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PC WORLD TOP 100! PCs, MODEMS, AND MORE!

PC WORLD

JUNE 1997 $5.95

Internet Explorer 4.0
Sneak Peek, *plus* Windows 97: Ready or Not?

Personal Printers
Color Is Red-Hot! Best Buys from Under $300

Internet Phones
Our Tests Reveal Which Ones Work—And Which Don't

FIRST LOOK!

Pentium II

VERSUS

MMX

VERSUS

AMD

We Test New 233- and 266-MHz PCs to Find Your Next Best Buys

Fortunately, some notebooks are more versatile than others, too.

Are you often called on to do the job of five people? If so, you're precisely the kind of person who can benefit from an NEC Versa® notebook. Take the Versa 6050, for example. Thanks to its patented VersaBay™ slot with interchangeable components, you can customize the exact notebook you need, when you need it. So let's say you want to get some work done on an airplane. Simply add an additional battery. Need space to download large documents? Just slide in the extra hard drive. You can even watch a movie by adding the 10X CD-ROM reader.

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- 32-bit PC CardBus and Zoomed video support
- Internal 33.6Kbps data/fax/voice modem
- VersaBay capability
- Desktop docking station (opt.)

NEC Versa 6050

The top-of-the-line Versa 6200 offers all that, and more. In addition to its VersaBay slot, it boasts a huge 13.3" display (the largest available in a notebook), making it perfect for presentations or viewing and working with large amounts of information.

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- VersaBay capability
- Desktop docking station (opt.)

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- 133MHz Pentium Processor or 150MHz Pentium Processor with MMX Technology
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- 1.44GB removable hard disk drive upgradeable to 2.0GB
- 16MB EDO DRAM upgradeable to 80MB; 256K L2 Cache
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- 16-bit stereo sound and speakers
- 33.6Kbps data/fax modem PC card (150MHz models)

NEC Versa 2600

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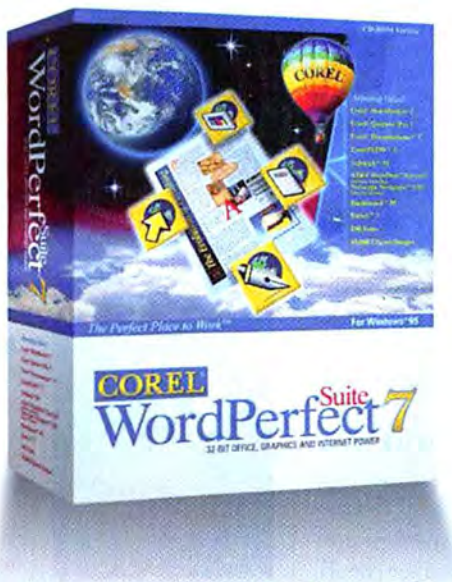

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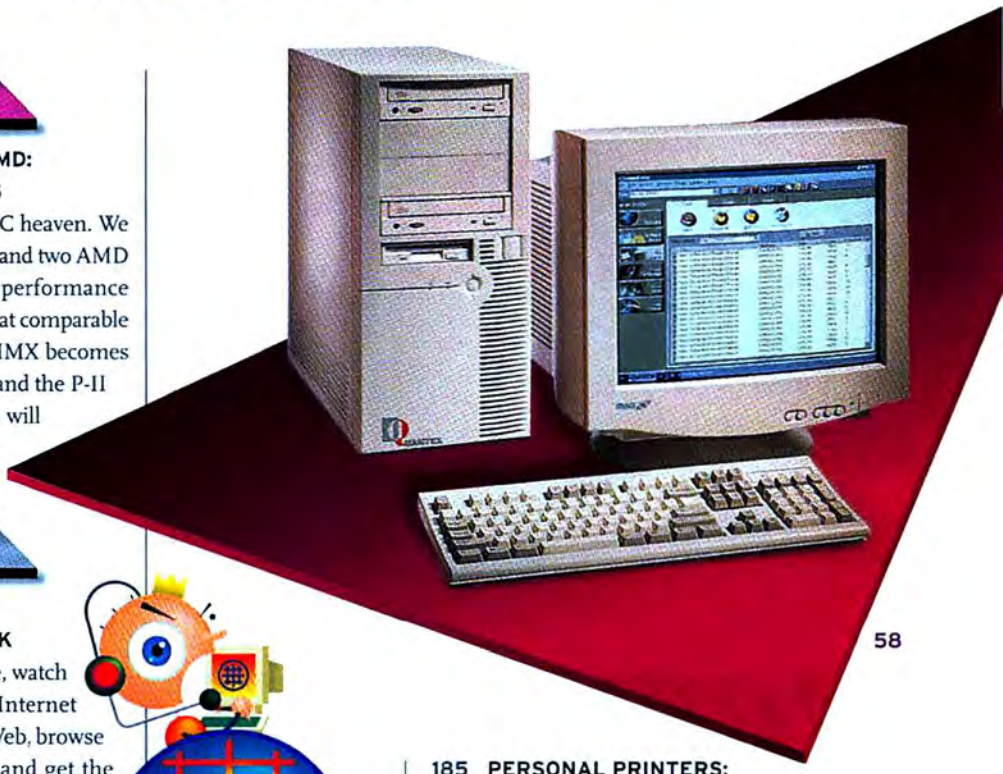
JUNE

VOLUME 15 ◆ NUMBER 6

COVER STORY

58 PENTIUM II VS. MMX VS. AMD: THE NEW POWER PLAYERS

It's like we died and went to PC heaven. We tested six Intel Pentium II PCs and two AMD K6 systems and found a big performance jump over current Pentiums—at comparable or even lower prices. As the MMX becomes the entry-level CPU of choice and the P-II the ultimate power processor, will the K6's price/performance advantage make it a hit?

