <b>FEATURES:</b> Ink jet, rated 6 ppm monochrome/5 ppm color. Standard 64KB of RAM, 1440-by-720-dpi monochrome/color resolutions, 100 sheets input, 35 output. <b>SUMMARY:</b> Gorgeous color and an extremely low price make this our top choice, though its text speed is the slowest on the chart.	-
2	<b>Minolta Color PageWorks PS</b> 888/264-6658 www.minoltaprinters.com	retested this month	\$3299	87	5.3	0.9	 <b>FEATURES:</b> Laser, rated 12 ppm monochrome/3 ppm color. Standard 20MB of RAM, 600-by-600-dpi maximum resolution, 400 sheets input, 250 output. <b>SUMMARY:</b> We like its well-designed paper-handling features, respectable speed, and strong text and color output quality, but graphics are a little coarse.	669
3	<b>Lexmark Optra SC 1275</b> 800/539-6275 www.lexmark.com	retested this month	\$2999	85	7.6	1.6	 <b>FEATURES:</b> Laser, rated 12 ppm monochrome/3 ppm color. Standard 16MB of RAM, 600-by-600-dpi monochrome/color resolutions, 400 sheets input, 250 output. <b>SUMMARY:</b> Good text quality and price make it a contender, but slightly garish colors and complex printer software keep top spots out of reach.	670
4	<b>Xerox DocuPrint C55mp Color Laser Printer</b> 800/349-3769 www.xerox.com	retested this month	\$4000	85	7.8	1.0	 <b>FEATURES:</b> Laser, rated 12 ppm monochrome/3 ppm color. Standard 30MB of RAM, 600-by-600-dpi monochrome/color resolutions, 250 sheets input, 150 output. <b>SUMMARY:</b> Its text speed sank after we upgraded our tests, giving the Lexmark a leg up. Still, you get great print quality and a \$500 ethernet card.	671
5	<b>QMS Magicolor 2 CX</b> 800/523-2696 www.qms.com	retested this month	\$3200	84	9.7	1.5	 <b>FEATURES:</b> Laser, rated 16 ppm monochrome/4 ppm color. Standard 24MB of RAM, 2400-by-600-dpi color resolution, 600-by-600-dpi monochrome resolution, 250 sheets input and output. <b>SUMMARY:</b> Excellent color quality, easy setup, and quick print speeds earn the QMS a first-time spot on our chart.	672
 Best Buy  Windows 95-certified Plug and Play         All products: 904								



**HOW WE TEST** The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



IF SPEED IS YOUR FIRST printing priority and good text your runner-up, you need a monochrome laser printer. The no-nonsense choice in offices big and small, monochrome laser printers

outrun most color lasers and ink jets by leaps and bounds, despite recent improvements in color speeds. Most monochromes fit into one of two categories: compact, less expensive (\$300-\$700) 6- to 12-page-per-minute models for small



and home offices; and speedier, higher-capacity, and more expensive (\$1000–\$1500) 16- to 18-ppm workhorses for departments and large businesses. This month we tested two impressive new monochrome printers, one from each category. The Optra S 1855, rated by Lexmark at 18 ppm, is part of the company's all-new lineup, while Okidata's 10-ppm-rated OkiPage 10i is part of another large new line of workgroup printers. Both make the monochrome chart, the Lexmark at number four and the Okidata at number five. (We didn't test any new color printers this month.) We also tried—for the third time—to test an older Xerox model, the DocuPrint 4512, but it still couldn't make it through our tests due to software problems. If you must have a Xerox printer, we recommend buying a newer one, such as the DocuPrint P12, our reliable number-three monochrome.

## TWO DEBUT

THE \$679 OKIPAGE 10i is priced and configured to compete in the small-business market, and has plenty to recommend it. It tested at 8.5 ppm on text and 2.5 ppm on graphics, so it's no slouch for its class. The 10i is easy to set up and operate; prints great text (though its gray-scale images are darker than we'd like); and has useful features for storing and printing forms and other nontypographical images. A \$289 option expands the 10i's

paper capacity from 250 to 850 sheets.

Lexmark's \$1129 Optra S 1855 hits the chart with considerably faster text speed than any other printer here: At 13.8 ppm, it's more than 10 percent faster than our Best Buy, the Hewlett-Packard LaserJet 4000 TN. It also has a better manual (one of the best ever published, in our estimation), a simpler control panel design, more toner capacity, outstanding paper-handling options (you can add trays incrementally up to 3350 sheets, though that particular option costs an extra \$1877), and a sturdier construction. At \$1129, it's also cheaper than the \$1599 HP, but it lacks many of the HP's extras, including an internal network connection.

So what keeps the Optra S 1855 from reaching the top of the chart? Print quality. Text looks fine at 10 or 12 points, but headline-size curves seem somewhat rough and patchy. The printer also performs inconsistently on gray-scale graphics: Some images came out smooth and realistic, while others looked fuzzy.

The newcomers bump two older printers—the Brother HL-1660 and the NEC SuperScript 1260—off the chart. The HL-1660 won't be around for much longer anyway; we'll test its replacement when it becomes available. A pricing mistake is partially responsible for the SuperScript 1260's slippage. The \$599 street price we listed in July included a \$100 rebate from the vendor, despite *PC World's* policy to omit rebates when listing prices.



**FAST, REASONABLY PRICED, and easy to operate, the Lexmark Optra S 1855 jumps onto our monochrome chart at number four.**

## TEST TRANSFORMATION

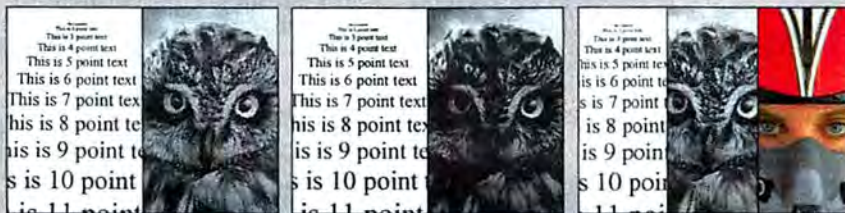
IN ADDITION TO testing new monochrome printers, the PC World Test Center was busy this month revising the test suite for printers in several ways. We upgraded the applications we use to the newest versions of Word (97 SR1), Excel (97 SR1), Corel Draw (8.0), Lotus Freelance Graphics (97), and Adobe Illustrator (7.01). (Freelance Graphics supplants Harvard Graphics.) We also replaced our test bed, a Pentium-90, with a faster PC, a Pentium MMX-166. Finally, we made some minor font modifications in one of the documents we print.

As a result, you'll see several changes in the print speeds posted by returnees to our Top 10, and a bit of place-shuffling on our color chart. The Lexmark Optra SC 1275 climbs to number three, bumping the Xerox DocuPrint C55mp down to fourth place. Meanwhile, the QMS Magicolor 2 CX, a printer we first tested four months ago, barely makes the chart for the first time this month, thanks to the test overhaul. It's significantly faster than before, churning out text at 9.7 pages per minute—faster than any other color printer we've seen—and printing graphics at a speedy 1.5 ppm. The Magicolor is easy to set up, too, and offers excellent output. We still think QMS could improve this model's unfriendly control panel menus and driver interface, however. (For more on the Magicolor, see *Top 10 Printers*, May.)

—Dan Littman ■

## PRINT QUALITY SAMPLES

### Small Text Shines With New Laser, LED



#### LEXMARK OPTRA S 1855

This laser's small text looks fine, but big letters come out a bit fuzzy. Also, gray scales are inconsistent: The image above shows a loss of detail absent from other pictures.

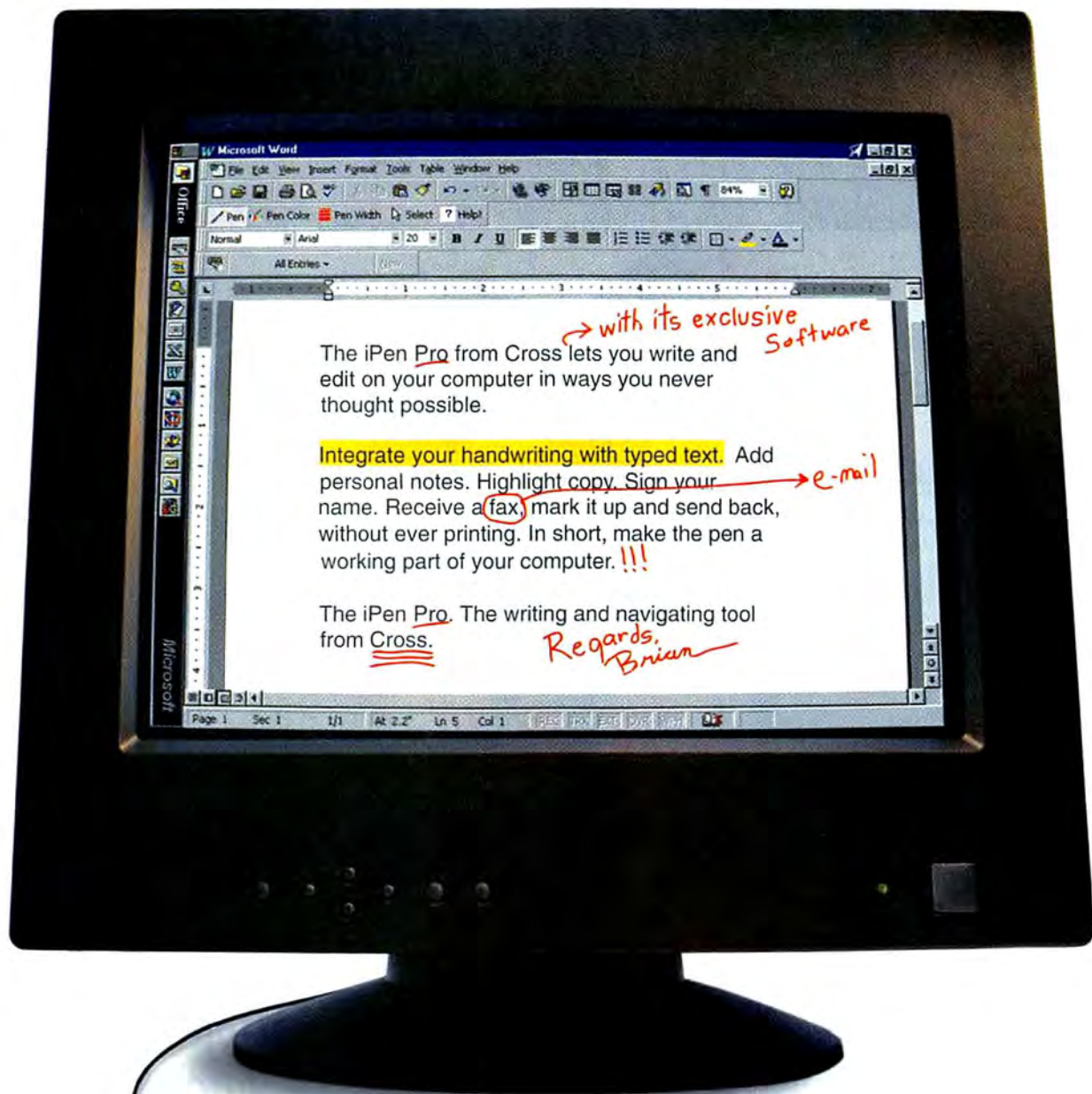
#### OKIDATA OKIPAGE 10i

Sharp, dense text is the strength of Okidata's inexpensive LED printer. On the other hand, its gray-scale images, though detailed, are awfully dark.

#### QMS MAGICOLOR 2 CX

Improved print speeds put this color laser on the chart. Its excellent print quality—lifelike color, precise text, and subtle grays—rivals that of our color Best Buy.



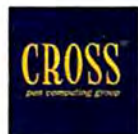


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## TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (6/15/98)	Overall rating	Quality of text/graphics	Comments	InfoNet number
1	 Iiyama VisionMaster Pro 17 800/394-4335 www.iiyama.com	Sept 97	\$499	90	very good/ excellent	<b>FEATURES:</b> 15.9-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 85-Hz refresh rate, Plug and Play ready, three-year warranty, 12-hour weekday toll-free support. <b>SUMMARY:</b> Buoyed by another \$80 price cut, this model with fine text and superb graphics maintains first place, but it lacks TCO compliance.	655
2	 Samsung SyncMaster 700p Plus 800/933-4110 www.sosimple.com	(NEW)	\$449	88	excellent/ very good	<b>FEATURES:</b> 15.6-inch viewable area, .26mm dot pitch tube, up to 100-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 24-hour toll-free support. <b>SUMMARY:</b> Bright colors and razor-sharp small fonts distinguish this update to the 700p, but its icons for on-screen controls are cryptic.	656
3	IBM P72 800/426-2968 www.pc.ibm.com	(NEW)	\$589	88	excellent/ excellent	<b>FEATURES:</b> 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 24-hour toll-free support. <b>SUMMARY:</b> The third most expensive here, this jet-black monitor renders gorgeous colors and comes with a wide array of on-screen controls.	-
4	Mitsubishi Diamond Pro 87TXM 800/843-2515 www.mitsubishi-display.com	Sept 97	\$549	88	very good/ very good	<b>FEATURES:</b> 15.7-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 107-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. <b>SUMMARY:</b> Long-time Best Buy drops two spots, but still hangs tough with a finely focused picture and elegant control panel.	657
5	Iiyama VisionMaster Pro 400 800/394-4335 www.iiyama.com	(NEW)	\$499	88	very good/ very good	<b>FEATURES:</b> 15.7-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 115-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 12-hour daily toll-free support. <b>SUMMARY:</b> Makes respectable showing with below-average price and dark text, but it lacks numeric gauges for adjustments.	658
6	AcerView 79g 800/379-2237 ext. 125 www.acerperipherals.com	Mar 98	\$449	88	very good/ excellent	<b>FEATURES:</b> 15.5-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 110-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 24-hour daily toll-free support. <b>SUMMARY:</b> A \$150 price cut and extended tech support hours help boost model with realistic colors, but it has a small viewable area.	659
7	Samsung SyncMaster 700b 800/933-4110 www.sosimple.com	Sept 97	\$399	86	very good/ very good	<b>FEATURES:</b> 15.7-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate, Plug and Play ready, three-year warranty, 24-hour toll-free support. <b>SUMMARY:</b> The least-expensive monitor here has fine text and graphics and an easy-to-use set of basic controls, although some menu icons may be hard to decipher at first.	660
8	ViewSonic PT775 800/888-8583 www.viewsonic.com	Sept 97	\$729	86	very good/ excellent	<b>FEATURES:</b> 15.9-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'92 compliant, three-year warranty, 11-hour weekday toll-free support. <b>SUMMARY:</b> Stunning graphics and crisp text keep this model in contention, but its comparatively high price weighs it down.	661
9	TeleVideo SVP270 800/835-3228 www.televideoinc.com	May 98	\$479	86	very good/ excellent	<b>FEATURES:</b> 15.7-inch viewable area, .25mm stripe pitch Diamond-tron tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. <b>SUMMARY:</b> Unit has fantastic colors and good controls, but new arrivals surpass it with longer tech-support hours.	662
10	Dell UltraScan 1000HS 800/289-3355 www.dell.com	July 98	\$629	85	very good/ excellent	<b>FEATURES:</b> 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 105-Hz refresh rate, Plug and Play ready, TCO'95 compliant, one-year warranty, 24-hour toll-free support. <b>SUMMARY:</b> Vibrant, eye-catching colors and great controls are undermined by high price and thin warranty (unless purchased with Dell system).	663



Best Buy

For reviews of products that didn't make the chart, visit [www.pcworld.com/t10monitors](http://www.pcworld.com/t10monitors).

All products: 903



**HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (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.

<sup>1</sup>Highest refresh rate at 1024 by 768 resolution. <sup>2</sup>Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.



THREE NEW MONITORS land on the chart this month. Samsung's SyncMaster 700p Plus leads the way with great picture quality, succeeding Mitsubishi's 87TXM as our second-place Best Buy. A

\$150 price cut boosts Acer's AcerView 79g from ninth to sixth place, while an \$80 price drop keeps Iiyama's VisionMaster Pro 17 on top. New monitors from Compaq, Hyundai, Nokia, Princeton Graphics, and ViewSonic fell short of the chart.





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## TOP 10 GRAPHICS BOARDS

	PCI BOARD	Month tested	Street price (7/8/98)	Overall rating	Mixed-media business rating	3D rating	Features rating	Comments	InfoNet number
1	 <b>Real 3D StarFighter PCI</b> 800/393-7730 www.real3d.com	Aug 98	\$250	86	average	excellent	average	<b>FEATURES:</b> 24MB of SGRAM (includes 16MB of dedicated texture RAM), 220-MHz RAMDAC, Intel740 chip, bundled 3D software. <b>SUMMARY:</b> With terrific 3D and a \$40 price cut, the StarFighter continues to lead the race among PCI boards.	682
2	<b>STB Velocity 128</b> 888/234-8750 www.stb.com	Aug 98	\$99	85	average	average	good	<b>FEATURES:</b> 4MB of SGRAM, 230-MHz RAMDAC, NVIDIA Riva 128 chip, bundled 3D games and 3D modeling program. <b>SUMMARY:</b> Priced \$30 lower this month, this board is a good low-cost option for users who like to dabble in everything.	683
3	<b>Diamond Viper V330</b> 800/468-5846 www.diamondmm.com	Aug 98	\$120	82	average	good	average	<b>FEATURES:</b> 4MB of SGRAM, 230-MHz RAMDAC, NVIDIA Riva 128 chip, bundled 3D games and tools for VRML authoring and photo editing. <b>SUMMARY:</b> Couldn't run our PowerPoint test with 3D plug-ins because of a driver bug, but otherwise a good buy.	684
4	<b>Intergraph Intense 3D Voodoo</b> 800/763-0242 www.intergraph.com/ics	Aug 98	\$199	81	average	excellent	average	<b>FEATURES:</b> 6MB of EDO DRAM (includes 2MB of dedicated texture RAM), 220-MHz RAMDAC, Alliance ProMotion chip and 3Dfx Voodoo Rush chip, bundled 3D games. <b>SUMMARY:</b> Fine choice for gamers, and it works well with standard office apps.	685
5	<b>Hercules Thriller 3D</b> 800/532-0600 www.hercules.com	Aug 98	\$99	79	average	excellent	below average	<b>FEATURES:</b> 4MB of SGRAM, 230-MHz RAMDAC, Rendition Verite V2200 chip, no bundled software. <b>SUMMARY:</b> It's fast in 3D and adequate for standard business use. However, slim features and sub-par support keep the Thriller 3D in fifth place.	686
<b>AGP BOARD</b>									
1	 <b>STB Velocity 128zx</b> 888/234-8750 www.stb.com	retested this month	\$149	95	good	excellent	good	<b>FEATURES:</b> 8MB of SGRAM, 250-MHz RAMDAC, NVIDIA Riva 128zx chip, bundled 3D games and VRML creator. <b>SUMMARY:</b> A good board overall; and thanks to updated drivers, 3D games looked much better than in last month's tests.	687
2	<b>Real 3D StarFighter AGP</b> 800/393-7730 www.real3d.com	Aug 98	\$100	93	good	good	average	<b>FEATURES:</b> 8MB of SGRAM, 220-MHz RAMDAC, Intel740 chip, bundled 3D games and 3D modeling program. <b>SUMMARY:</b> A low-priced option (thanks to a \$30 price drop) if you're a gamer looking for good 3D and a new collection of game software.	688
3	<b>Diamond Stealth II G460</b> 800/468-5846 www.diamondmm.com	Aug 98	\$130	93	good	excellent	average	<b>FEATURES:</b> 8MB of SDRAM, 203-MHz RAMDAC, Intel740 chip, bundled 3D games and 3D animation and 3D visualization software. <b>SUMMARY:</b> This powerful board is a nice option for almost any task. Its price didn't drop, while the competition's did.	689
4	<b>Intel Express 3D</b> 800/538-3373 www.intel.com/graphics	Aug 98	\$119	81	good	good	average	<b>FEATURES:</b> 4MB of SGRAM, 203-MHz RAMDAC; Intel740 chip; bundled 3D game, 3D data visualization tool, and VRML creator. <b>SUMMARY:</b> This board is a strong overall performer, but Intel gets less out of its own chip than the competition does.	690
5	<b>ATI Technologies Xpert 98</b> 905/882-2600 www.atitech.com	retested this month	\$90	81	good	average	good	<b>FEATURES:</b> 8MB of SDRAM, 230-MHz RAMDAC, ATI 3D Rage Pro Turbo chip, bundled 3D game and photo editing software. <b>SUMMARY:</b> Bargain price and updated drivers that improve both business and gaming performance help ATI's entry this month.	691
 <b>Best Buy</b>  For reviews of products that didn't make the chart, visit <a href="http://www.pcworld.com/t10graphics">www.pcworld.com/t10graphics</a> . All products: 916									