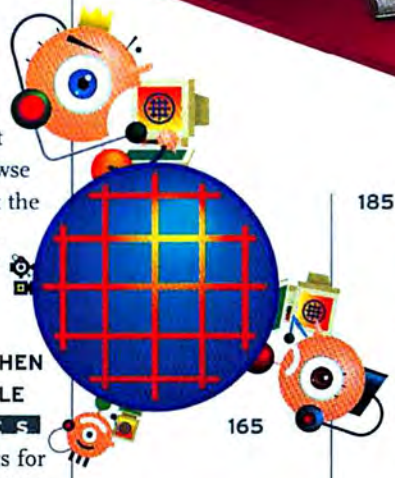


58

FEATURES

135 INTERNET EXPLORER 4.0: THE EMPIRE STRIKES BACK

PREVIEW Netscape, watch out: Microsoft's latest Internet suite lets you surf the Web, browse your hard disk, read e-mail, and get the news—all from inside your browser. Will IE 4.0 change the way you work? Plus a peek at the next Windows.



165

152 PC RELIABILITY AND SERVICE: WHEN BAD PCS HAPPEN TO GOOD PEOPLE

CONSUMER ISSUES

Dead PCs, defective parts, long waits for help—it could happen to you, just as it did to half of the 13,500 respondents in our reliability and service survey. Here are ratings for PC manufacturers, plus tactics to keep you from ending up with a system that's a bust.

165 INTERNET PHONES TAKE ON MA BELL

REVIEW Tired of paying through the nose for long distance? Internet phones let you call anywhere for virtually nothing. We dialed in using nine popular packages, and while the audio quality can't compare to a real phone's, one easy-to-use Best Buy is the next best thing to Ma Bell.

152

Additional material available on PC World Online: www.pcworld.com

185 PERSONAL PRINTERS: GOOD, CHEAP COLOR

REVIEW Personal printers are exploding with higher-quality color—but price tags remain down to earth. In this latest personal printer roundup, we find Best Buys for business and home among the 11 color and 11 monochrome models we tested.

SPECIAL REPORT

THE WEB AND YOUR BUSINESS

119 REAL SERVERS, REAL CHEAP

Tired of having your department, small business, or Web site limp along on an underpowered server? You need more than a converted standard PC to provide network service. Check out these Top 5 sub-$6000 network servers that aced our updated server tests.

COVER *Photography by Stan Musilek*

ICONS: JEFFREY PELO

TOP OF THE NEWS

64 **E-MAIL, VOICE MAIL, FAX FROM ONE IN-BOX? IT'S GETTING CLOSE**
Universal in-boxes for small offices fall just short of total one-stop communications, but options include sub-$200 products as well as services for less than $30 a month. Do they deliver?

185

68 **EASIER, CHEAPER RECORDABLE CDS BREAK THE MOLD**
Want to burn your own CDs? Once-pricey CD-R drives now cost a third of what last year's models did, and recordable discs are less than a penny per megabyte.

72 **BROWSER: SITES FOR MANAGERS**
Managing employees and resources, speechwriting help, and dealing with stress.

NEW PRODUCTS

82 Hewlett-Packard Vectra VL and XA Series
83 Recompute Business Pro P-90, Pentium-90
84 Digital HiNote VP 575, IBM ThinkPad 385D
88 Color 45/101st 19-inch monitor
88 Hewlett-Packard DeskJet 672C
92 Hercules Stingray 128/3D
92 Diamond FirePort 40 2.1GB Hard Drive Kit
94 Canon PowerShot 350, Kodak Digital Science DC120 Zoom
94 ProComm RapidRemote for Windows 95
96 HP 320LX palmtop PC
96 Windrenalin acceleration software
100 Print Shop PressWriter
100 i publish desktop publisher
107 Dr Solomon's Anti-Virus, PC-cillin II, VirusScan 3.0
110 LotusMail 4.5 Internet mail
112 Maximizer 97is contact manager
113 Adobe PageMill 2.0
114 Astound WebCast Personal

199

119

134

82

TOP 100

199 **PCS BREAK THE $1000 BARRIER**
We tested dirt-cheap systems from Everex, Packard Bell, and Vektron to see if they have the stuff to make it into our Budget Top 20. Other trends this month: MMX PCs arrive en masse, and the first 56-kbps modems invade our Modems chart.

204 **POWER DESKTOPS**
TOP 20 Pay a little more and go straight to the P-200s on our Power Top 20. One great debut: the zippy P5-200, Gateway 2000's first MMX PC—a home system with a generous software package.

214 **BUDGET DESKTOPS**
TOP 20 With more 200-MHz PCs rolling out, prices for Pentium-133s and -166s are dropping. A surprise performer: the Polywell Poly 500QX, based on AMD's K5-PR166 chip. Designed to be as fast as a P-166, it's nipping at the heels of some P-200s.

222 **NOTEBOOKS**
TOP 20 We tested a slew of notebooks—from the heavy-duty MMX-powered Dell Latitude LM M166ST to the light IBM ThinkPad 560 with its slim silhouette.

232 **WIN A CYRIX 6X86-P166+ PC**
CONSUMER FEEDBACK
How satisfied are you with your PC? Fax in this survey for a chance to win a CyberMax Cyrix Max C3 P166+, a Top 20 PC.

235 **PERSONAL PRINTERS**
TOP 10 Brother's HL-720 and Epson's Stylus Color 600 join the HP printers at the top of our latest charts.

237 **15-INCH MONITORS**
TOP 10 Superb displays help the Nokia Multigraph 449Xa and the Panasonic PanaSync/Pro P15 make this month's Top 10.

239 **GRAPHICS BOARDS**
TOP 10 *Hasta la vista*, baby: Hercules' Terminator 3D/DX muscles to the top.

241 **EXTERNAL AND PC CARD MODEMS**
TOP 10 56-kbps modems are here! U.S. Robotics' Courier V.Everything 56k and Sportster 56k Faxmodem make the chart.

HERE'S HOW

260 ANSWER LINE
Find out what's slowing down your modem; check how much RAM your applications are using; get DOS games going in Windows.