**HOW WE TEST** We test boards under Windows 95. Business tests include PC WorldBench 98, a PowerPoint test, and a Macromedia Director script. Our 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards we add a texturing test using Calligari's TrueSpace3. PCI boards were tested in a Micron Millennia Mme with a Pentium MMX-233 and 32MB of RAM. AGP boards were tested in an NEC Direction 333 with a PII-333 and 64MB of RAM. Overall rating is based on performance (PCI 55 percent, AGP 55 percent), features (25 percent), price (PCI 15 percent, AGP 10 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



GRAPHICS BOARD prices plunged this month. At \$90, ATI's Xpert 98 sets a new low for AGP board prices. In fact, it's the cheapest board on the list. However, average 3D performance holds it in

fifth place. Meanwhile, Real 3D dropped the price on the AGP and PCI versions of its StarFighter—a \$40 cut helps keep the StarFighter PCI in the Best Buy spot. STB's Velocity 128zx is our new AGP Best Buy, thanks in part to improved performance. ■



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## TOP 10 MODEMS

	INTERNAL MODEM	Month tested	Street price (6/22/98)	Overall rating	V.34 transfers/56-kbps downloads (min:sec per MB)	Comments	InfoNet number
1	 <b>Diamond Multimedia SupraExpress 56i</b> 800/468-5846 www.diamondmm.com	July 98	\$100	80	2:41/3:04	<b>FEATURES:</b> Supports V.90 and K56flex, 16-bit ISA card, V.80 videoconferencing support, distinctive ring, COMit and FaxTalk software. <b>SUMMARY:</b> The SupraExpress 56i is an excellent choice for people who want a fast, inexpensive modem, and who don't need voice features. The modem is also backed by long support hours.	673
2	 <b>IBM 56K Modem Internet Kit</b> 800/772-2227 www.ibm.com/pc/us/accessories	Nov 97	\$99	80	2:39/3:17	<b>FEATURES:</b> Supports x2, 8-bit ISA card, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSV, Caller ID, QuickLink Message Center software. <b>SUMMARY:</b> Even with a shorter warranty, this modem's a great deal, thanks to a low price (\$20 less this month), rich features, and around-the-clock support.	-
3	<b>E-Tech CyberBullet Modem PC56RVP</b> 888/609-8885 www.e-tech.com	July 98	\$99	80	2:47/3:10	<b>FEATURES:</b> Supports K56flex, 16-bit ISA card, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSV, ASVD, Caller ID, SuperVoice software. <b>SUMMARY:</b> This loaded modem has a good price (cut by \$30 this month). But it's a bit slow, and V.90 upgrade is free only if it can be performed through software.	674
4	<b>3Com U.S. Robotics Courier V. Everything</b> 800/638-3266 www.3com.com	NEW	\$240	80	2:31/3:00	<b>FEATURES:</b> Supports V.90 and x2, 8-bit ISA card, distinctive ring, callback, Caller ID, RapidComm software. <b>SUMMARY:</b> Although it's expensive, good security features and solid transfer and download speeds make this Courier—now with V.90—the chart's top choice for corporate buyers.	675
5	<b>Zoom FaxModem 56K</b> 800/631-3116 www.zoomtel.com	May 98	\$109	79	2:38/3:15	<b>FEATURES:</b> Supports K56flex, 16-bit ISA card, MNP-10EC, V.80 videoconferencing support, distinctive ring, COMit and WinFax Lite software. <b>SUMMARY:</b> It's a little slow, but this modem has a nice price (\$10 less this month), and is backed by long support hours and an unconditional upgrade guarantee to the V.90 standard.	676
6	<b>3Com U.S. Robotics 56K Faxmodem</b> 800/342-5877 www.3com.com	Sept 97	\$130	78	2:31/3:16	<b>FEATURES:</b> Supports x2, 8-bit ISA card, distinctive ring, Caller ID, RapidComm software. <b>SUMMARY:</b> This 3Com 56K Faxmodem is a tad pricey, but its good speed and excellent documentation should appeal to novices and experts alike. It costs \$30 less this month and still comes with a free upgrade to V.90.	677
7	<b>NewCom 56K IFX Internal Data/Fax Modem</b> 800/563-9266 www.newcominc.com	Mar 98	\$79	78	3:25/3:16	<b>FEATURES:</b> Supports x2, 16-bit ISA card, distinctive ring, voice mail, speakerphone, VoiceView, password protection, Caller ID, QuickLink II software. <b>SUMMARY:</b> The NewCom is a good choice for people seeking a low-cost voice modem (price fell \$10 this month). But it's slow, and you may have to pay extra to upgrade to V.90.	678
8	<b>Shark Multimedia Leopard 56K</b> 800/800-3321 www.sharkmm.com	Jan 98	\$75	78	2:38/3:04	<b>FEATURES:</b> Supports K56flex, 16-bit ISA card, MNP-10, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, VoiceView, ASVD, Caller ID, microphone, DialTone software. <b>SUMMARY:</b> This voice modem is a bargain. But V.90 upgrade is free only if it can be performed through software, and support policies are thin.	679
9	<b>Wisecom Accelerator Pro 56000 Internal Voice Data Fax Modem</b> 888/947-3266 www.wisecominc.com	NEW	\$99	78	2:40/3:04	<b>FEATURES:</b> Supports V.90 and K56flex, 16-bit ISA card, voice mail, speakerphone, DSV, ASVD, Caller ID, SuperVoice software. <b>SUMMARY:</b> The Accelerator Pro 56000 is inexpensive for a voice modem, but you'll need to be comfortable with installing devices in your PC—the manuals offer little help for novices.	680
10	<b>Boca 56K Tidalwave Modem</b> 561/241-8088 www.bocaresearch.com	May 98	\$99	76	2:39/3:14	<b>FEATURES:</b> Supports K56flex, 16-bit ISA card, V.80 videoconferencing support, Caller ID, QuickLink Message Center software. <b>SUMMARY:</b> This basic modem is affordable (price dropped \$20 this month), but upgrade to V.90 standard is free only if it can be performed through software.	681



Best Buy

For reviews of products that didn't make the chart, visit [www.pcworld.com/t10modems](http://www.pcworld.com/t10modems).

All products: 905



**TEST HOW WE TEST** We test V.34 (limited to 33.6 kbps) modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends one text file over 55 line conditions, and a mix of four files—graphics, text, program, and compressed files—over one line condition. For our x2 and K56flex performance tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are usually lower in the TAS test than in the ISP test because the files used in the latter are less compressible. Results for the two tests are not comparable. We currently do not test 56-kbps V.90 modem performance due to lack of ISP support. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



PRICE CUTS of \$30 each push E-Tech's CyberBullet and 3Com's U.S. Robotics 56K Faxmodem up the chart this month. The CyberBullet is one of the few voice-enabled V.90 modems that cost under

\$100. Meanwhile, Diamond rises to the top because IBM axed the warranty on its Internet Kit from five years to one. We tested the V.90 versions of 3Com's Courier and Wisecom's Accelerator modems, and found little change in their performance scores. ■



# 4PEAT



**PC COMPUTING'S TORTURE TEST WINNER 1995: DELL® LATITUDE® XP 4100CX**



**PC COMPUTING'S TORTURE TEST WINNER 1996: DELL LATITUDE XPi P120ST**



**PC COMPUTING'S TORTURE TEST SURVIVOR 1997: DELL LATITUDE XPi P150ST**



**PC COMPUTING'S TORTURE TEST WINNER 1998: DELL LATITUDE CP M233ST**



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- 128-bit Graphics Accelerator
- Stereo Speakers with 3D Surround Sound
- Two Smart Lithium Ion Batteries with ExpressCharge™ Technology
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- Stereo Speakers with 3D Surround Sound
- Smart Lithium Ion Battery
- 56K Capable™ Gold Card Global Modem
- Second Smart Lithium Ion Battery
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- Extendable 1-Year Limited Warranty†
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- Zoom Video and USB Ports
- Stereo Speakers with 3D Surround Sound
- Smart Lithium Ion Battery
- MS Office 97 Small Business Edition v2.0
- Microsoft Windows 98
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- Extendable 1-Year Limited Warranty†
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Mo.#	Intel® Pentium® Processor Featuring MMX™ Technology	Hard Drive	Base/Maximum RAM	Screen Size	Fax/Modem	CD-ROM Drive	Est. Street Price*
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3042ECX	Pentium® II Processor 266MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	24X CD-ROM	\$3395.00
3040ECX	Pentium® Processor 266MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	24X CD-ROM	\$3295.00
3037CX	Pentium® II Processor 266MHz	4.0GB HDD	64/128 MB RAM	13.3" XGA TFT	56K Modem	24X CD-ROM	\$2895.00
3035CX	Pentium® Processor 266MHz	3.1GB HDD	32/128 MB RAM	13.3" XGA TFT	56K Modem	24X CD-ROM	\$2495.00
3030ECX	Pentium® Processor 233MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	\$2995.00
3020ECX	Pentium® Processor 233MHz	3.1GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	\$2895.00
3015ECX	Pentium® Processor 233MHz	2.1GB HDD	32/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	\$2795.00



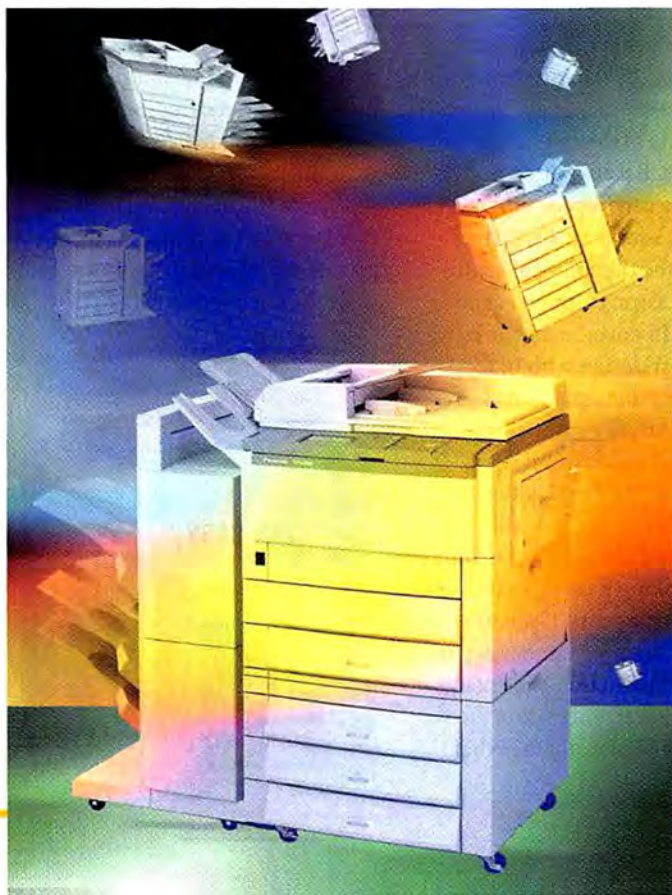
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# SPLIT PERSONALITIES

**By handling more than one job, the next generation of office machines promise to work as hard as you do**



**W**HETHER YOU MAKE YOUR copies on a compact desktop machine in a family room or a floor-standing model near the boardroom, chances are that there is a multifunction office machine in your future. And for good reason. When one machine can do the work that previously required multiple machines, productivity rises, expenses drop, and life at the office gets a little easier for everyone.

MFPs, shorthand for multifunction peripherals, make great sense. Why? Because just as today's business climate demands that you wear multiple hats, it also demands that your office equipment play multiple roles. Where once you had to purchase and maintain separate copiers, printers, faxes, and scanners, today's digital MFPs offer fine-grained output that rivals, and often surpasses, the quality of yesterday's standalone de-



vices. Over the last two years, inventive vendors such as Mita, Panasonic, Ricoh, Savin, Xerox and Minolta have developed MFPs that economically integrate two or more of these functions into a single box.

According to a recent research report from Framingham, MA-based International Data Corp., the demand for MFPs ballooned by 54% from 1.3 million units in 1996 to more than two million units in 1997. What's fueling this rapid growth? Consumers report that these all-in-one machines offer a host of time and space-saving solutions for every size office including:

- **Ease of use.** MFPs offer a consistent interface. So why spend your time learning how to control separate scanners, printers, copiers and fax machines when you can run everything through a single device? And by having to maintain only one machine, you can reduce your maintenance chores and have fewer supplies to track.

- **Total cost of ownership.** You can buy a MFP for about 50 percent less than the combined cost of individual machines. While the money-savings begins at purchase, it doesn't stop there. For example, connecting only one machine instead of many to the network saves money. Buying only one kind of toner instead of separate cartridges for the fax, printer and copier saves money. Buying a service contract for one machine instead of many saves money. Simply said, MFPs save you money.

- **Machine integration.** By combining multiple functions into one machine, you complete your work faster. What's more, with a networked MFP, you create, print, fax and copy a document directly from



your computer increasing productivity while reducing the likelihood of errors.

- **High quality output.** Whether you run a business from your home, own a small company or manage a department in a multinational corporation, you need office machines that will consistently produce professional looking documents. You can rely

## Today's MFPs offer output that rivals the quality of yesterday's standalone devices.

on the latest generation of digital MFPs to turn out sharp, clear documents because every copy is a perfect duplicate of the original.

- **Reliability.** Because an out-of-order machine can impede critical tasks, today's high quality MFPs easily rival the durability of standalone faxes, copiers, printers and scanners. Moreover, many units offer a modular design with independent memory that isolates malfunctions, so if, say, the scanner fails, you can still print and fax.

- **Versatility.** MFPs work the way you work. Many devices will store faxes, printouts and copies in different trays making it easier to find and distribute documents. Options such as collating, stapling, automatic duplexing, and reduction and enlargement ensure that you control the way the machine works, not the other way around.

### MATCHED TO THE TASK

For the small office, machines like Xerox's 17 page-per-minute DocuPrint N17 networked laser printer offer an attractive mix of basic features for less than \$1,000. The device supplies 1200 x 600 dpi resolution, multiple paper-size handling and Adobe PostScript 3 fonts. Xerox's WorkSet technology reduces network traffic by offloading printing functions to the N17's on-board RAM and optional 2.1 GB internal hard drive.

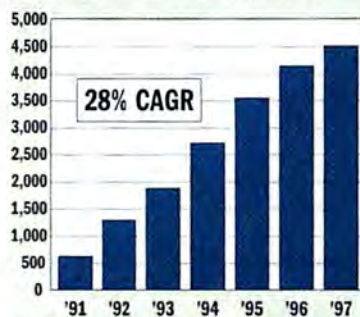
For the mid-sized office or small workgroup, look to Mita's Ai515, the quintessential definition of an "office in a box." Retailing for \$4,295, this 15 page-per-minute, 600 dpi digital combination copier and printer can print and collate documents up to 11 x 17-inch ledger size. To further

leverage the Ai515's power, add a network card to transform it into a multi-user printer/copier.

Networking MFPs multiplies their inherent efficiency. Sharp calls the electronic transmittal of documents the Networkplace, a technology that enables everyone in the company to raise productivity to new

### MFP shipments take off

Total MFP shipments for personal, business and workgroup use (000).



Source: International Data Group



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heights. Just as humans share ideas remotely with GroupWare to build upon one another's ideas, so can Sharp's concept of networked intelligent machines improve the quality of your company's products and services.

Xerox's DigiPath productivity software takes networking and remote administration to new heights by enabling customers to use the World Wide Web to submit print jobs, check on a work's progress, make revisions, and reorder previously printed documents from across town or across the globe. A Windows NT-based application, DigiPath works with Xerox's DocuTech family of products and has a list price of \$35,200.

Savin's 9920DP can handle the demand of large workgroups. This versatile \$4,980 machine copies at 20 pages-per-minute at 400 dpi. Modular in design, the 9920D accepts paper sizes up to 11 x 17-inch along with a wide variety of options. For example, when upgraded with a printer controller, the 9920PD becomes a 600 dpi network-ready laser printer. Add a 14.4 kbps fax controller, the machine can transmit up to ten pages-a-minute, which means that it will be ready for the new generation of high-speed Internet faxing.

"There is no substitute for the 20 to 30 page-per-minute multifunction devices," says Raymond Lutz, president of the Multi-function Peripheral Association. "They may sell for as much as \$20,000 each, but because larger firms can replace dozens of printers, scanners, fax machines and copiers with 10 copier-based MFPs, they snap them up."

For all the many ways these machines can help you "get it done," sometimes what you really need is an extra pair of hands. Help is finally here. Minolta's EP 4000/5000 can literally "give you a hand!" This advanced MFP provides two metal

hands that automatically remove and stack your collated reports. And it will keep stacking until you're finished.

#### ONE AMONG MANY

So which multi-function peripheral will work best for you? With models ranging from \$200 monochrome inkjet units to \$20,000 full-color, high-speed network machines, that can be a tough decision.

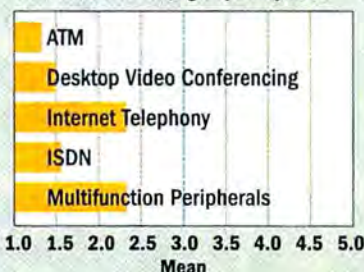
Lutz suggests first prioritizing your tasks. Then get an MFP that fits the way you currently work. "For example, most consumers have tended to purchase printer-only based machines because scanning, faxing and copying have usually been viewed as secondary needs," he notes.

But that's beginning to change as computer hardware runs down its traditional smaller, faster, cheaper path. According to IDC's research, almost three-quarters of all consumers now opt to purchase MFPs equipped with an inkjet color printer, copier, plain paper fax and a 30-bit color scanner, all for under \$600.

While such machines can competently meet the needs of many users, they may not offer the combi-

#### MFPs the hottest of the hot

On a scale from 1-5 rate your site's likely use of the following technologies, with 1 being no use and 5 being very heavy use.



Source: International Data Group

MFPs from Ricoh, Panasonic, Minolta, Mita or Xerox. These high-end machines, with prices in the \$8,000 to \$20,000 range, offer black and white plus laser-based color output, multiple output bins, sorting, stapling and collating.

"When you buy one of these machines, the costs of operation, consumables and maintenance go down immediately," notes Lutz. "Instead of buying fifteen different kinds of toner, you buy one. Instead of stockpiling parts for a hundred different machines, you keep spare parts for one."

What about tomorrow's MFPs? IDC predicts sales of MFPs will reach four million units a year by 2000 and most will offer color printing and copying. "Internet faxing will transform document exchanges by the start of the next century," predicts Lutz. "As fax standards change to accommodate the lower cost of Internet faxing, image quality will improve until it becomes possible to fax an image which is as clear and colorful as one that came out of a printer."

With MFPs linked to networks and the Internet, you can scan, fax, print and copy documents regardless of distance. Clearly, the future promises to be fast, economical and colorful.

The DocuPrint N40 network printer from Xerox cranks out 40 ppm and offers built-in networking.







The new Mita Digital Copier/Printer.  
(PC is optional.)

As a stand-alone copier it's in a class by itself, making up to 99 copies from a single scan. And as a 600 dpi network printer, it lets you produce sorted, stapled, finished documents right from your desktop. So while the computer may be optional, the Ai3030 is anything but. For more information call 1-800-ABC-MITA or visit [www.mita.com](http://www.mita.com).



Circle 132 on card or go to [www.pcworld.com/infonet](http://www.pcworld.com/infonet)



# MFPs give health group **MORE** for less

**W**HAT DRIVES purchasers to buy an MFP? Recent surveys by IDC Research in Framingham, MA indicate that low purchase and maintenance costs, high print quality and space savings top buyers' lists. Take Terry Hamilton, Director of Development at the Winter Park Health Foundation, a non-profit health organization in Winter Park, Florida, as an example. When she needed to

replace a collection of older, less-than-reliable office machines, she instituted an extensive upgrade program.

"We have a large, spread-out organization with over two hundred employees working at four locations in two counties," explains Hamilton. "We were decentralized with dozens of different office machines. There was a lot of wasted effort just moving paper. We needed to find a way to be more productive and to reduce the amount of money we were spending outsourcing the printing and copying work we could do in-house."

As the first phase of her upgrade project, she surveyed the people in the trenches to determine what they did and did not need. After evaluating input from the employees, Hamilton and her ad hoc team initiated a product search and spoke to several manufacturer's representatives. Only Savin's 9000 Series

line, they concluded, could meet their requirements for increased efficiency and reliability, while reducing costs and saving space.

## **We needed to reduce our expenditures for outsourcing printing and copying work.**

While the Savin representative's suggestion — four machines — seemed perfect, Hamilton and her team didn't end their upgrade project there. "People can often be put off

by new technology which they do not understand," she says. "We knew we had to deal with that immediately." As soon as the MFPs were in place, the team set up phase two of the project — a series of training classes to teach all employees how to operate the new machines.

For the third and final phase of the upgrade project, the team evaluated results. "Over the next several months, we looked at the performance of each machine to see how well it was utilized," she explains. "If we saw that some of the new MFPs were under-used, we created new training classes to help people get more out of the machines. It is a continual process, one which is still going on today, a year after the switch-over."

One of the biggest advantages of

the new MFP copiers is their ability to be networked, notes Hamilton. "People love being able to print and fax right from their PCs," she says. As Winter Park's employees learned more about what they could do with new machines, they lost their fear of the new technology. "They're actually excited about it," she says.

Today, Hamilton has moved on to run with her husband Hamilton International, Inc., an international avionics contracting company in Clermont, Florida. But her high opinion of Savin products hasn't changed. She is already looking forward to the time when her fledgling business has grown large enough to acquire its own Savin multifunction copier.

Savin's 9920 DP Digital Copier.





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# Small business WINS BIG with MFPs

**P**ROOF that multi-function devices can be a boon to even small and mid-sized offices comes from the Richard Burden P.C., a Birmingham, Alabama law firm specializing in medical claims and workman's compensation.

Legal Assistant Denise Alexander says Burden had two compelling reasons for installing a 30 page-per-minute Mita 3030i Multifunction copier. "We were short of space and our old copier died," she remembers. The Mita's relatively low cost, vertical shape and small footprint first grabbed her firm's attention. "For instance, its vertical shape meant we didn't have to bend down to make copies, so we knew it would help us avoid backaches," she says.

The staff at Richard Burden's office is just beginning to explore all the capabilities of the Mita multifunction copier. But in just its first month, the 3030 has already dramatically improved productivity. Despite the firm's need to duplicate a

large volume of documents, lines at the copier have virtually disappeared. "This is the smoothest machine I've ever used," exclaims Alexander. "We haven't had a single paper jam!"

Smooth, fast copying has proved to be just the beginning, however. Because the machine is linked to the office's network, every computer in the office can now print letters, forms, legal briefs, and even envelopes. Employ-



Mita's AI3030 Digital Copier/Printer operates at up to 30 ppm while printing at up to 2400 x 600 DPI resolution.

ees no longer waste time waiting on line or waiting for the documents to print. "We get more done in less time than ever before," says Alexander. "The machine does everything automatically."

One of the features Burden office personnel like best is the Mita's addressable output which lets each staffer have their own output tray. "I can

do a dozen letters, a brief, and print a dozen envelopes from my desk and then pick everything up from the 3030's output bin marked 'Denise,'" says Alexander. "It's a wonder!"

## DOCUMENT SYSTEM COMBINES LOCAL STORAGE, REMOTE ACCESS

Most business managers want sensible solutions to streamline their document handling processes including some way of dealing with the mountains of paper already packed into file cabinets. Panasonic's latest solution, the new Hyper Document System (HDS), offers an advanced document management and storage technique. To help offices control the burgeoning paper glut, the HDS allows a manager to readily store, access and print documents from a remote PC via a secure intranet or a client on a local area network.

HDS works by assigning each document its own Digital Document Barcode. The system stores the document in an internal hard drive or a rewritable CD-ROM until the user wants to access the file. You can retrieve a stored document by any of three methods - a barcode, the document's unique number code entered from a networked PC, or with a personal access card. The access card has the additional benefit of distinguishing between personal and company documents and can secure private files against unauthorized viewing. To accelerate file storage and retrieval, a browser tracks files by name, size, storage dates and content description.

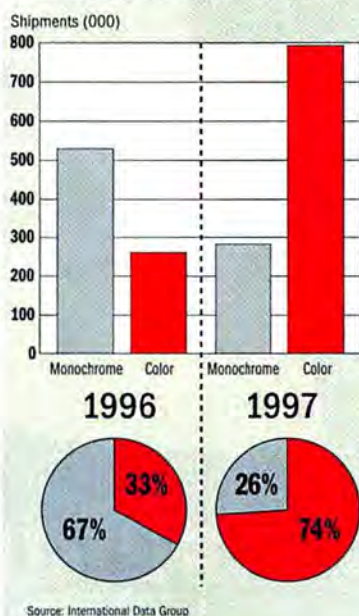


# A whirlwind of COLOR

**W**HEN THE TRANSFORMATION of the Yellow Brick Road from black and white to color took place in the original Wizard of Oz movie, it delighted and captivated audiences everywhere. Well, get ready. That same sort of transformation is under way in the world of business communication. Color documents, once generated exclusively by costly and often slow printers, are now within the reach of everyone. And just as the presence of color in movies, television and magazines multiples the impact of the message, so will color make all of your documents more readable and more likely to get read.

## A virtual color explosion!

Market share, color vs. monochrome MFPs.



Clearly, businesses see the benefits of communicating in color. According to IDC Research in Framingham, MA, the sales of color inkjet MFP units grew 53 percent from 1996 to 1997 and now outnumbered monochrome inkjet units by nearly 4:1. Shipments of color lasers increased 53 percent from 1996 to 1997 as well.

Why? Because color dominates our personal life making many of the things we read and watch easier to understand. We want it as part of our professional lives too, but for slightly different reasons. According to researchers, the judicious use of color in documents not only helps people better understand what they read, but it helps reduce errors and increase retention. In this age of information overload, helping people to better digest the stream of information rushing at them benefits both the writer and the recipient.

That's why vendors such as Ri-


coh are working to bring the many benefits of color to your business. For example, Ricoh's Aficio Color 2000 series digital copiers delivers the first affordable color copiers that combine extreme ease of use and high performance. Suited for departmental, workgroup and networked office environments, these easy-to-live-with copiers have multiple personalities. Add the optional Fiery XJ80e embedded print controller and your copier becomes a networked scanner and printer that delivers three full-color copies/prints-per-minute. An advanced image sensor delivers 256 tonal gradations of each color at a resolution of 400 dpi. In black and white the workhorse produces 21 copies/prints-per-minute.

Part of Ricoh's trouble-free design includes a unique straight paper-path toner transfer belt technology. While other color copier/printer transport mechanisms wrap the paper around the drum as many as four separate times, the transfer belt reduces paper jams by picking up the toner and depositing it on the paper as it travels past. The unit lists for \$11,500. The optional Fiery controller, which adds printing, scanning and network connectivity, costs about \$5,000. Together with Ricoh's service and support, this unit combines low cost with high resolution images in a manner fit to match any IT manager's dreams.

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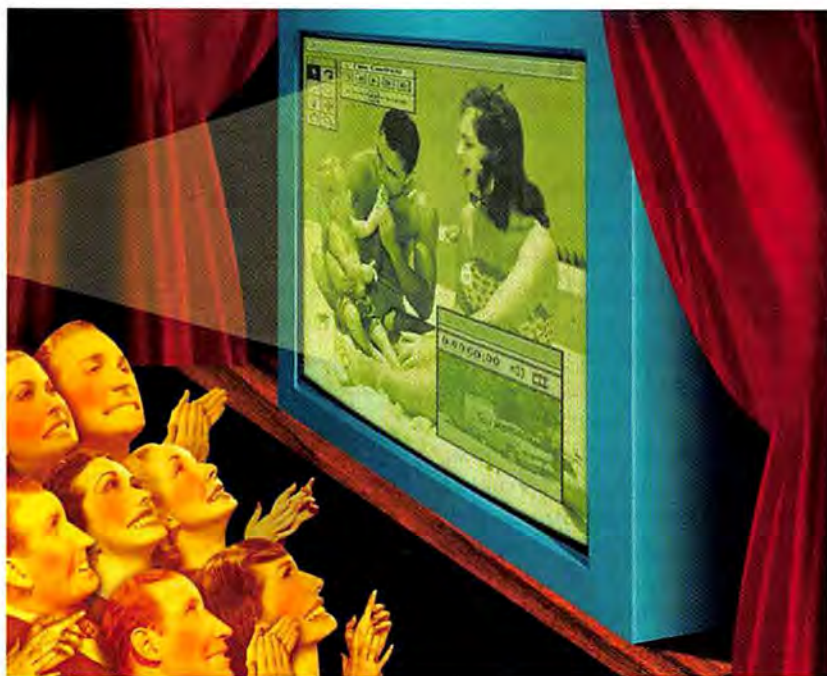
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## I'm Ready for My Close-Up

*With the latest video editing tools, you can transform a boring vacation video into a work of art.* ♦ BY DAN LITTMAN



THESE DAYS THERE'S no excuse not to take a camcorder with you on vacation. The latest models are so small you can take one anywhere, and you can operate it with one hand, leaving the other hand free to grip an ice cream bar or hold on to someone who's paying attention to traffic.

At least, that's how I pictured things as I planned a recent trip to Brazil: framing a Copacabana sunset while my companion fended off peddlers and pickpockets; zooming in on monkeys overhead as she shooed away the snakes at shoulder level.

And that's pretty much how things turned out. Before we left, I picked up a \$500 Sony HandyCam, flipped through the manual, and laid in a supply of Hi-8 cassettes. Three weeks later I returned home with a waist-high stack of tapes and no suntan on the right side of my face. Now, how would I show my friends what I saw down there? Videotape isn't like a set of snapshots—you can't duplicate a few favorites and drop them in the mail. But with a PC, some video capture hardware, and some editing software, you can digitize your videotapes, edit out the dull parts, and add cool effects. I narrowed the field down to two hardware gizmos and three software products. Then I got down to some serious moviemaking.

### THE FIRST CUT

FOR MY INITIAL attempt at editing my vacation tapes, I tried Pinnacle Systems' **Studio 400**, a \$199 camcorder-to-VCR gizmo about the size of a paperback. First I connected the Studio 400's purple mixer box to my camcorder, my VCR, and my PC's serial and parallel ports. This involved wiring and rewiring the devices together in several permutations, running configuration tests, and unearthing some dark secrets about how VCRs work.

I popped a tape in the camcorder, hit the Log button, and kicked back. The Studio 400 played through the video, separating it into individual scenes, which it saved as low-resolution digital clips on my hard disk. Since they're low-res, the clips don't take up much space (about 150MB for an hour of video), and I found it easy to rearrange them in the order I wanted, insert transitions (for instance, a fade or a wipe) between scenes, and add music and titles. Then the Studio 400 transferred the scenes directly from the high-quality original Hi-8 tape to a VHS tape in my VCR, inserting the computer-generated transitions and titles where I specified. Because my ▶



final production came straight from the source video, its quality was almost as good as the original's. I even had the option of saving my masterpiece to disk as an AVI file, suitable for posting on a Web site or burning onto a CD-ROM.

Though I found the software easy to use—in 5 minutes I was comfortable jumping from Capture to Edit to Make

tuner with software for watching or transcribing closed-caption text, and accelerates 2D and 3D graphics.

I ran the video from the camcorder into the PC and then back out to my VCR. Rather than telling the camcorder which frames to retrieve and then sending them straight to the VCR (as the Studio 400 does), a video capture board saves cap-

tured video on your PC as a high-resolution digital file, giving you more flexibility in editing and adding effects. When you've finished editing it, the All-in-Wonder Pro spits the file back out to the recording VCR.

I soon discovered a drawback, however: The process of digitizing video creates enormous files. One second of video saved in ATI's "Good" mode fills up just about 1MB of disk space. In

other words, an hour-long tape would have hogged almost 4GB of my hard disk.

## SERIOUS IN TOONLAND

CALL ME OLD-FASHIONED, but when it comes to software, I rate ease of use as the highest priority, and a cute interface a distant last. That's why I never felt at home with MGI's **VideoWave 1.5**, which is bundled with the ATI card (it also sells alone for \$99). Though intended to seem user-friendly, VideoWave's cartoonish appearance made it harder to learn. Menus lurk behind a tiny button labeled Start; the storyboard runs in a single row across the top of the screen; and controls for overlaps and transitions are tucked away at the bottom.

Once I got past the surface, I discovered some impressive features. For example, I could fade-in a scene to slowly replace the previous one, and make titles coast onto the screen, hang around for a second or two, and then shrink off into a corner, as if disappearing into the distance. I could set a low frame rate and select any of several compression schemes. And whether I chose to output to tape, to the Web, or to CD, VideoWave made all the necessary adjustments.

## All-in-Wonder Pro

Grade: **A-**; \$322 street; ATI Technologies; 905/882-2600; [www.atitech.com](http://www.atitech.com)

INFONET NO. 601

## Lumiere Video Studio 2.0

Beta software, not graded; \$79; IMSI; 800/833-8082; [www.imsisoft.com](http://www.imsisoft.com)

INFONET NO. 602

## Premiere 5.0

Grade: **B+**; \$600 street; Adobe Systems; 888/724-4507; [www.adobe.com](http://www.adobe.com)

INFONET NO. 603

## Studio 400

Grade: **A-**; \$199; Pinnacle Systems; 888/484-3366; [www.pinnaclesys.com](http://www.pinnaclesys.com)

INFONET NO. 604

## VideoWave 1.5

Grade: **B-**; \$99; MGI Software; 888/644-7638; [www.mgisoft.com](http://www.mgisoft.com)

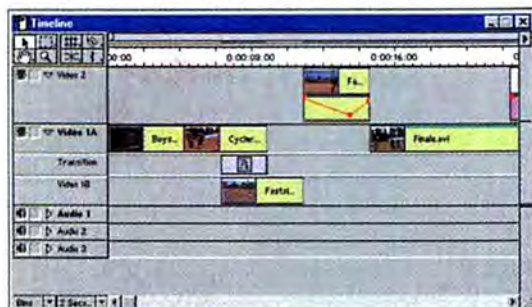
INFONET NO. 605

Regrettably, the final quality left much to be desired. Titles appeared particularly smeared and jerky, and the output tape was noticeably murkier than the original.

The next version of VideoWave, due out later this year, will let you move video directly from a digital camcorder to your PC, eliminating the tape-to-digital conversion process. In the meantime, though, I decided to go for more muscle.

## WHAT PRICE POWER?

THE JUST-RELEASED **Premiere 5.0** from Adobe combines some astounding features with plenty of new capabilities—and sells for a whopping \$600. I realized that Premiere is no mere toy for casual users. Just the same, I gave it a whirl. The timeline window accommodates an amazing 99 video and 99 audio tracks, which ▶



ON THE RIGHT TRACK: Premiere's timeline window makes working with multiple audio and video tracks simple.

Movie, and flipping open the Toolbox when I needed to edit a title or interpose a transition—I was disappointed at the minimal control it gave me over fades, transitions, title animation, and the like. What I really wanted to do was play with special effects. After all, I'm not making a documentary on Brazilian social conditions; I'm trying to impress my friends with my cool vacation (and my technical prowess). So I decided to try digitizing my videos with a capture card.

## HEAVY-DUTY HARDWARE

I TURNED TO ATI'S \$322 **All-in-Wonder Pro**, a graphics card that offers video capture almost as an afterthought. It can drive a 1600-by-1200-resolution monitor in 16-bit color at 85 Hz, has a built-in television

### FYI

WHEN IT COMES to keeping current, even Web surfers prefer newsprint over the Internet. In a recent Internet poll, 72 percent of respondents said that they read a newspaper most days; only 43 percent read online news that often.

SOURCE: UNIVERSITY OF CALIFORNIA AT SANTA BARBARA



THE B-LIST: VideoWave offers some cool special effects, but the final product was less than scintillating.



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## Home Sweet Home Page

DEATH, DIVORCE, and buying a house—these three ordeals rank near the top of the list of life's most stressful events. Though we can't help you much with the first two, a good source of real estate therapy is Microsoft Home Advisor ([www.homeadvisor.com](http://www.homeadvisor.com)). This highly customizable site guides you through the arduous home buying process, offering financial calculators, home listings, community information, loan finders, sample contracts, tips, checklists, glossaries, and more. Now, if only it could pack up your belongings.

## Addicted to the Web

MEET MARY H., whose Internet habit—50 to 60 hours per week—led to estrangement from her friends and family. An extreme case, no doubt, but the Center for On-Line Addiction reports that a growing number of Web surfers don't know when to say when. Visit its (non-addictive) Web site ([www.netaddiction.com](http://www.netaddiction.com)) for details, including case studies and an online survey. The most habit-forming activities, according to the center: chat rooms and multiuser games.

## Scanners for a Song

A YEAR AGO, an entry-level flatbed scanner cost \$250; now prices are about what you'd pay for dinner for two at a nice restaurant. Storm's EasyPhoto ImageWave, for example, can be found for as little as \$80. Models at these prices lack the highest resolutions and fastest speeds, but they're fine for scanning photos for Web pages or newsletters.

## Martha Stewart Computing

PCs ARE PRACTICAL. They're fun. But they've never made a fashion statement—until StyleTek's line of designer systems came along. Hand-assembled with mahogany cases and stained to match any décor, these PCs exude style but aren't for the faint of wallet: A PII-400 with wooden monitor, keyboard, speakers, and mouse costs \$8500.

• **StyleTek PCs;** StyleTek Industries; 212/420-1815; [www.style-tek.com](http://www.style-tek.com)

INFONET NO. 610

—Harry McCracken

the ambitious editor can nest and collapse like an outline. If I'd had three videographers along to document my trip, and needed to combine their tapes into one high-tech vacation video, Premiere could have handled the task with ease. As it was, I had nowhere near 99 tracks; but even

ous about the new version, **Lumiere Video Studio 2.0**, which comes bundled with Corel Photo-Paint 7. I looked at a prerelease copy of the software.

At \$79, Lumiere costs less than VideoWave, but its feature set comes closer to Premiere's. Its dozens of special effects, from Smoked Glass to Psychedelic Color, made my video do everything but backflips. Every option comes with detailed controls. For example, the Puzzle special effect lets you set the width, height, and offset of the jigsaw-puzzle pieces. Though most of the effects are a little too gaudy even for my Carnival-inflected tastes, there's certainly something for everyone here.

A huge collection of transition options let me move easily from scene to scene using everything from standard side-to-side wipes to Curtain or Funnel segues. Lumiere can almost instantly generate a production preview, including various complex special effects—a capability that encouraged me to experiment freely. I found the controls for special effects, titles, and other components easy to grasp at a glance. And the final movie looked quite stunning—the compression process caused very little loss of detail and minimal distortion.

## FADE OUT

SO NOW I have a vacation video patched together from clips edited with several different software packages, and though my friends are thoroughly impressed, I'm exhausted. The Pinnacle Studio 400 fits my basic video editing needs most closely at the moment, though I may outgrow it by the time I embark on my next exotic vacation—in which case I plan to settle on one multipurpose piece of editing software. If I have a big chunk of money left after airfare, I'll buy a copy of Premiere; but if I've spent it all in some tropical paradise, I'll happily settle for Lumiere. Now I just have to decide where to go.