268 WINDOWS TIPS
Clean up useless readme and help files; point your program to the right folder.

274 SPREADSHEET TIPS
Put your calendar in a Microsoft Excel worksheet.

278 WORD PROCESSING TIPS
Format dates in Word, WordPerfect, and Word Pro; fix messed-up menus in Word 97.

282 DATABASE TIPS
Create a summary report from related Access databases.

286 INTERNET TIPS
Download Internet files by using only e-mail; encrypt and protect your e-mail.

290 HARDWARE TIPS
Set up your PC to back up and recover data efficiently on your hard drive.

292 MULTIMEDIA TIPS
Go from your PC to TV in just a few simple steps.

294 UPGRADE GUIDE
Add speedy SCSI peripherals to your PC, step-by-step.

49

260

250

@HOME

243 @HOME PRODUCTS
A CD that dissects your body; a tuner that turns your desktop into a TV; Post-its that stick to your screen.

244 KEEPING UP
News, Web sites and services of interest to consumers.

248 TOP 5 HOME PCS
Three HP Pavilions crowd the Top 5, but the new Dimension Pentium MMX-166 makes Dell the king of the hill yet again.

250 HOME OFFICE
Men who back up too much and the PCs they love, hosted by Steve Bass.

243

DEPARTMENTS

17 UP FRONT The "cost" of the PC revolution.

23 LETTERS Readers sound off on telecommuting, pricey so-called budget PCs.

35 CONSUMER WATCH What your kids are telling strangers online.

45 PCW ADVOCATE Burned by a warranty.

49 REAL SOLUTIONS Watching over employees' Web access.

55 BUGS AND FIXES Plug holes in IE.

262 COMING UP

328 FULL DISCLOSURE Sitting in front of our PCs, wasting time.

RESOURCES

14 HOW TO CONTACT PC WORLD

296 MAIL-ORDER SHOPPING GUIDE

310 PC WORLD CATALOG

319 READER SERVICE CARD

321 ADVERTISER INDEX

324 EDITORIAL PRODUCT INDEX

PCW ONLINE

DON'T GET PUSHED AROUND
REVIEW Webcasting (aka push/pull technology) is the latest tsunami to hit the Net's shores. Which product is right for you?
www.pcworld.com/jun97/push

I.E. 4.0: TIPS 'N' TRICKS
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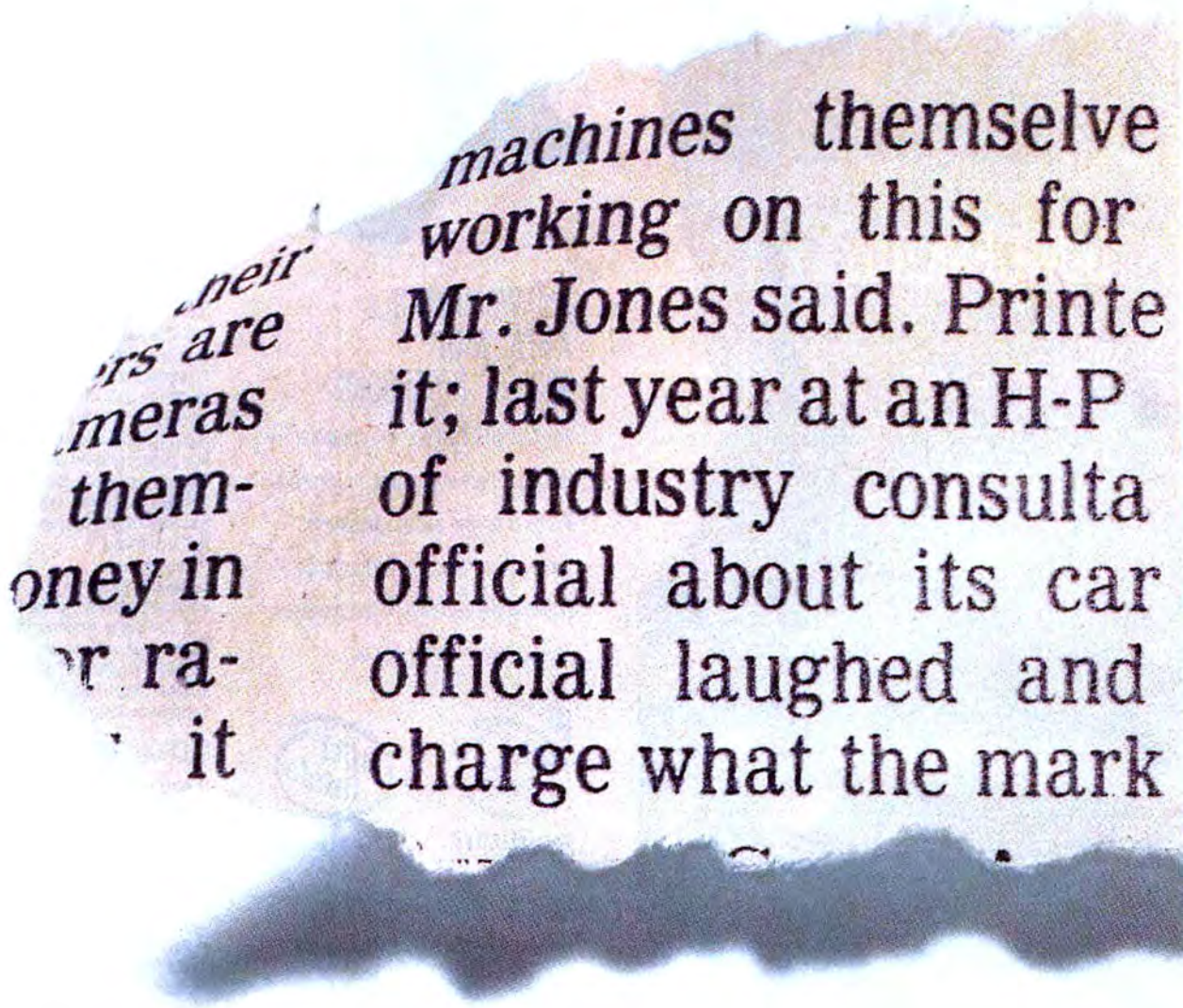