Dan Littman is a freelance writer living in Oakland, California.



**A STAR IS BORN:** Lumiere not only offers lots of special effects; it also gives you an instant preview.

so, nesting made working with numerous elements simpler. Another feature I found useful was the software's project window. After labeling elements with a name, duration, and location, I could locate them easily when I needed them.

I jumped right on another interesting feature: rolling and crawling titles (something most video editing programs don't offer). I created lines of text scrolling from bottom to top—thanking my friend's many relatives for taking us in, and the restaurateur in Vitória for making us dinner long after his restaurant closed.

With such breadth of features and great documentation, Premiere lets the serious video student learn how to do things right. But it's overkill for a casual user like me.

## THE NEXT GENERATION

THE LAST TIME WE reviewed Lumiere (*New Products*, April 1997), the video editing software had a different owner. But Corel sold it to IMSI last fall, so I was curi-

## F Y I



IN A RECENT survey, 45 percent of computer users believed that Bill Gates had a bigger impact on their lives than Bill Clinton; 44 percent

of computer users gave the nod to Clinton.

SOURCE: UPI/LUNTZ RESEARCH





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— *Boot Magazine*, April 1998

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— *PC Gamer*, August 1998

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May 1998



June 1998



July 1998



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# Talk Amongst Yourselves in a Free Web Forum

"YOU'RE REALLY GOING to do it?" my buddy asked, nearly choking on his coq au vin. I had just agreed to create and manage an online mail list. "Sure," I said as my wife fired me one of those looks, "it'll just take a couple of hours." Okay, so they were *computer* hours. Fortunately, I stumbled onto an exciting way to share information. It's free, easy to use, and powerful.

## TABLE FOR 178, PLEASE

IT ALL STARTED with dinner at an expensive but not very good restaurant in Pasadena, California. As an intrepid journalist (and a wannabe food reviewer), I decided to warn others about the place. With e-mail, there was nothing to it. I wrote a short review, added it to the weekly e-mail mis-sive I distribute to Pasadena IBM Users Group members, and hit Send.

I was stunned by the response. Almost 200 people wrote back, critical thumbs waving wildly up and down. (With e-mail, *everyone's* a critic.) One request I heard loud and clear: Find a way to let list members interact with each other. And that's when my trouble started.

At first, I tried to get away with simply using my e-mail program. But managing a list with Eudora Pro was crazy: I was spending my evenings making sure messages got to everyone on the list. And adding and removing people from the list was a time-consuming horror.

For a few minutes, I considered something called a list server. You may have heard of these (or worse, you're stuck on one and can't figure out how to get off): A list server is a program that automatically redistributes messages back to everyone on the list. My Internet gurus warned me away—list management is notoriously



## I put together a private online forum in 20 minutes flat. The cost? Zero.

time-consuming, and list servers can be spam magnets. Find out about lists yourself by checking out the FAQs at [www.webcom.com/impulse/list.html](http://www.webcom.com/impulse/list.html).

I needed something easy to use, mostly self-administering, and cheap. I was poking around the Internet, killing some time before facing a deadline, when I came upon Delphi. My prayers were answered.

## DIRECT THEM TO DELPHI

IMAGINE A HANDSOME Web site with a sophisticated, multithreaded message board and a live chat room. A site you can access from anywhere as long as you're a member. That's what Delphi forums offer.

I put together a private forum for the food group—my own virtual intranet—in 20 minutes flat. The cost? Zero.

Once you've become a member of a forum, you don't have to waste your time

logging on to the site to check for new messages, since the forum notifies you by e-mail whenever mail hits your in-box. That's smart. And once you're on the site, you can save time by viewing only, say, messages to you, or just the new ones. You can send messages containing fancy HTML codes, and even add a signature.


Did I mention it was free?

As forum master, I have access to a satchel full of powerful administrative tools. For instance, I can automate the sending of e-mail invitations. Once friends log on to the forum, they're instantly accepted. With one click, I can lock out disruptive individuals, or keep certain members from entering specific message areas. It's easy to create private message areas for a handful of members, and I can designate other members to be chat moderators or assistant managers. A comprehensive membership report lets me keep an eye on the forum stats. By the way, did I say that everything at Delphi was free?

There's only one shortcoming (besides a few banner ads), and it's minor: No spelling checker for messages. So I did a little digging and came up with Spell Checker 3.0, a handy program that can check spelling in just about any window. It offers alternative spellings, lets you add words to its dictionary, and comes in eight languages. It's easy to use: Just hit the hot key, and the program starts checking.

Ready for the clincher? It's free, too. And the download is a scant 136KB (the dictionary adds 328KB). You can pick up Spell Checker 3.0 at PC World Online.

I created a forum for this column so you can see what Delphi is like. Log on at [www.delphi.com/homeoffice](http://www.delphi.com/homeoffice), and let's chat. The group code word—and keep this under your hat—is *zippy*.

 Find files mentioned in this article at PC World Online's FileWorld ([www.fileworld.com](http://www.fileworld.com)). Contributing Editor Steve Bass, a licensed marriage and family therapist, is president of the Pasadena IBM Users Group. See page 14 for contact information.



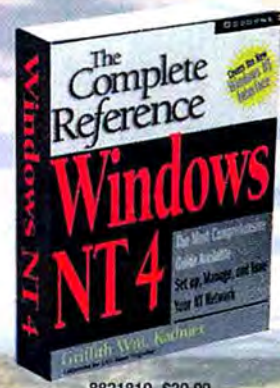
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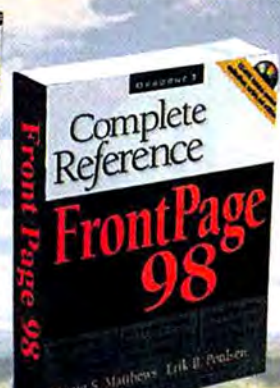
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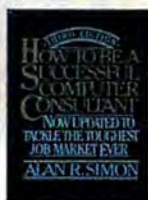
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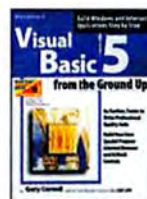
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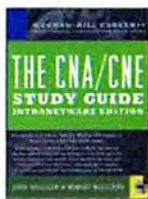
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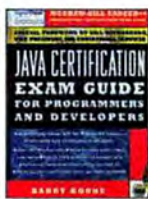
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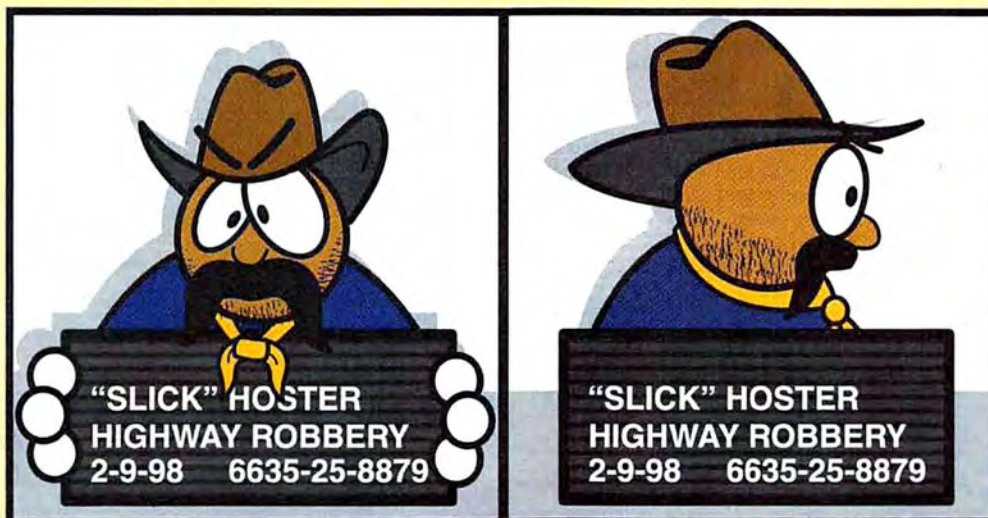


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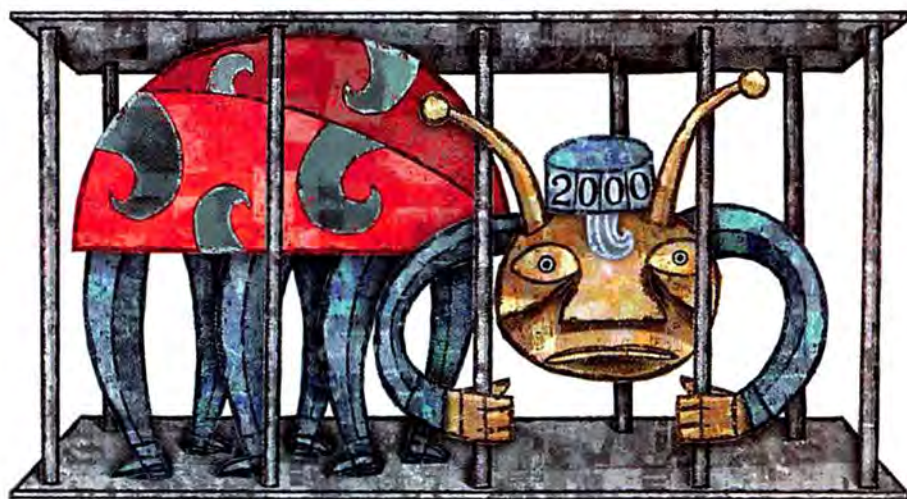
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# HERE'S HOW



## WINDOWS TIPS

SCOTT DUNN

# Fix Year 2000 Bugs in File Manager and DOS



BY NOW YOU'VE HEARD ALL THE JOKES, read the analyses, and listened to the doomsday predictions about what will happen to computers everywhere when the clock strikes midnight on December 31, 1999. But what about the system that's sitting on your desktop? What dread calamity is likely to befall your own PC at the dawning of the new millennium?

The good news is that Windows 98 and NT 4.0 don't have any known problems with the year 2000. And even earlier versions of Windows won't suddenly go berserk when the milestone is reached (at least not as a result of the date). But you may discover a few quirks lurking in Windows as you enter the new century. And

beware: The tips listed here do not cover year 2000 problems in individual applications. For help with that, see "Year 2000: Impending PC Disaster? Not If You Plan Ahead" (January, page 78).

**Upgrade your copy of File Manager:** If you use File Manager—whether in Windows 3.1, Windows for Workgroups 3.11, or early

releases of Windows 95—expect to see some funny-looking dates for files created after January 1, 2000 (see **FIGURE 1**).

Windows 95 users can find out whether their File Manager will have year 2000 troubles by choosing *Start•Find•Files or Folders*, typing `winfile.exe`, and pressing **<Enter>**. Make sure Details is checked on the View menu so that you can see the file's date. If the file date is earlier than 3/11/97, your version of the operating system has the garbled-date problem.

To upgrade your copy of File Manager, download `w31filup.exe` (for Windows 3.x), `wfwwfilup.exe` (for Windows for Workgroups 3.11), or `w95filup.exe` (for Windows 95) from Microsoft's support Web site: First, go to [support.microsoft.com/support/downloads](http://support.microsoft.com/support/downloads); then follow the links to the Updates and Utilities section for your particular version of Windows. If you are using Windows 3.x, move the downloaded file to an otherwise empty directory. In all Windows versions, double-click the .exe file to extract the files and instructions you need (Windows 3.x) or to start the upgrade installer (Windows 95).

**Correct bugs in DOS commands:** If you use the DOS prompt in Windows 95, you'll notice other minor glitches. For starters, the `Dir` command will display only two digits to represent the date in file listings. And in the `Date` command, if you try to set a new date using only two digits from 00 to 79, you'll receive an 'Invalid date' error message. The work-around is to use four digits when setting a new date with the `Date` command.

For a permanent solution to the `Dir` and `Date` problems, download and install `wing95y2k.exe` from Microsoft's support site, as explained above. Even this upgrade isn't without quirks, though: If, after upgrading, you use the `Date` command to specify a date using only two digits from 00 to 79, Windows will assume you mean





FIGURE 1: FILE MANAGER WILL SHOW GARBLED DATES for files created in the year 2000—unless you upgrade to a newer version.

a year between 2000 and 2079. If you specify a two-digit date from 80 to 99, Windows will take it to mean a year between 1980 and 1999.

### TRACK DOWN SHORTCUT SOURCES

**98** EVER WONDER where an application is installed or where to find the actual copy of a file you open using a Shortcut? Suppose you need to open an application folder on an unfamiliar system—for example, to access a file in the browser's cache folder. If you don't know the application's executable file name or where it was installed, locating it can be a chore. Tracking down the source of a document Shortcut is even harder on a poorly organized hard drive.

What to do? If the Shortcut in question is on the Start menu, right-click the *Start* button and choose *Open* or *Explore*. Navigate to the Shortcut that launched the application, right-click it, choose *Properties*, and click the *Shortcut* tab. If you just want to find the path to the Shortcut's file,



FIGURE 2: ACT DIRECTLY on a Shortcut's target file with the *Target* utility in PowerToys.

com) and install the *Target* utility. Once you've installed it, you can right-click on any Shortcut and choose *Target>Open Container* to open a window that holds the Shortcut's specified file. In addition, the *Target* menu gives you several commands (*Send To*, *Copy*, *Delete*, and *Properties*) that act on the file itself rather than on the Shortcut (see FIGURE 2).

### KEEP AN EYE ON IMPORTANT FILES

**98** SYSTEM FILE CHECKER keeps Windows 98 in working order by monitoring important system files to make sure they've been properly installed. But you can also use it to preserve any file in its pristine state. For example, you may want to protect the templates your employees base their files on.

First, create backups of the files you want to monitor and store the copies in a safe place. Next, start System File Checker by choosing *Start>Programs>Accessories>System Tools>System Information*. In the System Information window, choose *Tools>System File Checker*. To add the files you want to monitor, click *Settings*. On the Settings tab, select the options that fit your needs—for example, you'll probably want to leave 'Check for changed files' and 'Check for deleted files' selected (see FIGURE 3). If you'd like to be able to scan a separate set of files (such as templates) without scanning all your system files, click the *Advanced* tab and click *Create*. Select a location and type a name for your new .sfc file. This is a listing of the files you want to keep an eye on. Click *Save*.

Now click the *Search Criteria* tab. Click *Add Folder* and select a folder that contains

look at the *Target* box. If you want to act on the file directly or to find related files, click *Find Target* to open the folder containing the Shortcut's file.

To get even speedier access to Shortcut sources, download the free Microsoft PowerToys at PC World Online ([www.fileworld.com](http://www.fileworld.com)).

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### INTERNET



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files you want to watch. Click *OK*. If you want to monitor all the files in a folder's subfolders, make sure the larger folder is selected, and click *Include Subfolders*. Repeat to add other folders.

Next, specify the type of files that you want to monitor. Click *Add Type*, type a file specification, such as \*.dot, and then click *OK*. If you want greater specificity, click *Add Type*, type a complete file name (such as salesrpt.xls), and click *OK*. Repeat this process for additional file names or specifications. If you change your mind, select the item from the list and click *Remove*. Click *OK*, then click *Close* twice, and you're done.

To check your files, start System File Checker and click *Settings*. Click the *Advanced* tab and choose your custom .sfc file from the *File name* drop-down list. Click *OK*, then click *Start*. If the utility finds a discrepancy, you'll be given a ▶



### Increase Your Keyboard Power

OFTEN YOU CAN WORK FASTER with the keyboard than you can with the mouse. To speed things up even more, use Keyboard Express to collapse complex or repetitive sets of keys and frequently repeated text into just a couple of keystrokes.

This \$25 utility lets you create macros either by entering keystrokes manually or by recording them as you type. Other features include date and time stamp-



ing and scheduling of macros. Versions are available for Windows 3.x, Windows 95, and Windows NT. Download an evaluation copy from PC World Online ([www.fileworld.com](http://www.fileworld.com)) or from [www.keyboardexpress.com](http://www.keyboardexpress.com).

number of choices. If you recently modified the files or approved recent changes, select *Update verification information* or *Update verification information for all changed files*. System File Checker will thenceforth consider the current versions officially acceptable. If you choose the Restore option, you'll get a chance to store the changed version in a backup folder in case you later change your mind.

See "Picks and Pans for Win 98 System Tools" in July's *Windows Tips* for a description of other Windows 98 system tools.

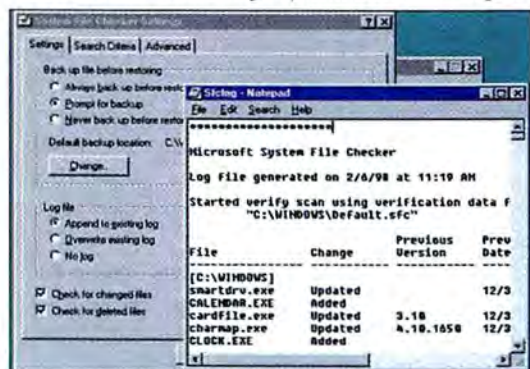


FIGURE 3: CHECK FOR CHANGES to all your sensitive documents by using Windows 98's System File Checker.

### AN OUNCE OF PREVENTION FOR WINDOWS NT



WINDOWS NT IS only as reliable as the hardware that runs it. In times of trouble, you'll be glad you have a backup, not just of important data files, but of system settings such as those in the Windows NT Registry.

Unfortunately, you can't save the entire NT Registry by backing up a few files, since some hardware-related settings are created every time you start NT. Still, you can and should make backups of other NT portions regularly or any time your system changes (for example, when you install new software). Here are some ways to do just that:

**Winner tapes all.** If your PC contains a tape drive, use NT's Backup utility to take a snapshot of Registry settings when it backs up other files. Choose *Start>Programs>Administrative Tools (Common)>Backup*. Double-click the drive you want to back up, and then check the boxes

for the folders or files you want to include. When you're ready, click the *Backup* button. Check the *Backup Local Registry* box, type a Description, and click *OK* (FIGURE 4). You must back up at least one file on the same drive as NT; otherwise, the *Backup Local Registry* box will be grayed out.

**Repair for tomorrow.** When you installed Windows NT, it asked you whether you wanted to make an emergency repair disk, a resource that can come in very handy if you ever need to run Setup with the Repair option. Even if you chose *Yes*, you

should keep your repair information up-to-date. NT's Repair Disk Utility—though not as thorough as the Backup utility, which copies any files you want to a tape—saves a compressed copy of Registry files in NT's Repair folder and on a floppy disk (if you so specify).

Select *Start>Run*, type *rdisk*, and press *<Enter>*. If you simply want to copy settings to a floppy, click *Create Repair Disk*. If you want to copy the files to the

Repair folder on your hard disk, click *Update Repair Info*. The latter button makes a copy on your hard drive, then invites you to copy the same files to a floppy disk. If you want Repair Disk to include security account manager (.sam) and security database files, type *rdisk /s-* in the Run dialog box. Repair Disk will update information in the Repair folder and then exit. If you type *rdisk /s* (without the hyphen), you'll also receive a prompt to make a floppy copy.

The */s* and */s-* switches overwrite the Registry .sam and security settings that were saved during installation. And be-

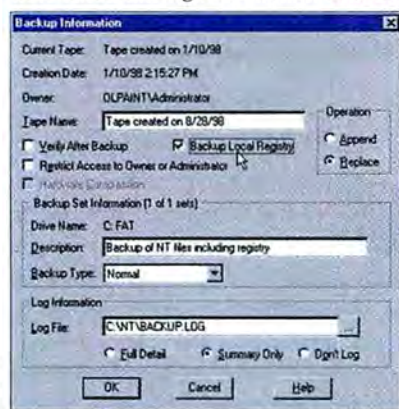



FIGURE 4: NT'S BACKUP UTILITY lets you include the Registry on a tape backup.

cause the .sam and security files saved with these switches contain information about all users and groups, the resulting backups are often too big for a floppy disk. Therefore, use the */s* switch with caution.

**Give it the boot.** To copy Registry files manually, you must boot to another operating system (use a bootable floppy if necessary). Navigate to the folder where you installed NT and then to the Config folder in the System32 folder. Copy all files in the Config folder to a safe location. Unlike the backup files made with the Repair Disk Utility, these files won't be compressed.

 Find files from this article on PC World Online at [www.fileworld.com](http://www.fileworld.com). Windows Tips welcomes tips and questions and pays \$50 for published items. Contributing Editor Scott Dunn is a principal author of *The PC Bible*, 2nd Edition (Peachpit Press, 1995). See page 14 for contact information.



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## YOUR QUESTIONS ON: Copying files to and from a Mac ♦ Recycling batteries

# When Windows Really Does Lose Its Memory

IN "HOW MUCH MEMORY Does Windows Take?" (*Answer Line*, April, page 266), I confidently reassured letter writer Brian Hughes that Windows 95 is capable of addressing up to 4GB of memory and asserted that there was no truth to rumors that Windows 95 systems slow down if you present them with more than 64MB. But as a number of readers subsequently pointed out, I completely missed the boat with that particular answer.

Okay, technically I was correct. Windows 95 can address up to 4GB of memory. But there's an important and serious limitation on this impressive-sounding capacity: Your system may not be able to store much of the addressable memory in its secondary cache—and this shortcoming can severely impede your PC's performance.


The problem resides in the motherboard's chip set, which controls memory caching. Most chip sets currently in use cache only memory located in the first 64MB of main memory. If your system has 128MB of memory, your PC's chip set can't store the top half of it.

Possessing memory beyond 64MB that doesn't get cached is much less of a problem for NT, which uses the faster, cacheable bottom memory first and works its way up from there. But both Windows 95 and Win 98 begin using uncacheable memory from the top almost at once.

If your Windows 95 or 98 system is a Pentium or a Pentium MMX with more than 64MB of memory, the

operating system's use of upper memory is probably hampering the computer's performance. Most low-end Pentiums are equipped with either Intel's 430VX or its 430TX chip set, both of which can cache memory only in the first 64MB. Many high-end Pentiums, however, run on the 430HX chip set, which theoretically ought to be able to cache memory in the first 512MB, but which actually (in most—and perhaps all systems) doesn't do anything of the sort beyond the first 64MB of memory. In contrast, the 440LX chip set that is used in Pentium II systems caches memory from anywhere in the first 512MB.

## GUILTY BY ASSOCIATION?

 HOW DO YOU BREAK the association between a specific file type and an application? I recently double-clicked an .asu file, and Windows asked me what program to open it with. I clicked Internet Explorer, only to discover, first, that IE can't even open .asu files and, second, that 'Always use this program to open this file' was checked. So now double-clicking an .asu file launches IE, which doesn't do any good. How can I reset Windows so that there's no association for .asu files?

Noah Blumenthal, Baltimore  
MICROSOFT OBVIOUSLY never imagined that you might want to dissociate a file extension from an application. To compli-



## Rearrange the Start Menu in Windows 98

THE WINDOWS 95 Start menu insists on alphabetizing its submenus and Shortcuts. But in Windows 98, you can drag almost any item on the Start menu or its submenus to any other position on the same or another menu. You can even put a Shortcut above a submenu. You can copy items to different submenus by holding down the <Ctrl> key or by right-clicking items to bring up an appropriate Shortcut menu.

cate matters, installation programs reassociate extensions all the time (since I install a lot of utilities, I never know what to expect when I double-click a .zip file).

There are two ways to ensure that an extension won't be associated with an application. The easier way usually works, but I'll tell you both.

In Windows Explorer, select **View • Options**. In the Options dialog box, click the **File Types** tab. Look for the appropriate file type, which will probably be the extension name followed by the word **File**—for instance, **ASU File**. If you don't find it here, look under the application name.

Once you've chosen the file type, scan the bottom of the dialog box, where the word **Extension** appears. If the extension you want to dissociate is the only one listed, you're in luck—you can use the easy way.

You may be asking, "Why not just select the file, press <Shift> while right-clicking it, and select 'Open With' to permanently associate the file type with another application?" Here's why: If you don't investigate the Options dialog box, you won't know what other extensions are appended to this file type (see **FIGURE 1**). And you may still want .htm files to open with IE.

**The Easier Way:** In the Options dialog box, if the errant extension is the only one associated with the file type, while you have the type selected, click **Remove**, **Yes**, then **Close**.

**The Harder Way:** If the extension is one of several connected with the file type, and you want to remove only one, you'll have to edit the Windows Registry. This is ►



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MODEL	7VXL	7V	5VXL
CRT	17" MICROFILTER	17" S-MASK	15" S-MASK
DOT PITCH (MM)	0.26	0.27	0.28
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H-SCAN (KHZ)	30-70	30-70	30-70
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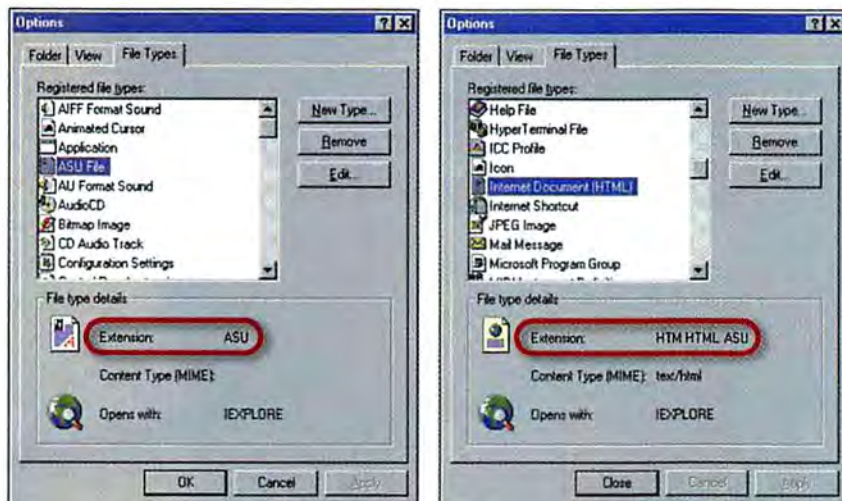


FIGURE 1: DISSOCIATING AN EXTENSION from an application is easy if Windows identifies that extension as the only one in its file type. But if it's one of several, the fix is trickier.

an inherently dangerous task, so make sure that you back up your Registry files (user.dat and system.dat) before undertaking it. (See "Back Up Your Registry," *Answer Line*, June, page 290, for details.) Once you've made your backup, select **Start•Run**, and enter **regedit** to open the Registry Editor. In the left pane, expand **HKEY\_CLASSES\_ROOT** and look for a folder with the name of the extension you want to remove. Delete that folder, close the Editor, and reboot.

### PASS OVER THE PASSWORD

I RECENTLY INSTALLED a network, and now every time I load Windows 95, a dialog box asks me for my password. I left the password field empty, which (according to Windows' installation program) should prevent this box from reappearing. But I still get it every time I boot. How can I skip this dialog box?

THE DIALOG BOX still shows up because Windows insists on knowing who is loading Windows. To make it stop asking, you need to make this information irrelevant.

First select **Start•Settings•Control Panel**, double-click the **Passwords** icon, and click the **User Profiles** tab. Select *All users of this PC use the same preferences and desktop settings*, and then click **OK**. You'll be asked if you want to reboot your computer—you don't have to. The next time you reboot, you'll go straight to work.

### READ AND WRITE MAC FLOPPIES

DO YOU KNOW of any shareware programs that have been designed to make it possible for users to transfer files from a Macintosh-formatted disk to a Windows 95 system?

Don St. Esprit, Dayton, Ohio

I KNOW OF ONE good one. It's called TransMac, and it was created by Acute Systems. You can download the program from [www.asy.com](http://www.asy.com) or from PC World Online ([www.fileworld.com](http://www.fileworld.com)).

TransMac lets you copy files to and from a high-density Mac disk, delete files off one, and even format such a disk.

The only catch: By shareware standards, it's expensive. Registration costs \$64.

### RECYCLE A DEAD BATTERY?

WHAT HAPPENS to laptop batteries that can no longer hold their charge? Can they be refurbished or rebuilt in some way to charge another day? Or must they be consigned to our already overtaxed landfills?

Christopher E. Spratt

Victoria, British Columbia

IN MOST CASES when a notebook battery can't hold a charge, it goes straight to the landfill. This is not a good thing. Batteries contain many dreadful substances that do far more harm to the environment than common recyclables (newspapers, ▶

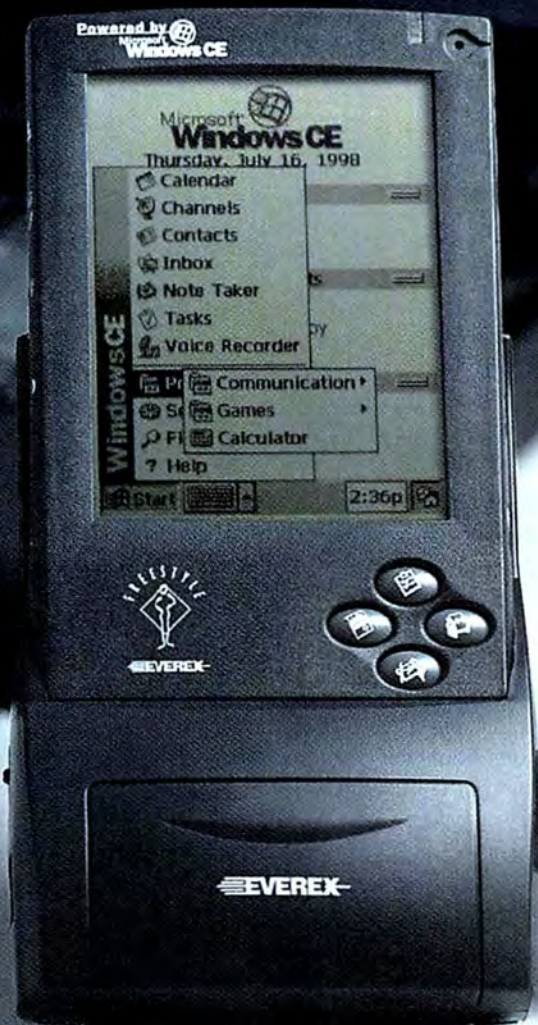
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ADDITIONS

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bottles, and cans). Federal regulations (in Canada as well as in the United States, presumably) ban battery dumping, although the legal sanctions that can be imposed under these provisions are rarely enforced against individual consumers.

You could look up "waste disposal" in your local yellow pages, but don't expect too much. In my neighborhood, you have to make an appointment with the county Household Hazardous Waste office—not the most consumer-friendly bunch of public servants around. I've heard of people getting 6 a.m. appointments.

Recycling old nickel cadmium batteries is easy. The Rechargeable Battery Recycling Corporation separates spent NiCd batteries into dozens of reusable parts—and RBRC has drop-off spots all across North America. I recommend that you check out [www.rbrc.com/cgi-local/zip.pl](http://www.rbrc.com/cgi-local/zip.pl) to find a recycling station in your zip code or city, or visit [www.rbrc.com/progpart.htm](http://www.rbrc.com/progpart.htm) for a list of drop-off locations.

Nickel-metal hydride, lithium polymer, and lithium ion batteries are another story. Companies that recycle them often charge more and cater to large organizations.

Two companies will take any type of bad battery off your hands: Battery Solutions ([www.batteryrecycling.com](http://www.batteryrecycling.com), 734/467-9110) and Kinsbursky Brothers (800/548-8797). Contact either one for details about costs and shipping rules.

**Note:** Since I originally wrote this, Mr. Spratt found a local company, GFX Power in Burnaby, British Columbia (604/299-0199), willing to rebuild his existing battery—recycling the spent parts—for about the cost of a new one. You may have similar luck in your own area.

### STRINGING MUSIC TOGETHER



MY WINDOWS 95 Media folder contains a long list of classical music MIDI files, all of which can be played through Media Player. Is there a method to play them one after another? It would be nice to be able to play this music in the background while I'm working.

P. Packer, Lake Havasu City, Arizona  
FIRST, LET'S REVIEW how to find these MIDI files. If your C:\Windows\Media folder isn't already stocked with files like

Dance of the Sugar-Plum Fairy.rmi, and you want it to be, put your Windows 95

CD-ROM into the CD-ROM drive. When

the blue CD-ROM window appears, click *Add/Remove Software*. On the *Windows Setup* tab, select *Multimedia*, click *Details*, and check *Sample Sounds*. Then click OK twice and close the CD-ROM window.

Now that you have the files, you need to create a batch file to play them one after the other. First, use Windows Explorer to go to C:\Windows\Media. Then open a DOS window by clicking the *Start* button and selecting *Programs>MS-DOS Prompt*. Next, at the DOS prompt, type **copy con c:\windows\media\music.bat** and press **<Enter>**.

With both windows visible, drag the first piece you want to play to the DOS window and press **<Enter>**. Repeat this step for each of the other pieces you want to play. When

```
start /w /m mplayer /play /close C:\WINDOWS\MEDIA\BEETHO~1.RMI
start /w /m mplayer /play /close C:\WINDOWS\MEDIA\DANCEO~1.RMI
start /w /m mplayer /play /close C:\WINDOWS\MEDIA\BACH'S~1.RMI
start /w /m mplayer /play /close C:\WINDOWS\MEDIA\DEBUSS~1.RMI
```

**FIGURE 2: THE WINDOWS 95 CD-ROM comes with lots of MIDI files. Copy them to your hard disk, then play them one after another with this simple batch file.**

you've finished, your batch file will resemble the one shown in **FIGURE 2**. Then press **<Ctrl>-Z** and **<Enter>**. Close the DOS window.

Right-click the newly created music.bat file icon in the Explorer window and select *Edit*. At the start of the first line, before 'C:\WINDOWS', enter **start /w /m mplayer /play /close** and be sure to include a space after the word *close*.

Next, position your cursor immediately after the space, and press **<Shift>-<Home>** and then **<Ctrl>-C** to put that text in the Clipboard. Then move to the start of the next line and press **<Ctrl>-V**. Repeat this last step until the same words appear at the beginning of every line. Close Notepad and save the file. ▶

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## Sort Your Checks in Quicken

WANT TO SEE all the checks you've sent to a particular person or institution? While viewing your checking account's registry, click the **View** drop-down menu and select **Sort by Payee**. Just remember to return it to **Sort by Date/Amount** (or whatever you prefer) when you're done.



Now right-click the icon once again and select **Properties**. On the **Program** tab, click the **Run** drop-down box and select **Minimized**. Check **Close on exit**, and then click **OK**. This creates a Shortcut to the batch file that will automatically minimize the ugly DOS window that accompanies the beautiful music. Drag that icon to the desktop or the Start button or anywhere else that's convenient for you.

## EASIER WAY TO DELETE

I GUESS I'M A BIT out of practice in the clever DOS tricks department. After I gave Bruce Tazsarek a complicated solution to the problem of confirming a `del *.*` command in a batch file ("Automatically Confirm Your Deletes," July, page 306), various readers wrote in to recommend a much simpler solution. The Delete command in the batch file should read:

```
echo y | del c:\windows\temp\*.*
```

Thanks to this method, there's no need for Bruce to create the `y.txt` file I told him to make. I stand (or sit) corrected.

## TransMac

\$64 shareware; Acute Systems;  
[www.asy.com](http://www.asy.com)



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## Peaceful Coexistence for Communicator and IE 4.0

EACH BROWSER HAS its virtues and, heaven knows, its foibles. You may prefer Internet Explorer for viewing graphics-intensive sites because of its smart image handling, but you may like Netscape Communicator better for Web searching because it seems to load text faster. Either way, some of your favorite sites will definitely work better with one or the other. If you tend to shuffle between Internet Explorer and Communicator, here are some tips for helping them coexist.

**Choose your default browser.** Would you like to choose which browser loads when you click on a URL in an e-mail message or on a URL shortcut on your desktop? You can easily designate Explorer or Communicator as your default browser.

To make Explorer your default browser, select **View**•**Internet Options**. Click the **Programs** tab, and check the box next to 'Internet Explorer should check to see whether it is the default browser'. Click **Apply**. Exit Explorer and reload it. When asked if you'd like to make Explorer your default browser, click **Yes**.

To make Communicator your default browser, head to its preference file by selecting **Start**•**Find/Files or Folders** and typing **prefs.js**. Once Windows locates it, right-click the file and select **Edit**. Then add the line `user_pref("browser.wfe.ignore_def_check", false)`.

This line will force Communicator to check whether it's the default browser. (A "true" value at the end of the line would set it to *not* check.) Save the file, and then reload Communicator.

Unfortunately, you can't arrange for one browser to pop up every time you click on an e-mail address and the other one to appear when you click on a desktop shortcut. Nor can you specify different

browsers to show different desktop URL shortcuts. Readers sometimes ask if it's possible to configure the latter, but the answer seems to be no. (But if you know of a way, please write!)

**Share bookmarks.** You can import Communicator bookmarks into Internet Explorer just by dragging and dropping. Here's how:

In Explorer, select **File**•**Open**. In the dialog box, click **Browse**; then go to the Netscape Users folder

that contains your preference file, and look for a file named **bookmark.htm**. It will probably be in **C:/Program Files/Netscape/Users/yourname**.

If you don't have an HTML version of your Netscape bookmark file, make one by clicking the **Bookmarks** button in Communicator and selecting **Edit Bookmarks**•**File**•**Save As**. Save the file as **bookmark.htm**.

Once you've loaded this file in Explorer, click the **Favorites** button. Drag and drop bookmarks from the Netscape list of links to the Favorites window on the left side of the screen (see **FIGURE 1**).

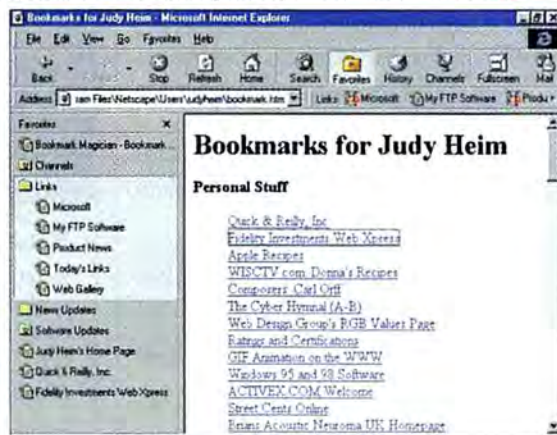
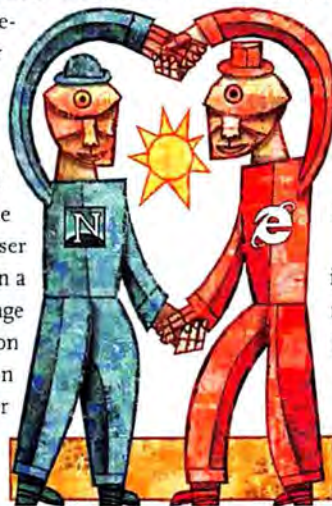


### Check Mail Sans Downloads

DON'T YOU HATE IT when you dial your Internet service provider to skim your e-mail and end up downloading megabytes of junk mail? A nifty freeware utility called POP3 Scan Mailbox lets you delete unwanted mail without downloading it. POP3 can check multiple ISPs as well as multiple e-mail names. Set it to display message headers or first lines; then have it retrieve the mail you want or download it later. Download POP3 Scan Mailbox from [www.netcomuk.co.uk/~kempston/smb](http://www.netcomuk.co.uk/~kempston/smb) or from PC World Online.

Importing Explorer bookmarks into Communicator is not so easy; you need to use a bookmark import utility. My favorite is the \$20 shareware **Bookmark Importer Lite 2.0** from WebObj Technology ([www.webobj.com](http://www.webobj.com)). This wizard transforms Explorer Favorites into Communicator Bookmarks and vice versa, placing them in the proper directories. It even lets you select which bookmarks to import.