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The Wall Street Journal, August 16, 1996

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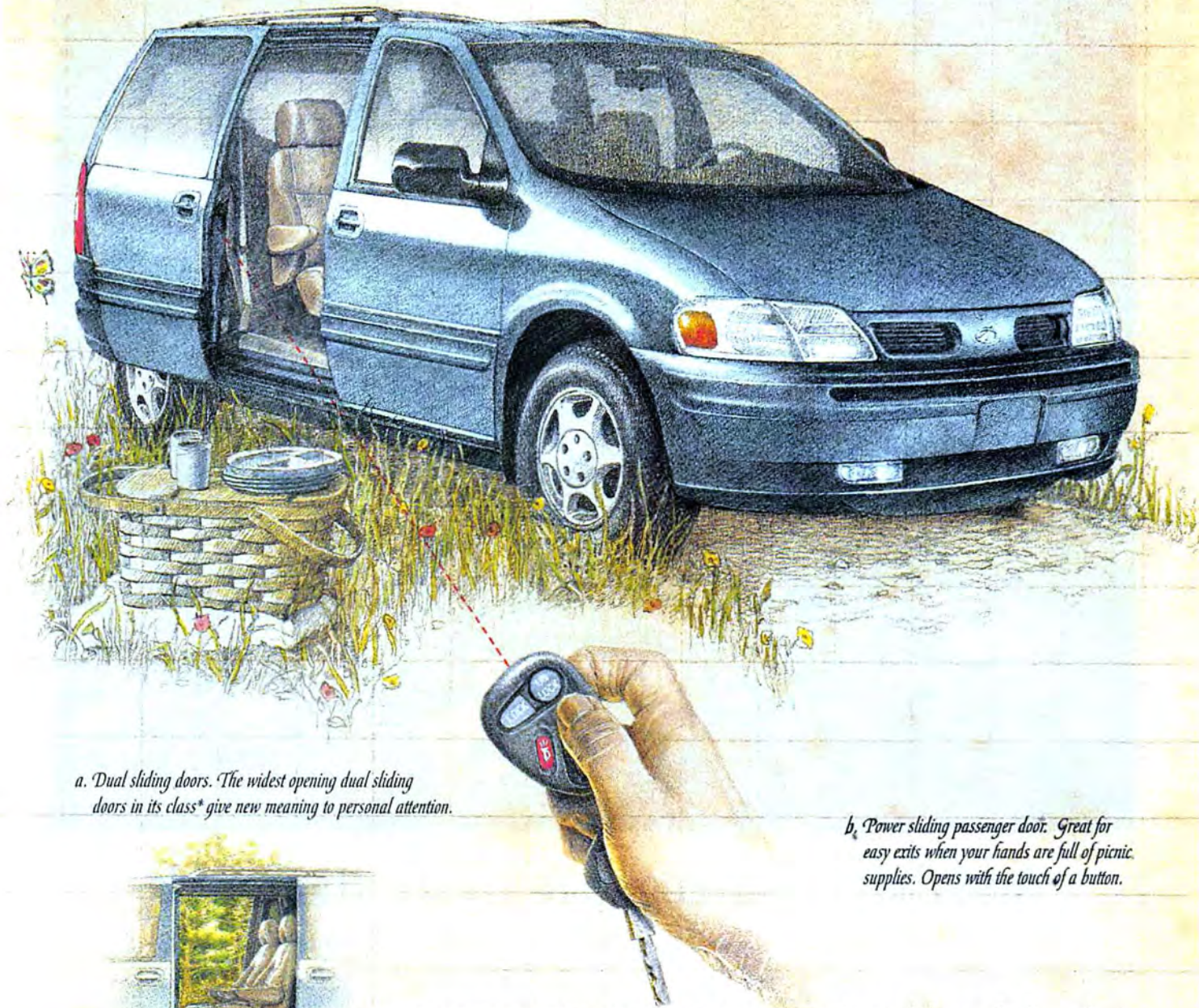