For a free alternative, try **IEConverter**, a utility by Jae Yim that's available on PC World Online. IEConverter saves your IE bookmarks to a file called **book.htm**, overwriting your current Communicator bookmark files. For that reason, you should save your converted IE bookmarks to a different file (**book2.htm**) and load them separately in the browser. You ▶



**FIGURE 1: IMPORT NETSCAPE BOOKMARKS** into Internet Explorer by using the **File** menu to open the HTM file where your Netscape bookmarks are stored, then dragging and dropping them into Explorer's Favorites window.



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## Should You Be on CompuServe?

TIRED OF AMERICA ONLINE'S busy signals and teen-centric content? Suspect that clients don't take your e-mail seriously because of that @aol.com address? Maybe it's time for you to switch to CompuServe (www.compuserve.com). This veteran service's biggest advantage over AOL is the quality of its forums, which cover a wide variety of professions and topics. Messages are more adult in tone than those in AOL forums. And forum libraries are great sources for software.

Most notable are CompuServe's computer support forums, sponsored by all the major software and hardware vendors. Many times I've solved a midnight computer glitch by tapping into a vendor's forum and downloading files or reading tech support posts. CompuServe also maintains links to Great Britain, Germany, Japan, and many other countries.

CompuServe costs \$24.95 per month for unlimited access, including the Internet—and you get a free 30-day trial. One caveat: AOL now owns CompuServe and appears to be walking a very cautious path toward making it more like AOL, cutting employees (particularly in its customer service center), dropping certain forums, and slowly retooling CompuServe software to make it more AOL-like.



**COMPUERVE OFFERS EXCELLENT FORUMS** for professionals and seekers of computer support.

can also use an editor like WordPad to cut and paste the two files together.

**Use another mail program.** Both Communicator and Explorer balk at firing up the other browser's mail program when you click on a Web page's mail link. But you can configure both browsers to load a third-party mail program like Eudora.

In Communicator 4.x, select *Edit•Pref-*

erences. Under the Navigator category, click *Applications*. In the Description box, scroll down the list and look for an entry called 'URL:MailTo Protocol'.

If there is such an entry, highlight it and click the *Edit* button. Make sure that the Application button is selected, and in the Application edit box, replace the current path with the path to your mail program's executable file—*c:\eudora\eudora.exe*, for instance. Click *OK*.

If there's no 'URL:MailTo Protocol' entry, create one by clicking the *New Type* button. In the dialog box, type **URL:MailTo Protocol** in the MIME Type box, and type the path to your mail program's executable file—for example, *c:\eudora\eudora.exe*—in the 'Application to use' box. Click *OK*. When the program asks you for the file extension, type **URL:MAILTO PROTOCOL**.

In Explorer 4.x, select *View•Internet Options*, click the *Programs* tab, select your mail program from the Mail drop-down list, and click *OK*.

## DUN WITH PASSWORD HASSLES?

THINK INSTALLING Windows 98 will bring relief from Dial-Up Networking annoyances? Think again. Windows 95's refusal to store DUN passwords often recurs in Windows 98. You'll find advice on curing this woe in Microsoft's tech support article #Q148925, available at support.microsoft.com/support.

One solution is to rename your *username.pwl* and *rna.pwl* files, then restart Windows and let it create new ones. (Hint: Rename one file at a time, restart Windows after each change. Also, some systems lack *rna.pwl* files.) You can confirm that password caching (saving) is enabled by opening the Registry (click

*Start•Run* and type **regedit**) and looking through it for the key 'HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows\CurrentVersion\Policies\Network\DisablePwdCaching'. (Warning: Don't edit the Registry unless you've backed it up and you know what you're doing!) Alternatively, deleting Dial-Up Networking and then reinstalling sometimes brings relief.

## GET PAID TO SURF?


ARE THOSE CYBERPROMOTION sites that promise great deals and prizes in exchange for your time on the Web too good to be true? Yes, unless you put no value on your time.

MyPoints (www.mypoints.com) from MotivationNet makes you answer a battery of personal questions and choose how you'd like to be contacted by marketers—by snail mail and phone, by e-mail, or not at all (see **FIGURE 2**). Then you sit back and wait. Each time a salesperson calls or writes, you get points, which you can then exchange for goodies. For instance, about 270 visits to Web sites will snag you a \$25 gift certificate for Hyatt Hotels. You can also accumulate points by visiting designated Web shopping sites.



**FIGURE 2: CYBERPROMOTION SITES** offer gifts or cash for browsing, but you make pennies per hour.

CyberGold (www.cybergold.com) asks no personal questions, but the site typically requires you to purchase things or fill out survey forms at Web sites in order to earn "cyber cash," which translates into real money deposited into your bank or credit card account. For instance, you might earn 50 cents by downloading and installing software, registering at a coupon-clipping site, or ordering magazine subscriptions. Big whoop!

 Find files from this article on PC World Online at [www.fileworld.com](http://www.fileworld.com). Internet Tips welcomes questions and tips and pays \$50 for published items. Contributing Editor Judy Heim is a coauthor of *The Quilter's Computer Companion* (No Starch Press, 1997). See page 14 for contact information.



1. Start image editing software
2. Choose "file acquire"
3. Pre-scan page
4. Set scan area
5. Set resolution
6. Set scan mode
7. Scan page
8. Close TWAIN
9. Save file
10. Close image editing application
11. Start e-mail package
12. Start new message
13. Choose "attach file"
14. Locate saved file on hard disk

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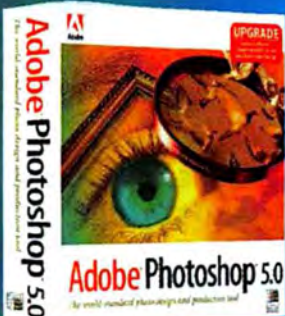
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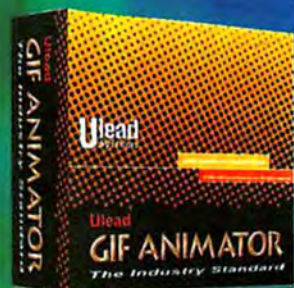
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Color your text any shade ♦ Preserve your document's formatting

# Align Graphic Elements Automatically in Word 97

ALIGNING GRAPHIC elements—text boxes, clip art, AutoShapes, and so on—on a page can be tedious, especially if you created them by clicking and dragging. But Word 97 makes this job a snap. Just follow these steps to get all your graphic ducks in a row:

1. Select all the graphic elements you want to align by holding down <Shift> as you click each of them in turn.



FIGURE 1: LINING UP GRAPHICS by hand is a chore. Let Word 97 do it for you automatically.

2. Click the *Draw* button on the Drawing toolbar, select *Align or Distribute* from the pop-up menu, and choose an alignment or distribution strategy, using the menu icons as a guide (see FIGURE 1).

## CREATE A SAMPLE FONT LIST IN WORD 97

IF YOU'RE LIKE MOST Word users, you use only a few of the scores of fonts available to you in your documents. In part, that may be due to the inconvenience of not being able to see what an exotic font

looks like before applying it.

Here's a Word 97 macro for creating a document containing samples of every font installed on your PC, neatly formatted and sorted alphabetically. Just follow these simple steps to generate the macro:

1. With a blank document on the screen, select *Tools*•*Macro*•*Macros*.

2. In the *Macros* dialog box, type *ListFonts* in the 'Macro name' field, type *Lists All Available Fonts* in the 'Description' field, and then click *Create*.

3. The *Microsoft Visual Basic* window will open. After the 'Sub ListFonts()' line and the two comment lines inserted by Word, but before the 'End Sub' line, type the commands in FIGURE 2. Use the <Tab> key to indent. (The *ListFonts* macro is available on PC World Online.)

4. Select *File*•*Save Normal* to save your macro in the *normal.dot* template, then select *File*•*Close and Return to Microsoft Word*.

5. To create the font list (as in FIGURE 3), select *Tools*•*Macro*•*Macros*, choose *ListFonts* in the 'Macro name' list in the *Macros* dialog box, and click *Run*. Finally, save the list to your hard drive and print a copy for reference. Rerun the macro whenever you add or remove fonts.



FIGURE 2: RUN THIS WORD 97 MACRO to create a file with samples of every font on your PC. Rerun it whenever you add or remove fonts.

## Straighten Curly Quotes

WORD AND WORDPERFECT automatically change straight quotation marks into curly quotes. But when you want straight quotes—say, for inch and foot marks—you can turn off this feature. In Word, select *Tools*•*AutoCorrect*, click the *AutoFormat As You Type* tab, uncheck "Straight quotes" with "smart quotes", and click *OK*. You can also tell WordPerfect to use straight quotes only after numbers: Select *Tools*•*QuickCorrect*, click the *SmartQuotes* tab, check *Use straight quotation marks after numbers*, and then click *OK*.

## ADD DESIGNER COLORS TO HEADLINES

THE STANDARD SET of colors may suffice for most jobs, but sometimes you want text that's puce instead of red, chartreuse instead of green, or lapis lazuli instead of blue. Headlines and display text, in particular, can benefit from designer colors. Here's a guide to getting just the right shade to highlight your document.

**Word 97:** When formatting regular text, Word limits you to a piddly selection of standard colors. Fortunately, you can turn display text into WordArt to access a full spectrum of hues:



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**FIGURE 3: PRINT THE FONT LIST** created by the macro in Figure 2 for handy reference.

1. Place the cursor where you want your fancy text to go. Then select *Insert* • *Picture* • *WordArt*. Word automatically switches to Page Layout view, if it wasn't already there.
2. In the WordArt Gallery dialog box, choose a style for your text, then click *OK*. The plain style in the upper left corner works well for most headlines.
3. In the Edit WordArt Text dialog box, choose a font and size, type your text, and click *OK*.
4. Drag the text to its final position in the document, then click the *Format WordArt* button on the WordArt toolbar.
5. The Format WordArt dialog box will open with the *Colors and Lines* tab selected. In the Fill section, click the arrow next to the Color box and select *More Colors* from the pop-up box.
6. In the Colors dialog box, click the *Cus-*



**FIGURE 4: WHEN STANDARD COLORS won't do, turn display text into WordArt for more choices.**

tom tab, then click in the *Colors* display to choose a basic color, and use the shading slider to the right to pick the exact shade you want. Look at the preview box in the lower right corner as you work (see **FIGURE 4**). When you are satisfied, click *OK*.

7. Repeat steps 5 and 6 to select a color for the bordering line, if necessary. Then click **OK** in the **Format WordArt** dialog box to finish the job.

If you need to change these colors later, make sure you're in Page Layout view, right-click the text, and select *Format WordArt* from the menu.

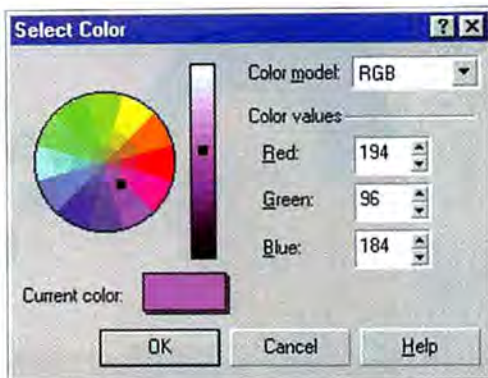
**WordPerfect 8:** WordPerfect 8 lets you add custom colors to regular text.

1. Type your text, select it, right-click it, and then choose *Font* from the menu.
2. In the Font dialog box, select the font and size you want.
3. In the same dialog box, click the *Text Color* icon, then click *More* in the resulting pop-up box.
4. In the Select Color dialog box, click a color close to the one you want in the color wheel, then click in the shading bar to get the exact color. Keep an eye on the 'Current color' box as you work (see **FIGURE 5**).
5. Click *OK* in each dialog box to apply the new color and return to the document.

To change the color later, first select and right-click the text, then choose *Font* from the resulting context menu and repeat steps 3 through 5 above.

**Word Pro 97:** Word Pro 97 makes it easy to choose from a wide variety of stock colors for your text, but selecting a custom color is not at all intuitive.

1. Type your text, then select it and pick a font and font size from the status bar at the bottom of the document window.
2. Click the *Text Color* button on the left side of the status bar.
3. Hold down **⌘** as you click a basic color in the pop-up Color palette.
4. In the Custom Color Selector dialog box, use the slider arrow to the right of the larger color box to fine-tune your color selection, watching the preview box as you work. You can also change the basic color by clicking anywhere in the palette before moving the slider. When you're satisfied, click *Add Color*. Both of the color selection



**FIGURE 5: ENHANCE EVEN REGULAR text prepared in WordPerfect 8 by giving it a custom color.**


palettes will disappear, but your new custom color won't take effect yet.

5. Click the *Text Color* button on the status bar again. You'll find your new color at the bottom of the Color palette. Click it to apply it to your text.

New colors added to the palette in this way will be available on the basic Color palette the next time you start Word Pro.

## A FONT FAREWELL




 I CREATED A DOCUMENT in Word with the font set to 12-point Times New Roman. I then saved it as a .txt file to a floppy disk. But when I opened it the next day, the font had changed to 10 points. No matter what I do to the document, it always reverts to 10-point type when I open it. Can you please help?

*Alnoor Samji, Scarborough, Ontario*

WHEN YOU SAVE a document as a text file in any version of Word, all formatting information is lost, as the programs warn you. When you reopen the text file later, Word uses the default font to display the document. In your case, the default font is Times New Roman in 10-point size. The solution: Save your documents in normal Word format, rather than as text files. That way, you'll preserve all your formatting, including font name and size.



 Find files from this article on PC World Online ([www.fileworld.com](http://www.fileworld.com)). Word Processing welcomes your questions and tips and pays \$50 for published items. Contributing Editor George Campbell is a contributor to The PC Bible (Peachpit Press, 1995). See page 14 for contact information. ■



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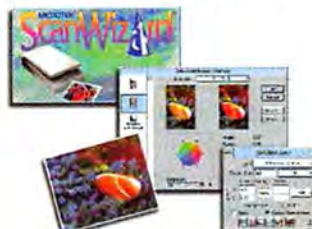
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The ScanMaker X6EL's new push-button design calls up Microtek's new *ScanSuite<sup>™</sup>* utility. ScanSuite's presets let you quickly scan photos or documents and route them to your printer for a quick copy, your fax or email software, or directly to *Adobe Photoshop LE* (included), *Caere OmniPage Limited Edition* OCR (included), or any favorite application you have on your computer. To access even more image controls and effects, ScanSuite also lets you call up Microtek's award-winning *ScanWizard<sup>™</sup>* Twain-compliant scanning software.

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# Reference the Last Cell in an Excel Column

CHIP PEARSON of Kansas City, Kansas, shared a useful formula that returns the contents of the last filled cell in a column. It's handy if you store information that is periodically updated, as in a worksheet for recording daily sales, for example. A formula in that worksheet may refer to the last daily sales amount, but the location of that amount changes every day.

Chip's formula (shown below) returns the last value in the first 50 rows in column C (see the figure).

```
=indirect(address(max((row(1:50)*
(C1:C50<>""))),column(C:C)))
```

This is an array formula, so you must enter it by pressing <Ctrl>-<Shift>-<Enter>.

If your data will occupy more than 50 rows, change the two occurrences of 50. Also, if your data is not in column C, change the column references.

## A BUG IN 1-2-3?



I THINK I'VE FOUND a bug in 1-2-3's @if function. Here's a formula I use:

```
@if(B1="Sold","Yes","No")
```

This formula checks the contents of cell B1, and if it contains the word *Sold*, the formula returns *Yes*; otherwise it returns *No*. The formula works fine, except that it also returns *Yes* when cell B1 is empty. Do you know why?

Michelle Odes, San Diego

monthly sales.xls					
	A	B	C	D	E
1	Date	Sales	Cumulative		
2	09/01/98	6,550	6,550		
3	09/02/98	6,574	13,124		
4	09/03/98	6,602	19,726		
5	09/04/98	6,490	26,216		
6	09/05/98	6,483	32,699		
7	09/06/98	6,456	39,155		
8	09/07/98	6,606	45,761		
9	09/08/98	6,605	52,366		
10	09/09/98	6,612	58,978		
11	09/10/98	6,487	65,465		
12	09/11/98	6,482	71,947		
13	09/12/98	6,532	78,479		
14					
15					
16					

THE FORMULA IN cell E4 uses the Indirect and Address functions to return the contents of the last filled cell in column C.

THE FORMULA is actually working the way it should—1-2-3 equates both text and blank cells to 0. Therefore, an empty cell is equivalent to any text.

One way to avoid this problem is to use a nested @if function that will first check to see if the cell is blank, then check the contents of the cell. The formula below returns *No* if the cell is empty; otherwise, it checks for the text *Sold*:

```
@if(B1="", "No", @if(B1="Sold", "Yes", "No"))
```

## CONVERT IMPORTED VALUES TO ACTUAL VALUES



I OFTEN IMPORT data into Excel from various applications, including Access. I've found that values are sometimes imported as text, which means I can't use them in calculations or with commands that require values. I've tried formatting the cells as values, with no success. The only way I've found to convert the text into values is to reenter the data. Is there an easier way to make these conversions?

Gordon Kraus, Clarksville, Tennessee  
I'VE HAD SIMILAR problems with imported values, as well as with numbers

that are entered with a leading apostrophe (1-2-3's symbol for left-aligning an entry).

Here's a simple way to convert these cells to values. Select any empty cell, enter the value 1, and choose *Edit>Copy*. Select all the cells that need to be converted, then choose *Edit>Paste Special*. In the Paste Special dialog box, select *Multiply*, then click OK. This operation multiplies each cell by 1, and in the process converts the cell's contents to a value.

## Year 2000 Spreadsheet Resources

ARE YOU WORRIED ABOUT what will happen to the dates in your spreadsheets on January 1, 2000?

Microsoft has set up a comprehensive Web site that lists potential year 2000 issues for each of its products (including Excel) at [www.microsoft.com/ithome/topics/year2k](http://www.microsoft.com/ithome/topics/year2k).

For information on how the new millennium will affect 1-2-3, go to [www.lotus.com/home.nsf/tabs/y2k](http://www.lotus.com/home.nsf/tabs/y2k). And if you use Quattro Pro, Corel has compiled a brief FAQ page at [www.corel.com/2000.htm](http://www.corel.com/2000.htm).

## PLAGUED BY THE LAROUX VIRUS?

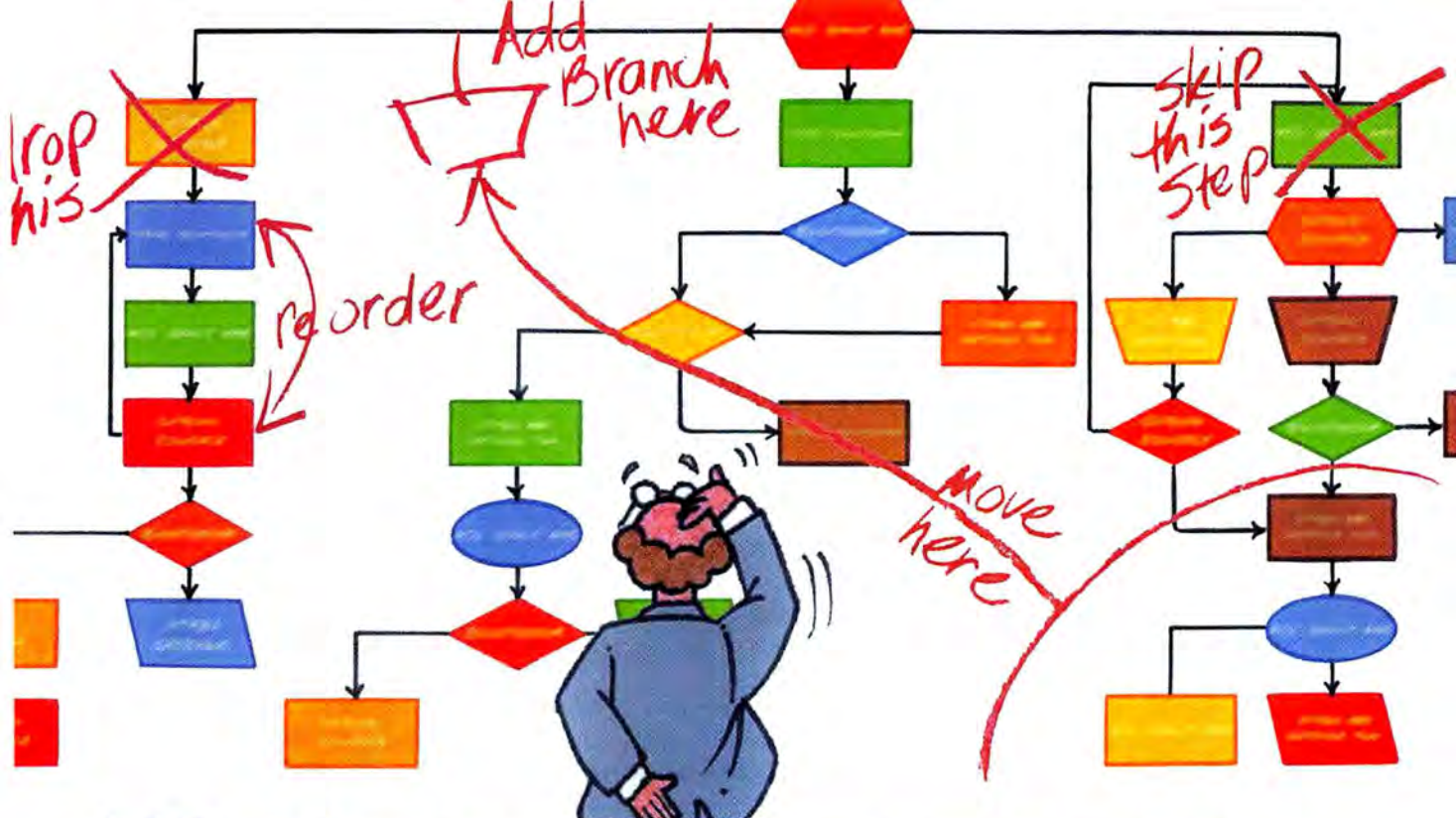
THE LAROUX VIRUS, which attaches itself to files from Excel 5 or later, has been around for years and can spread quickly. There are several variants of this virus, and although they all appear to be basically nondestructive, you should still remove them from your system.

The virus is stored in a hidden sheet and spreads by replicating itself in your personal macro workbook (personal.xls). Once the virus makes its way to the personal.xls file, it spreads to all other Excel files that you open. Another strain of the virus writes a file named pldt.xls in your \xlstart directory.

If you find a pldt.xls file on your system, or notice other strange goings-on—for example, extra sheets or unknown macros listed in the Macros dialog box—there's a good chance your system is infected. Your first line of defense is to get the latest update of your favorite antivirus program and eradicate the virus. All the major antivirus software programs (such as Symantec's Norton AntiVirus and McAfee's VirusScan) can detect and remove the Laroux virus. Performing a virus scan on a regular basis will help you stamp out the virus at an early stage.

Spreadsheet Tips welcomes your questions and tips and pays \$50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen spreadsheet books and maintains The Spreadsheet Page ([www.j-walk.com/ss/](http://www.j-walk.com/ss/)). See page 14 for contact information. ■





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What you need to know about AGP graphics ♦ PC power for world travelers

# Tweak Your Settings to Get the Best Display

THINK LOOKS DON'T count for much? Tell that to anyone who spends hours a day staring at a computer screen. Poor image quality can lead to eyestrain, headaches, choppy business presentations, or (worst of all for you gamers) *total annihilation by monster aliens*. Here's a quick review of image basics for Windows 95 and 98, plus some tips on getting the sharpest possible picture.

## SOME GRAPHIC DETAILS

FIRST, A REFRESHER COURSE on your PC's graphics adapter and monitor:

**Screen resolution** is the number of individual picture elements (pixels) that make up the screen image. The more pixels displayed, the sharper the image. The typical setting for a 14- or 15-inch monitor is 640 (horizontal) by 480 (vertical). A 17-inch monitor can be viewed comfortably at 800 by 600 or 1024 by 768. Most applications work at any setting, but some (especially multimedia titles and games) work best—or only—at one setting.

**Color depth** is the number of colors available for each pixel. It varies with the number of bits of memory allotted per pixel: If 8 bits are allotted, the color depth is 256 ( $2^8 = 256$ ); if 16 bits are allotted, you get 65,536 colors (High Color); and if 24 bits are allotted, you get a whopping 16,777,216 colors (True Color). Most programs look fine with 256 colors, but if you're working with photographs or sophisticated graphics, you'll want at least High Color. To find out how much video memory you need, see "The Color of

RAM" in July's *Answer Line*.

**Refresh rate** is the number of times per second that the graphics card redraws the screen's image. Refresh rates below 75 screens per second (75 Hz) produce an often-imperceptible flicker that can cause eyestrain after long viewing. If your card supports it, 85 Hz taxes your eyes less than 75 Hz. Some cards can be ratcheted up to rates as high as 120 Hz, but unless



## Revive Your Floppy Disk

A FLOPPY DISK can get mangled in a hundred ways. But the magnetic disk containing your data may be fine. Gently take off the metal cover, carefully separate the two halves of the plastic shell, and remove the magnetic media by lightly touching its center. If the media is wet or dirty, rinse it with distilled water and let it dry without wiping. Reinsert it into a new shell and fasten the plastic halves together with tape. You don't need the metal cover. Insert the disk into the floppy drive and copy your data to the hard disk.

you work with very detailed graphics, rates beyond 90 Hz add an unnecessary processing burden.

## LOOKING GOOD

OKAY, YOU KNEW all that. Time to tweak.

You typically set resolution, color depth, refresh rate, and other display parameters from within the Windows Control Panel: Click **Start•Settings•**

**Control Panel**, double-click the **Display** icon (or right-click the desktop and choose **Properties**), and select the **Settings** tab. Your graphics adapter may come with its own utility—a stand-alone application or an enhancement to the Display Settings menu—that you can launch from the Taskbar or by selecting **Start•Programs•**

While you're here, check under the **Settings** tab to verify that Windows 95/98 recognizes the correct monitor type.

In Windows 95, you may have to reboot before changes take effect. To change

color depth on the fly, without a reboot, download and run Quickres, a free utility program available from Microsoft's Web site ([www.microsoft.com/windows95/info/powertoys.htm](http://www.microsoft.com/windows95/info/powertoys.htm)). Windows 98 eliminates this problem.

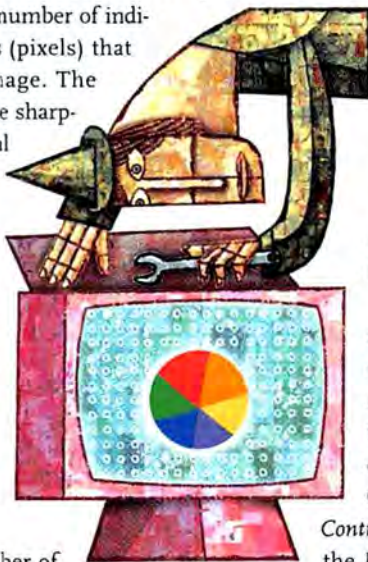
If both your monitor and your graphics card support Plug and Play Display Data Channel—check your documentation to find out—you may not need to set the refresh rate. Windows 95/98 will pick the highest possible rate for your current resolution and color depth. If your monitor doesn't support DDC, you may be able to adjust the refresh rate manually in the Display Settings dialog box or from a utility program supplied by the vendor.

More sophisticated graphics cards may let you adjust other display settings, such as gamma correction, which alters the overall lightness or darkness of the screen image (see **FIGURE 1**).

## DESIGNATE THE RIGHT DRIVER

TO GET THE MOST out of your graphics card, check the manufacturer's Web site to make sure you're using the latest version of its driver. These are constantly being updated. The latest versions are easy to download and install.

Graphics drivers can cause all kinds of PC problems, from scrambled displays to mysterious system reboots. To determine whether a problem is due to your graphics driver, load the plain-vanilla VGA driver and see if the problem disappears: In the Display Settings dialog box, click ►





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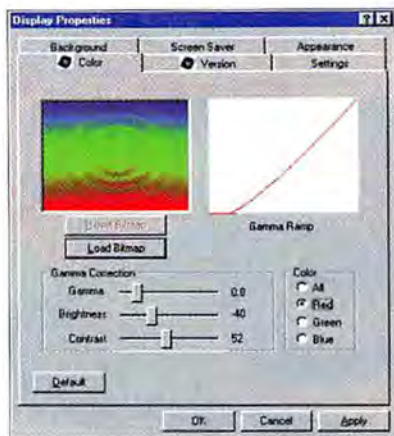
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**FIGURE 1: FANCY GRAPHICS ADAPTERS** let you tweak many display settings.

**Change Display Type.** Click the top *Change* button, select *Show all devices*, and select *Standard display types*.

Windows 95/98 also lets you disable your video card driver incrementally and, at a cost to performance, get up and running: Double-click the Control Panel's *System* icon (or right-click *My Computer* and select *Properties*), select the *Performance* tab, and click the *Graphics* button. You'll see a bar and slider with four settings ranging from 'Full' to 'None.' Moving the bar a notch to the left eliminates mouse troubles; two notches overcomes minor graphics problems; and three bypasses your graphics accelerator. But none of the settings produces results as good as you'd get from having a fully compatible driver.

Windows 98 brings a new driver model designed for compatibility with Windows NT. If you upgrade to Windows 98 but it doesn't support your adapter, you may have to reinstall your Windows 95 driver.

## MONITORING BEHAVIOR

ALL MONITORS PERMIT a few basic adjustments that can improve image quality. To perk up a dull image on an older monitor, set contrast and brightness to their maximums. Then find a patch of solid black on your screen and slowly reduce brightness until the patch is deep black.

If you see distortions on parts of the screen, hit the degauss button on your monitor's control panel.

To fine-tune your monitor, try using the \$79 DisplayMate for Windows from Son-

era Technologies. The program effortlessly guides you through numerous tests and screen adjustments. Sonera's Web site contains a useful demo that lets you set your monitor's contrast and brightness.

## ZAP! BIFF! POW!

THE BIGGEST RECENT changes in graphics hardware are fueled by 3D games. To play with 3D, you need a card with a 3D accelerator (see "Whiz-Bang Graphics: Top AGP and PCI Boards," August). Most new graphics cards come with 3D acceleration. But if you don't want to give up your old card, you can add a complementary 3D-only board like the original \$100 Monster 3D from Diamond Multimedia. For superfast 3D performance, try the new Monster 3D II, for \$249.

Meanwhile, Intel has rolled out the Accelerated Graphics Port, a specialized bus with a dedicated high-speed graphics card slot. The current version—AGP 2X—can move data four times faster than the PCI bus (see **FIGURE 2**).

If your PC didn't come with AGP, don't worry about it—yet. *PC World* tests have detected little difference in performance between AGP-based and PCI-based cards for a number of games and applications; that's because this software doesn't exploit AGP's higher transfer speeds and use of main memory for storing textures. But you'll see more games and business apps optimized for AGP in the near future.

Keep in mind the different versions of AGP. The next generation, AGP 4X, should start showing up early next year, but 4X cards won't work in 2X slots. If you already have an AGP motherboard and are buying an AGP graphics card, make sure it supports AGP 2X. Some AGP cards on the market deliver only AGP 1X.

## ACHIEVE WORLD POWER



I'LL BE TRAVELING throughout Europe and Asia on business for the next several months, and I'll need to use my laptop every day. Any suggestions on what accessories I should take to make sure I can plug in anywhere?

*E. J. Pidar, New York City*

TAKE AT LEAST one extra battery pack and keep it charged at all times. There's no

GRAPHICS CARD CONNECTOR	Maximum data rate (MB/sec)
PCI	132
AGP 1X	264
AGP 2X	528
AGP 4X	1056

**FIGURE 2: ACCELERATED GRAPHICS PORT** cards boost performance—at least in theory.

doubt that you'll need it sooner or later.

Fortunately, most recently-made laptop battery chargers can handle 110V or 220V. Just don't forget to switch to the correct voltage setting, if your charger has one.

Power surges can happen anywhere you go. So you'll probably want to get a surge protector that includes connectors for both power and phone lines, like the \$15 TravelSurge from Woods.

You'll also want an assortment of three-pin grounded adapters for plugging into the various wall sockets you'll encounter. In Europe, for example, most countries use a common adapter type, but you'll need different adapters for Great Britain, Italy, and Switzerland. Happily, a company called Travel Essentials makes all the accessories you're likely to need, and even maintains a toll-free help line for advice about what you'll need where.

*Kirk Steers is a PC World contributing editor. Hardware Tips welcomes your questions and pays \$50 for published items. See page 14 for contact information.* ■

## Adapter accessories

various prices; Travel Essentials; 800/268-5157  
INFONET NO. 606

## DisplayMate for Windows

\$79; Sonera Technologies; 732/747-6886;  
www.displaymate.com

INFONET NO. 607

## Monster 3D

\$100, and Monster 3D II, \$249; Diamond Multimedia; 800/468-5846; www.diamondmm.com

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# Put It All on a Tape Backup Drive

PSST, HERE'S SOME great advice: *Back up your data.*

Heard that before, eh?

Yes, it's probably second only to *eat your vegetables* as good advice that's often ignored.

But you ignore it at your peril. Hard drives have grown vastly more reliable, but they can still fail.

And everyone occasionally erases crucial files—a problem that becomes particularly common if a coworker or family member shares your PC.

Tape drives remain an excellent choice to back up all your data and applications. They're not as fast as removable-cartridge drives, but they can accommodate the contents of today's big hard drives, letting you back up everything in one fell swoop. Also, tape cartridges are much less expensive than removable cartridges. And the latest tape drives come with emergency

recovery software that allows you to restore data from your backup tape without having to reinstall Windows 95 first—a major hassle in the past.

When picking a drive, your first consideration should be cartridge capacity. Note that capacity is measured in terms of *compressed* data. The backup software that comes with the drives compresses the data as it backs it up, with an average compression ratio of 2 to 1. (Compressed files such as .zip files or DriveSpace files won't be further compressed.) So a drive rated

**1 Hook up a parallel-port tape drive.** Enter your PC's system setup (details vary by manufacturer). Make sure your PC's parallel port is set for Enhanced Parallel Port mode. Some setups, like the one shown here, offer a combined ECP/EPP mode. That's fine, too.

Shut down your PC. If you have a printer attached, disconnect the printer cable from the parallel port.

Connect one end of the cable that came with your tape drive to your PC's parallel port, the other to the appropriate connector on the rear of the drive.

If you have a printer, connect your printer cable to the printer port on the tape drive.

Hook up the power connections on the rear of the tape drive and plug the power supply into an AC socket.

Now skip to Step 3.

```

ROM PCI/ISA BIOS ((PSHX-B))
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IDE HDD Block Mode      : Enabled
PCI Slot IDE 2nd Channel : Enabled
On-Chip Primary PCI IDE  : Enabled
On-Chip Secondary PCI IDE: Enabled
IDE Primary Master PIO   : Auto
IDE Primary Slave PIO    : Auto
IDE Secondary Master PIO  : Mode 3
IDE Secondary Slave PIO   : Auto

Onboard FDD Controller   : Enabled
Onboard Serial Port 1    : 3F8/IRQ4
Onboard Serial Port 2    : 2E8/IRQ3
UART 2 Mode              : Standard
Onboard Parallel Port    : 378H/IRQ7
Onboard Parallel Mode    : ECP/EPP
ECP Mode Use DMA         : 3
Parallel Port EPP Type   : EPP1.9
    
```



```

ESC : Quit          |I-- : Select Item
F1  : Help          |PU/PD/+/- : Modify
F5  : Old Values    |(Shift)F2 : Color
F6  : Load BIOS Defaults
F7  : Load Setup Defaults
    
```

**2 Hook up an internal EIDE tape drive.** Some internal drives require that you install their software before you install the drive. Read the instructions that come with your drive carefully before you start.

Turn off your PC and remove the cover.

Figure how you'll connect the data cable. Don't use the extra connector on the data cable that's connected to your PC's hard drive (the primary EIDE channel), since that might slow down your PC. Instead, use the secondary EIDE channel (the middle connector shown below in A).

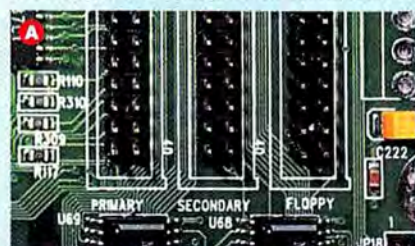
If a CD-ROM drive or other device is already attached to the secondary EIDE connector on the motherboard, set the tape drive

jumpers to "slave" (B). Otherwise, set the jumpers to "master."

Mount the drive in your PC (C). If there's no front-accessible 3.5-inch drive bay available, look for mounting adapters for 5.25-inch drive bays, which come with most drives.

If another device is attached to the secondary EIDE connector, attach the tape drive to that data cable's extra connector. If not, connect the cable that came with the drive to the secondary EIDE connector. Either way, make sure the colored side of the cable is aligned with the drive's Pin 1 (usually next to the power connector).

Find a free power connector and plug it into the drive.





at 8GB physically holds only 4GB. You can choose not to compress data, but that slows down the backup process.

Plan for expansion when you choose your drive. You may have a 2GB hard drive now, but if you're considering upgrading it in the future, buy a tape drive that'll handle the bigger capacity. (Yes, you can use multiple tapes to back up a big hard drive, but it's a pain.)

Prices of tape drives, like those of all PC hardware, just keep falling. You can find drives in the 2GB-to-3GB range for \$120 to \$160, while 4GB-to-6GB drives usually sell for around \$200. And 8GB drives, which are becoming the standard for PCs with large drives, cost roughly \$250. Major brands for desktop tape backup

drives include Hewlett-Packard ([www.hp.com](http://www.hp.com)), whose Colorado 8GB external drive is pictured below in Step 1; Iomega ([www.iomega.com](http://www.iomega.com)); and Seagate ([www.seagate.com](http://www.seagate.com)), whose TapeStor 8GB internal drive is shown below in Step 2.

Travan tape cartridges from Imation ([www.imation.com/dsp/travan/index.html](http://www.imation.com/dsp/travan/index.html)) are the standard for desktop backup. Cartridge prices start at about \$17 per tape for lower capacities, and reach a maximum of about \$28 each for the 8GB tapes. You can't beat this price—way less than a penny per megabyte.

Tape drives for desktop PCs come in external parallel-port and internal EIDE versions. (SCSI tape drives offer greater speed and storage capacity, but they cost

much more and are designed primarily for network servers.) External drives are the simplest to install and can be moved easily between PCs, but they're slower—about one-half to one-quarter the speed of internal drives. Performance varies by product model, but you can figure on 20MB to 40MB per minute for parallel-port drives, and 40MB to 60MB per minute for EIDE drives.

Installing tape drives is straightforward. Here are steps for installing both parallel-port and internal drives. Once you're done, be sure to perform those regular backups—and eat your vegetables!

*Stan Miastkowski is a PC World contributing editor.*

**3 Install the software.** Turn on your computer and install the software that came with your tape drive. Installation procedures vary by manufacturer and drive type. Carefully follow the software's on-screen directions.

If you installed an internal EIDE tape drive, Windows 95 should automatically detect it at start-up and install the required software. (You may be asked to insert your original Windows 95 CD-ROM.)

For parallel-port drives, the software should automatically install all required drivers. You may be asked to restart your PC after the installation process is finished.

If the installation software can't find the tape drive, select **Start\*Settings\*Control Panel**, double-click the **System** icon, and click the **Device Manager** tab. If an exclamation mark appears next to your new drive, go to **Start\*Help**, search for hardware troubleshooter, and follow the directions. If you still can't get the drive to work, it's time to call your friendly tech support representative.

If you're using Windows NT, you will need to manually install a driver for the tape drive. The Windows NT Installation CD-ROM comes with drivers for most tape drives, but you may need to use a custom



driver. Check to see whether a Windows NT driver came with the tape drive. If this is not the case, don't worry—you should be able to download the driver from the vendor's Web site.