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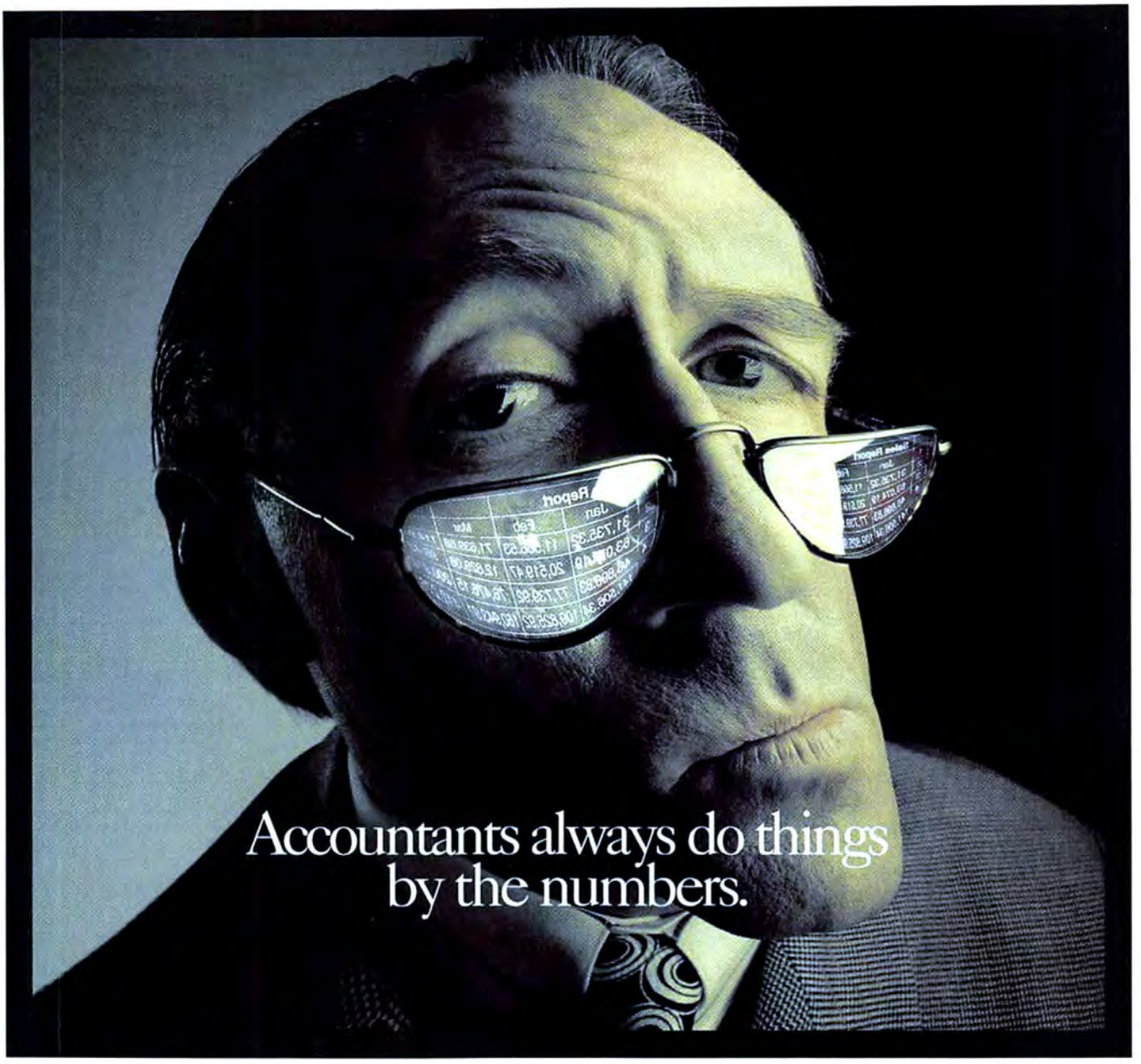

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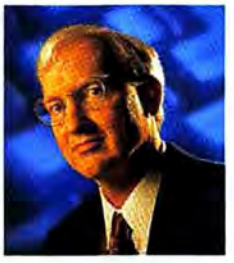
Straight Talk About PC Costs

NOW THAT PCS ARE RUNNING in almost all our offices and in more than 40 million U.S. households, you'd think we would have learned to talk about them sensibly. But for the millions of people who just want to use PCs for business and personal benefits, talk that's neither hyperbole nor hypercriticism is hard to find. One of the most pronounced objects of current industry hype is the Internet phone. And the best example of vehement hypercriticism is the din about the total cost of ownership of PCs.

To hear proponents tell it, Internet phones are the perfect way to beat the system. Just junk that familiar $20 piece of analog hardware, and the joys of free global long-distance calling will be yours. But after Contributing Editor Steve Bass and the PC World Test Center conducted numerous experiments (reported in "Internet Phones Take On Ma Bell"), they found hassles and expenses on the road to these supposedly free Internet calls. For example, it often took a regular telephone call to set up and debug an Internet call.

As for sound quality, Bass writes, "At its best, live audio over the Internet sounds like a cheap cellular phone. At its worst, it sounds like a cheap cellular phone, low on batteries, at the bottom of a well."



A PC may cost $7438 a year, but a humble coffeepot for a 50-person department costs more: $39,679.

WHAT DOES IT COST TO OWN A PC?

ARE THE COSTS OF PCS AS UNDERSTATED as the costs of Internet phone calls? Companies selling network computers say so. In the most celebrated study in support of this view, the Gartner Group consulting firm asserts that the annual cost of owning a Windows 95 PC is $7438.

Strange, but one business we know calculated its combined annual cost of depreciated capital and hardware expense at $1448, and its total cost of technical support and administration—including allocations for salaries and benefits for all its information systems staff—at $750, for an annual total operating cost of $2198. If we count the roughly $1800 difference in these costs as a monument to the inefficiency of the corporations studied by the Gartner Group, we're still left with a staggering annual cost of $3464 that the consultancy claims for "end-user operation."

That's not a bonus that each of us gets for using a PC every year—it's the value of the time we waste "playing" with PCs! The Gartner Group assumes that if a coworker helps you install a new driver to speed up your PC, a portion of both your salaries becomes part of the cost of owning the PC. The study doesn't consider the possibility that both of you will do your work by staying late, taking home a notebook PC, or whatever. No, your employer will have to make up for the "cost" of your time somehow.

If you believe the Gartner Group's numbers on PC costs, you'll love its new study of the humble coffeepot, which shows an annual total operating cost of $39,679. According to the report, a company must allocate to the coffeepot a portion of each employee's salary to reflect the time spent walking over to it, pouring coffee, putting in a new filter and Italian-roast grounds, saying hello to someone, and so on. If 50 employees making $35,000 a year spend 10 minutes a day getting coffee, that's 500 minutes a day or about 9 hours—worth $39,400 a year. (The actual $279 cost of the pot accounts for the rest.)