When you have the driver, select **Start\*Settings**, then choose **Control Panel** and double-click the **Tape Devices** icon. Follow the resulting directions.



**4 Start backing up.** Use your backup software to create emergency restore disks and perform a complete backup. And stick to a schedule—a backup is effective only if it's up-to-date. For even greater peace of mind, keep a copy off-site.







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#11247	TP560X	233MHz MMX*	32	4GB	—	12.1" TFT	—	'2,949

### NEW ThinkPad 600

Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#30320	TP600	233MHz MMX*	32	3.2GB	—	12.1" TFT	—	'2,659
#30322	TP600	PII233MHz	32	3.2GB	10-24X	13.3" TFT	56K	'3,809
#30323	TP600	PII266MHz	32	4.0GB	10-24X	13.3" TFT	56K	'4,379

### ThinkPad 770

Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#30325	TP770E	PII266MHz	32	5.1GB	—	14.1" TFT	33.6K	'4,299
#30327	TP770E	PII266MHz	64	8.1GB	DVD	14.1" TFT	56K	'5,519

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Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#31320	280DX	233MMX*	32	3.2	20X	12.1" DSTN	56K	'1,499
#30986	770TX	200MMX*	32	3.2	20X	12.1" TFT	56K	'1,799
#30987	790TX	266MMX*	32	4.0	20X	12.1" TFT	56K	'2,499
#30985	690TX	266MMX*	32	4.0	20X	12.1" TFT	56K	'3,299

\*Pentium® processor with MMX™ technology.

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#31672	266MHz MMX*	32	3.2GB	—	TD	Win® 95	'959
#31673	PII 266MHz MMX*	32	3.2GB	—	TD	Win® 95	'1,069
#31808	PII 300MHz MMX*	32	3.2GB	24X	TD	Win® 95	'1,349

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#31655	PII 333MHz MMX*	32	3.2GB	DT	Win® 95	'1,579
#31657	PII 350MHz MMX*	32	6.4GB	DT	Win® 95	'1,735
#31669	PII 300MHz MMX*	32	3.2GB	DT	Win® 95	'1,519

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#32542	Celeron 300MHz MMX	64MB	8GB	32X	56K	'1,099*
#32544	300MHz PII	64MB	8GB	32X	56K	'1,299*
#32546	350MHz PII	64MB	8GB	DVD	56K	'1,899*
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#32274	1573MDT	233MHz MMX*	32	3.2GB	20X	12.1" DS	56K	'1,999
#33235	1700 PII	266MHz MMX*	32	4.0GB	24X	13.3" TFT	W56	'2,519

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Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
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#33230	1700 PII	233MHz MMX*	32	4.0GB	24X	12.1" TFT	W56	'2,889
#33235	1700 PII	266MHz MMX*	32	4.0GB	24X	13.3" TFT	W56	'3,369

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#31072	7800 PII	266MHz MMX*	64	5.0GB	20X	13.3" TFT	33.6K	'4,809
#31073	7800 PII	266MHz MMX*	64	5.0GB	20X	13.3" TFT	—	'4,819

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#27412	656153U	PII300	32MB	4.2GB	16X	'1,229
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#27417	659154U	PII300	32MB	4.2GB	—	'1,309
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#27407	656132U	PII266	32MB	2.5GB	—	'1,059
#27408	656134U	PII266	32MB	4.2GB	—	'1,109
#27409	656135U	PII266	32MB	4.2GB	—	'1,159
#33325	656138U	Celeron® 300	32MB	3.2GB	—	'1,099
#33326	627544U	PII333	32MB	3.2GB	—	'1,709
#33327	627555U	PII350	32MB	3.2GB	—	'1,959
#33328	627556U	PII350	64MB	3.2GB	—	'2,049
#33329	627566U	PII400	64MB	6.4GB	—	'2,339

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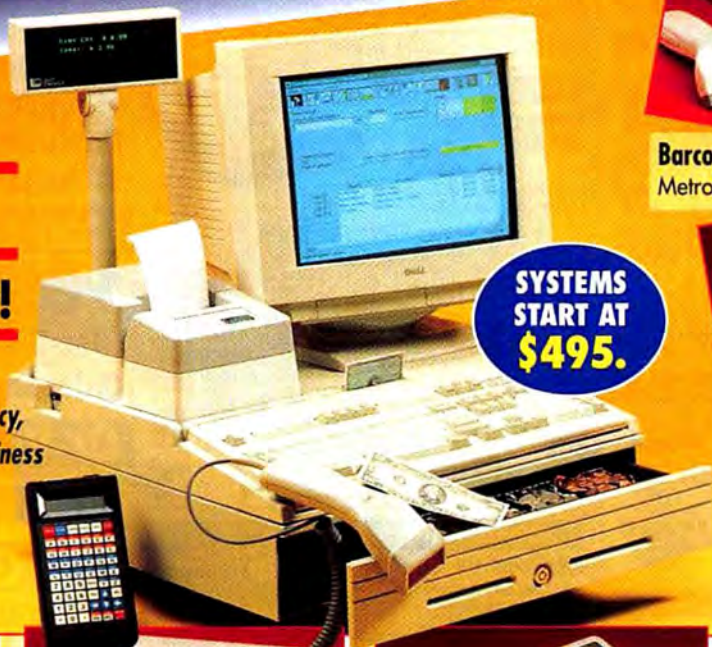


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100CT 166/MMX 32MB 2GB 7.1" AM .....1897.36

#### Satellite & Satellite Pro notebooks

320CDS 233/MMX 32MB  
4.1GB 12.1" DS 20X .....1629.89

4.1GB 12.1" AM 20X .....1997.86

440CDS 133/MMX 16MB  
1.34GB 12.1" DS 10X .....1297.68

470CDS 200/MMX 32MB  
2.1GB 12.1" AM 10X .....2347.56

480CDS 233/MMX 32MB  
3.8GB 12.1" AM 10X .....2587.36

490CDS 233/MMX 32MB  
4GB 12.1" AM 20X .....2896.25

490XCD 266/PPII 32MB 4GB 12.1" AM .....3367.82

#### Tecra notebooks

530CDS 166/MMX 32MB  
3.8GB 12.1" AM 10X .....3067.52

550CDS 266/MMX 32MB  
3.8GB 12.1" AM .....3847.63

740CDS 166/MMX 16MB  
3GB 13.3" AM 10X .....2637.86

750CDS 133/MMX 32MB  
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780DVD 266/MMX 64MB  
5.1GB 13.3" AM DVD .....4754.23

780DVD 266/MMX 64MB  
8.1GB 13.3" AM DVD .....5137.26

#### Portege notebooks

320CT 266/MMX 32MB 3.8GB 10.4" AM .....2857.26

### Acer

#### Extensa notebooks

393C 166/MMX 16MB 2GB 12.1" DS 20X .....1157.23

#### TravelMate notebooks

7120T 200/MMX 32MB 3GB  
12.1" AM 20X .....2694.62

7130TE 233/MMX 32MB 3GB  
13.3" AM 20X .....3197.89

7164TE 266/MMX 32MB  
4.1GB 13.3" AM .....3657.18

### COMPAQ

#### Armada notebooks

1571DM 200/MMX 32MB  
3.2GB 12.1" DS 20X .....1857.36

1598DMT 266/MMX 32MB  
4GB 13.3" AM .....2847.35

4220T 266/MMX 32MB 4GB 12.1" AM .....2817.46

7770DMT 233/MMX 32MB  
3GB 12.1" AM 20X .....3137.11

7792DMT 266/MMX 32MB  
5GB 13.3" AM 20X .....3967.26

7800 266/PPII 64MB 5GB 13.3" AM 20X .....4567.23

7800 266/PPII 64MB 5GB 13.3" AM 20X .....4727.56

### HP

#### HP OmniBook notebooks

800CT 166/MMX 16MB 2GB 10.4" AM .....3679.68

3000CTX 200/MMX 16MB  
2.1GB 13.3" AM .....2397.18

5700CT 166/MMX 16MB  
1.86GB 12.1" AM .....1867.29

### Armada 1700



### COMPAQ

2937.56  
CDW 118016

233MHz Intel Pentium® II processor + 4GB hard drive + 32MB RAM standard + 12.1" active-matrix display + 24X Max CD-ROM drive + Integrated 56K bps (K56flex) modem + Windows® 95

AM = active-matrix color display DS = dual-scan color display

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266/PPII 32MB 3.2GB .....1047.87

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333/PPII 32MB 3.2GB 24X .....1457.45

350/PPII 64MB 6.4GB 24X .....1787.23

400/PPII 64MB 6.4GB 24X .....1937.65

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266/PPII 32MB 4.2GB .....1397.55

400/PPII 64MB 6.4GB 32X .....2287.89

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400/PPII 64MB 4.2GB 32X .....2297.88

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IBM Business Partner

**\$1237.55**  
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Monitor sold separately

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- Windows® 95

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#### HP VE Series desktops

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266/Celeron 32MB 2.5GB 10/100 .....998.87

#### HP VE Series mini-towers

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266/Celeron 32MB 3.2GB 32X .....1098.68

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266/PPII 32MB 4.3GB 24X .....2057.25

#### HP VL Series mini-towers

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266/PPII 32MB 4.3GB 24X .....1398.55

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#### Entra 3000 Series

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233/MMX 32MB 4.3GB 24X 56K bps .....778.46

#### Flex 4000 desktops

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233/MMX 32MB 4.3GB 32X .....887.10

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COMPAQ

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- 56K bps (V.90) modem

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10BASE-T ISA Ethernet adapter	22.05
10BASE-T ISA Combo Ethernet adapter	23.36
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10BASE-T Ethernet Combo PC Card	79.33
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333/Pii 64MB 4 2GB	2887.45

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266/Pii 64MB 24X RAID	2998.25
6300 Pii 64MB 24X	2598.75
6300 Pii 64MB 24X Hot Swap	2887.65
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350/Pii 32MB 32X	2947.75

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266/Pii 64MB 24X	2278.55
266/Pii 64MB 4 3GB 24X	2768.25
333/Pii 64MB 24X	2788.22
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4-port 10BASE-T hub	35.52
4-port 10BASE-T hub w/BNC	40.42
8-port 10BASE-T hub	56.42
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8-port 10BASE-T hub w/BNC, AU	77.16
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4-port 100BASE-T hub	89.63
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Remote Access ISDN Router	279.57

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EtherEZ 10BASE-T PC Card	124.44
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EtherEZ 8-port Ethernet hub	69.87
EtherEZ 16-port Ethernet hub	147.73

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SparQ 1GB external	199.99
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Microtek EyeStar videorecording camera	99.89
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Stylus Color 600	199.00
Stylus Color 800	299.00
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HP DeskJet 694C color printer	239.00
HP DeskJet 722C color printer	299.00
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Sony Multiscan 400PS 19" (18" view) 0.25-0.27mm	969.61
ViewSonic E771 17" (16" view) 0.27mm	384.62
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ViewSonic G790 19" (18" view) 0.26mm	609.83
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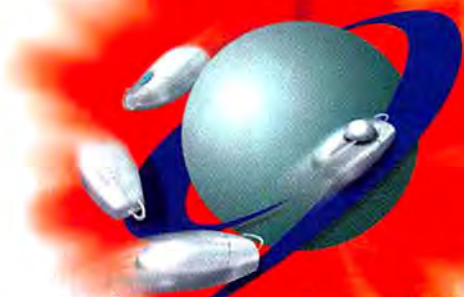
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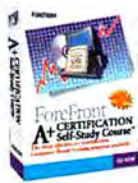
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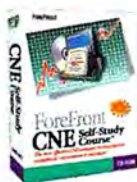
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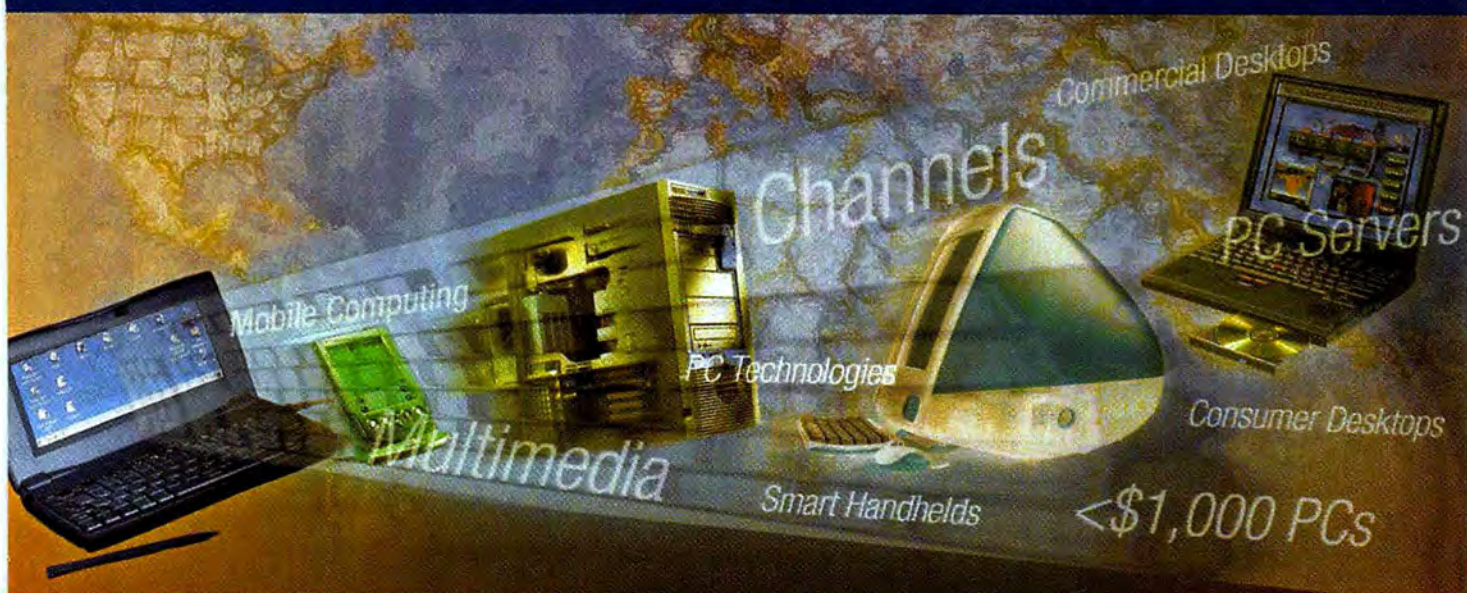
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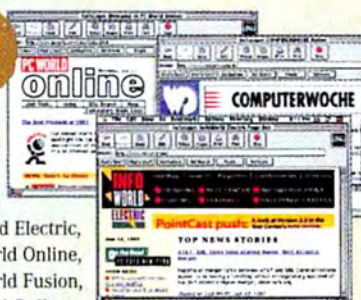




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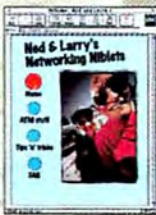
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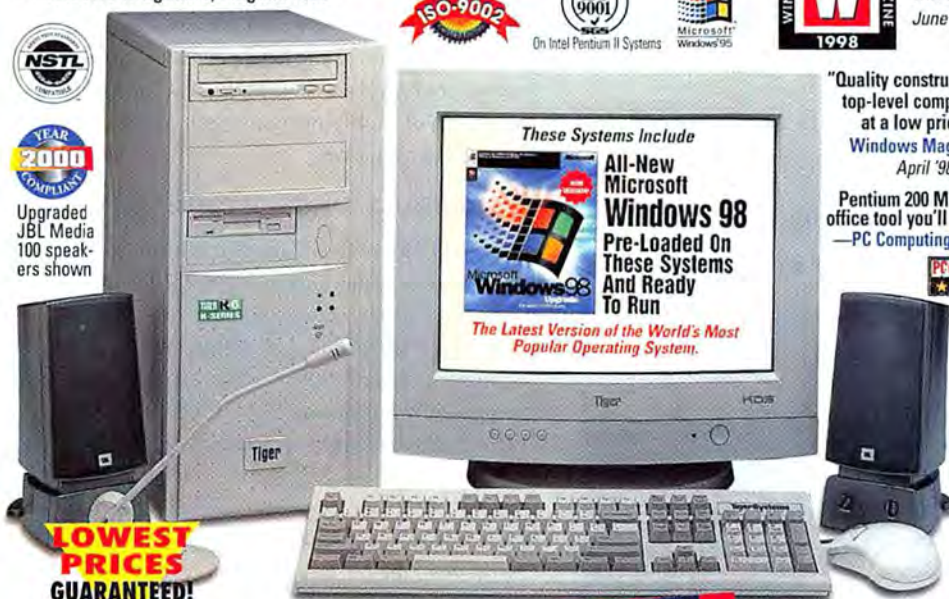
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# How Much Privacy Do You Really Want?

THE ONE SURE THING about privacy in the United States is that you don't have much of it. Unless you deal only in cash, refuse to drive, and make all your calls from pay phones, your preferences, habits, and financial profile are fair game for anybody who wants to know about them. Here as elsewhere, the Internet is merely an extension of the rest of life, where privacy has become a casualty of

a capitalist paradise where we trade personal information for cash, convenience, and goodies.

It's not always a bad trade. When I refinanced my house a few months ago, the bank trusted me with a sizable sum based on data about me it bought on the open market. But that was possible only because I long ago gave up any pretense that my finances were private. Agreements I accepted let lenders share my personal data with just about anybody. The alternative—passing up credit entirely—is impractical in a world where plastic money is a virtual necessity.

## DIG AND YOU SHALL FIND

ANY REPORTER KNOWS how much information can be unearthed with a little digging. In hours, you can find out everything about your neighbor, from the price she paid for her house to her run-ins with the law. The difference in the digital age is that more data is available, it's easier to sort and store, and keeping it to yourself is impossible.

The worst part is that your privacy is eroding without your knowledge. Take that toll-free call you just made: Even if you block Caller ID, the other party can tell where you're calling from. Sure, that can let a database identify you as a repeat customer and speed up the transaction. But nobody tells you it's happening, and you can't do anything to stop it.

On the Net it's even harder to know who has access to your personal data, and any information you provide can be instantly retransmitted. Give out your e-mail address, and it's likely to become a publicly traded commodity. That's why I detest having



We Americans may think we **cherish** privacy, but we're too **willing to swap it** for bargains or convenience.

to supply one in exchange for information, as Microsoft demands on its support site.

The privacy of e-mail hinges on the honesty of strangers. What else stops the system administrator at your Internet service provider from sifting through your messages, except fear of getting arrested or, more likely, getting fired? At most workplaces, the e-mail system belongs to the corporation, so the boss can snoop around correspondence you consider private—and with the help of high-powered search tools, do it years after you leave.

## YOU: JUST ANOTHER COMMODITY

IN THIS ERA of free-market capitalism, where your dossier is just another set of salable information, only laws and encryption are likely to help you retain a modicum of privacy. But don't hold your breath. Most privacy laws will be opposed by businesses that want to market to ever-narrower targets—in other words, most of them. The sensible Smith junk e-mail bill (H.R. 1748) would work like the junk fax law that restored sanity to our fax machines. But as I write this, the bill has met with lukewarm response. And though strong encryption could keep private correspondence private, the government is still demanding a back door, a gaping hole that would render encryption useless.

Technology may someday offer cashlike electronic payments that can't be traced to the buyer. Consumers could boycott companies that refuse to protect their privacy. But social, commercial, and technological history in America suggest a future with less privacy, not more. Even those who pay cash for groceries blithely accept cards that track their buying habits in exchange for a few cents off a six-pack. Because I use a credit card in pursuit of frequent-flyer miles, my travel

patterns and purchasing preferences are an open book.

The rules are different in Europe, where permission is required before data about you can be sold. And European law may well spur us to adopt stronger privacy protections. We Americans may think we cherish privacy, but we're too willing to swap it for bargains or convenience. Until that attitude changes, the best way to think about privacy is to behave as though you don't have any.

PC World Contributing Editor Stephen Manes has been writing about computers and their discontents for more than 15 years. He is coauthor of *Gates*, a biography of Microsoft's chairman. ■



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