DEVILISH CLEVER, THESE PCS

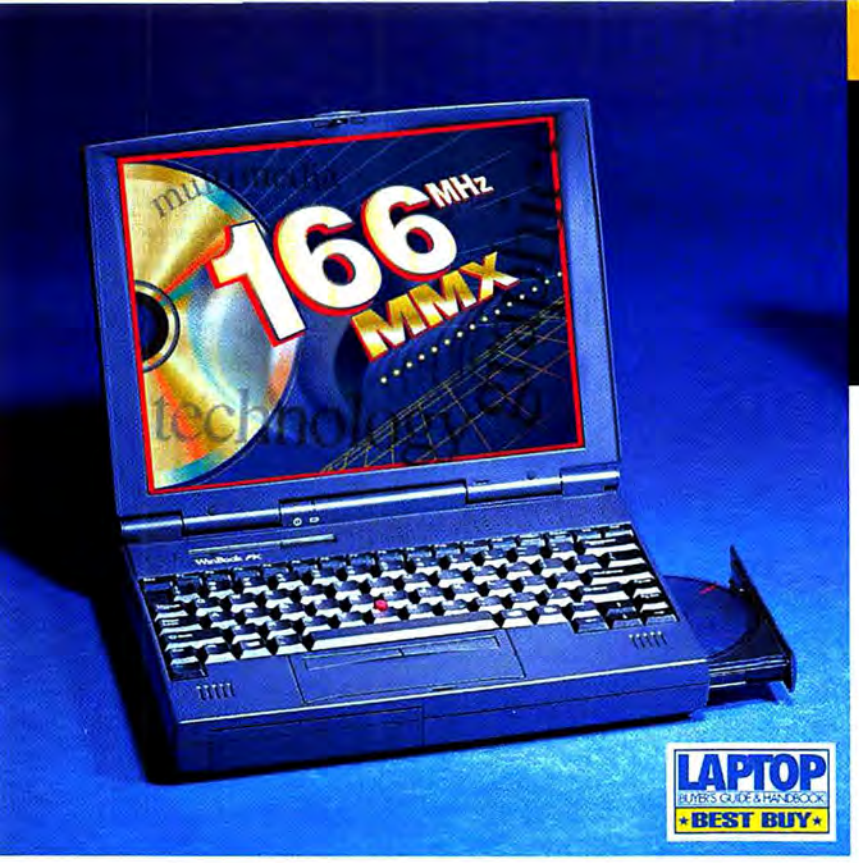
IF YOU'RE NOT CONVINCED that PCs have put us on the brink of ruin, consider this. In May 1992, the Compaq Deskpro 50M Model 120 came with a 50-MHz 486DX2 CPU, a 120MB hard drive, 8MB of RAM, and MS-DOS, and it sold for $5898 with a 15-inch monitor. This month's number 20 PC in the Top 20 Budget Desktops—the Quantex QP5/200MMX SM-3, a 200-MHz Pentium MMX system with 32MB of RAM, a 3.2GB hard drive, a 17-inch monitor, Windows 95, and a big software bundle—sells for $2399. If the price has fallen by 60 percent, the memory quadrupled, the disk storage increased 25-fold, and the processor become at least 20 times more powerful, can the cost of PC ownership have gotten worse?

Consider also the Hewlett-Packard LaserJet IIP personal laser printer that won a Best Buy in February 1991. Its street price was $1493, it output at 300 dpi, and it took about 90 seconds to print a Microsoft Word page. The HP LaserJet 5L Xtra is a Best Buy in this month's review of personal printers. It sells for $399 (street) and prints a 600-dpi page of text in about 15 seconds.

There must be a cost catastrophe somewhere in this picture. Quality improvements aside, the decreased prices leave us about $5000 to spend on a research study about the financial disaster these devilish clever machines are inflicting on us all.

Phil Lemmons is editorial director of PC World. ■

PHOTOGRAPH: ERIK BUTLER



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LAPTOP BUYER'S GUIDE & HANDBOOK ★BEST BUY★ — Laptop Buyer's Guide April 1997, WinBook LM P133 TFT

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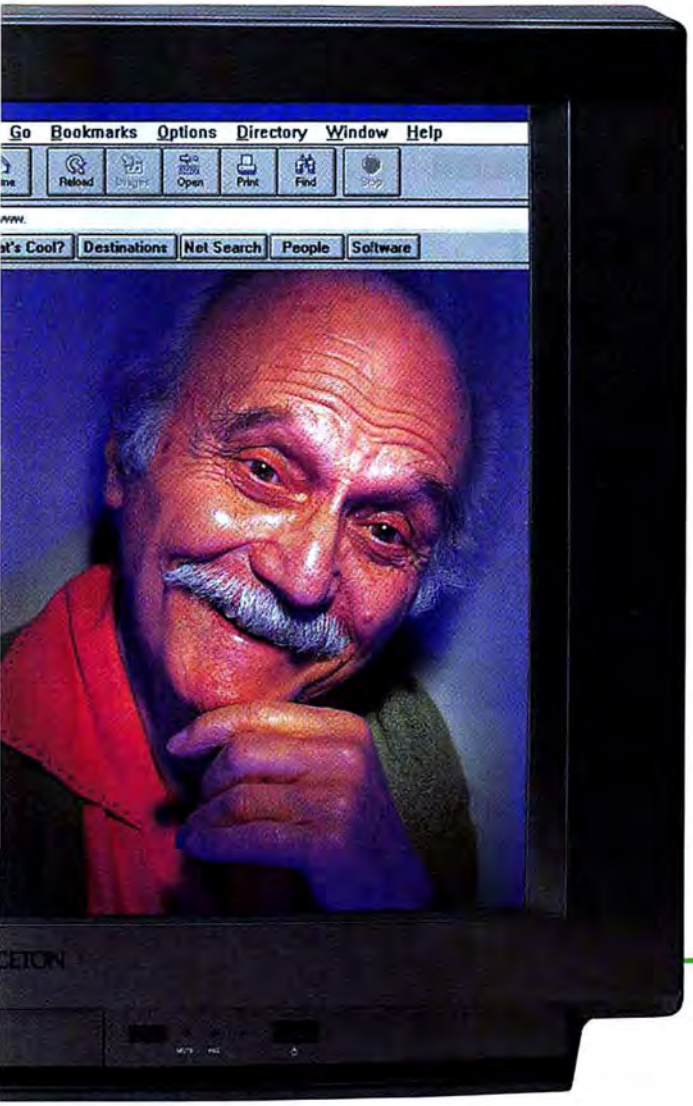
ITS FATHER WAS A MONITOR.



the monitor

Early computer "displays" were simple text displays or printed output. Used with mainframes, the first true monitors were rack-mounted behemoths. In the early 1980's microcomputers displayed alphanumerics and jagged graphics in monochrome. Today, monitor technology has advanced to exquisite high-resolution color and full-motion video.

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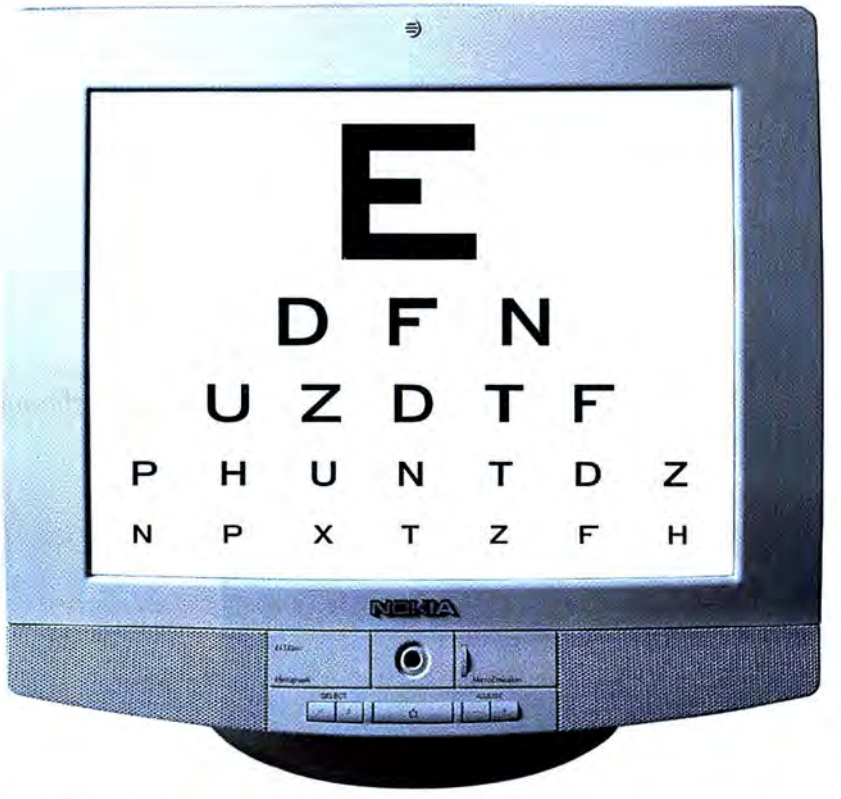

As imaging becomes mainstream, budgets and the demands on technology explode. So now is the time to focus on the monitors engineered to satisfy MIS and finance departments alike: the Nokia 445X series.

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YOUR TAKE ON: Telecommuting ◆ Pricey "budget" PCs ◆ Obvious tips unveiled

THE NUMBER ONE CITY TO TELECOMMUTE

IN "BEST PLACES TO Live and Work" [April] you list San Francisco as the number one place to telecommute. As a native of the San Francisco Bay Area, I had a good laugh when I saw the city's annual number of sunny days listed as 265. I now wonder if anyone at *PC World* ever goes outside. Aside from that, I thought your article was very good. I do agree: San Francisco is an excellent place to live. Keep up the good work—and try to give accurate weather reports in the future!

Carston Johansen, San Jose, California

SAN FRANCISCO is the best place in the United States to live and work? Give me a break! If you mean the best place to "stay at home and work," maybe. But to live and work? No way! I visit San Francisco frequently for work and pleasure. It's a great place to visit but nobody in their right mind would really want to live there. Traffic, overcrowding, high living costs, taxes, and crime all combine to make the city a nightmare.

People enjoy living where they do because it feels good to them and provides them opportunity and hope. There's a lot more to life (and telecommuting) than ISDN and modems.

Steve Williams, Nashville

THANKS FOR THE great telecommuting article. It was very timely for my situation. I live in San Francisco and travel 30 miles to work every day. Presently, my company is in the process of phasing my department into telecommuting. Soon I will be telecommuting full-time, a very new concept to me. I found your article to be informative—and, strangely enough, comforting. Best of all, I was delighted that you ranked San Francisco the number one city to telecommute. San Francisco is not only "golden for telecommuting," it is majestic in its beauty, diverse in culture, and a welcome place for all kinds of people. Whether in warm sunshine or mystical fog, I look forward to the telecommute.

J.P. Meranda, San Francisco

SURE, SAN FRANCISCO is a beautiful city. But after the Loma Prieta earthquake, how can any sane person want to live there? I was on the 38th floor of an older Financial District building when the doorway arches start to sway, the floors began rolling, and file drawers bowled back and forth. That sickening roller-coaster sensation lasted for what seemed like hours. And then the fires! When the transportation system was up and running a week later, I made a mad dash to the airport and never turned back. Let's just say that ISDN connections and Internet access aren't as important as the earth beneath my feet.

Gregg Burke, Internet

BUDGET DESKTOPS NOT A BARGAIN

IT'S TIME FOR YOU to update your pricing criteria on the Top 20 Budget Desktops—or leave the word *budget* out. How can you consider a $2459 Compaq Deskpro 2000 a budget system? [See Top 20 Budget Desktops, April.] I'd sure like to be on *your* budget!

With $1000 desktop computers now on the market, I consider "budget" to be in the $1000-to-$1600 price range. Maybe you should add a "Top 20 Economy Desktops" for those people who can't afford your so-called budget PCs.

Ash Hilliard, Cleveland

Editor's response: Not everyone would agree with your price range for a budget PC. It really depends on what brands you are willing to purchase and how important cost is to you. The prices on our April Budget chart range from $1399 for an AST Advantage to $2459 for the Compaq Deskpro 2000, a decidedly corporate computer. With such a range, surely there is something for almost everyone. –Tracey Capen

VOICE DICTATION WORTHWHILE

MY COMPLIMENTS ON your article concerning the use of voice dictation software to alleviate the problems of repetitive strain injuries [*Real Solutions*, April]. As the director of an Internet-based program (quite small at the time), I was unable to go on disability when symptoms struck, as Ms. Landon did. Had I not been able to turn to voice software, my organization would have closed. Instead, I have been using Kurzweil Voice for well over a year and am extremely pleased.

It is important to emphasize that one should turn to voice dictation products sooner rather than later. A $295 investment [for Kurzweil Voice] could save many hours of expensive therapy and preserve full use of one's hands over the long term. At the first sign of trouble, voice dictation is obviously worthwhile.

Rabbi Yaakov Menken, Baltimore

BASS GETS GROUNDED

APRIL'S *Home Office* was very good, except for one thing: Steve Bass says to unplug the computer and then tells you that you can ground yourself by touching the power supply every few minutes. But in most cases the power supply will not ground you if it is not plugged in. My brother and his friend once fried some components because they did not have the power supply plugged in while they were "grounding" themselves. It sounds like Steve has been very lucky, but I would hate for *PC World* readers to be unlucky.

Paul Reid, Yorba Linda, California

Author's response: What a mistake! Your advice is right on target: Leave the computer plugged into the wall socket and turn ▶

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it off. You'll then be grounded and, unlike me, you won't have to rely on luck. –Steve Bass

DOCUMENTED SECRETS

THE MARCH COVER story, "Undocumented Secrets: 101 Hidden Tips," was a joke. I actually laughed out loud when I read tip number 13, which explained that one could minimize a window in Windows 95 by clicking the Minimize button at the top of an open window. By what stretch of the imagination is this use of a basic interface component undocumented, hidden, or secret? Next you'll be shocking your readers with new ways to use the power button on their monitors.

David A. Karp, Internet

ALREADY DISAPPOINTED WITH WINDOWS 97

WITHOUT OWNING IT, I am already disappointed with Windows 97, especially after reading "Sneak Peek: Windows 97" [April]. While I am aware that it's still early in the release cycle, I expect better from Microsoft.

Although some of the new features sound fun (you can view different documents on different screens, for instance), let's not forget that "fun" translates to *fluff*. Trinkets, baubles, and gadgets do not make a real operating system. Solid application performance, complete reliability, easy reconfiguration, and wide vendor acceptance are key. So far, Microsoft has built an empire by pairing wide vendor acceptance with good looks alone. I hope the personal computer market demands more than fluff before shelling out money on yet another makeover.

Leif E. Rudd, Internet

E-MAIL ADDRESS FOR LIFE

IN "INTERNET ACCESS: How Long Can Flat Rates Last?" [*Top of the News*, April], Janet Spiegel stated that she didn't want to change to a different Internet service provider because of her e-mail address. A simple answer to her and others in the same situation: I would suggest checking out www.usemail.com. This service will direct your e-mail to whatever ISP you happen to be using at that time. I shared Spiegel's concerns until I subscribed. I've used the service for about a year now, been through three ISPs, and kept the same e-mail address.

Skip Royeton, Henderson, Nevada

PC-CILLIN II: NOT READY FOR PRIME TIME

YOUR TIMELY ARTICLE "Virus Killers" [March] contained lots of useful information. But it omitted one fact about PC-Cillin II that your readers should be aware of before they rush out and buy the software like I did.

PC-Cillin II's online program updates are available to registered owners for only 90 days. Thereafter, in addition to the $50 you fork over for the initial product, you must pay an annual fee of $29.95 for updates and support.

While creating a "rescue disk" when I was installing the software, my computer crashed. Attempt at remedies failed, and I was faced with a call to tech support. Sad to say, I couldn't reach them because, as their own recording said, there has been a sudden increase in the volume of calls. So I sent an e-mail message to tech support. Weeks later, I still haven't received a response. Since the rescue disk is a ▶

CORRECTIONS AND CLARIFICATIONS

"COMPAQ'S $1000 PC: Desktop on a Diet" (*New Products*, April) incorrectly stated the price of the Presario 2100's monitor; the actual price is $299. It also incorrectly noted the system's speed rating: The Presario 2100's actual performance was slightly below that of an average Pentium-100 system. The story implied that we had conducted a head-to-head comparison of the Pentium-133 chip and the MediaGX-133 processor used in the Compaq system; no such tests were performed.

The support quality rating for the Sys Technology Performance Pro 200 in April's Top 20 Power Desktops chart should have been Fair.

The reviews of Dell's OptiPlex Gs+ 5200L in our April and May issues reported that no speakers were included with the system. Actually, Dell's price included a pair of Altec Lansing ACS90 speakers.

PC World regrets the errors.

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key item in the overall PC-Cillin program, I feel distinctly shortchanged.

PC-Cillin II is a good utility, but I feel like we consumers have all been turned into beta testers.

Bob Peschka, Aloha, Oregon

SOFTWARE ACCELERATORS: DUBIOUS PROMISES

THANKS FOR "Software Speed-Ups: Bold Claims and Dubious Promises" [*Top of the News*, April]. With a 486 desktop computer and 8MB of RAM, I am always looking for new ways to bolster my system's performance. Unfortunately, I purchased Quarterdeck's MagnaRAM 97 prior to reading the article. It is meant to boost RAM, but I saw absolutely no difference in my PC's performance. In fact, the only good thing about this product is the company's 90-day refund policy.

Jill Watson, Internet

INTRODUCING FAXED JUNK MAIL

IF YOU THINK that junk e-mail, junk postal mail, and the thickening slurry of unwanted telemarketing phone calls is annoying [*Consumer Watch*, April], you haven't seen anything yet. Both my private and unlisted office fax numbers have become the property of fax-telemarketers—and now I am inundated with a daily blizzard of four- and five-page faxes that attempt to sell me everything from vacation packages to football tickets.

This is worse than any other marketing ploy I've seen because, unlike e-mail messages that can readily be deleted, telemarketing by fax is uncontrollable—the unwanted advertising rolls out of the machine, costing me real money for fax supplies. To get back at these fax-blasters, I use my fax-modem to send a letter of complaint in 72-point font to advertisers—whose fax machines are then forced to spit out 18 pages or so of my complaint. This gets advertisers' attention, and the blizzard has somewhat subsided.

Barry Garsson
Yorktown Heights, New York

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

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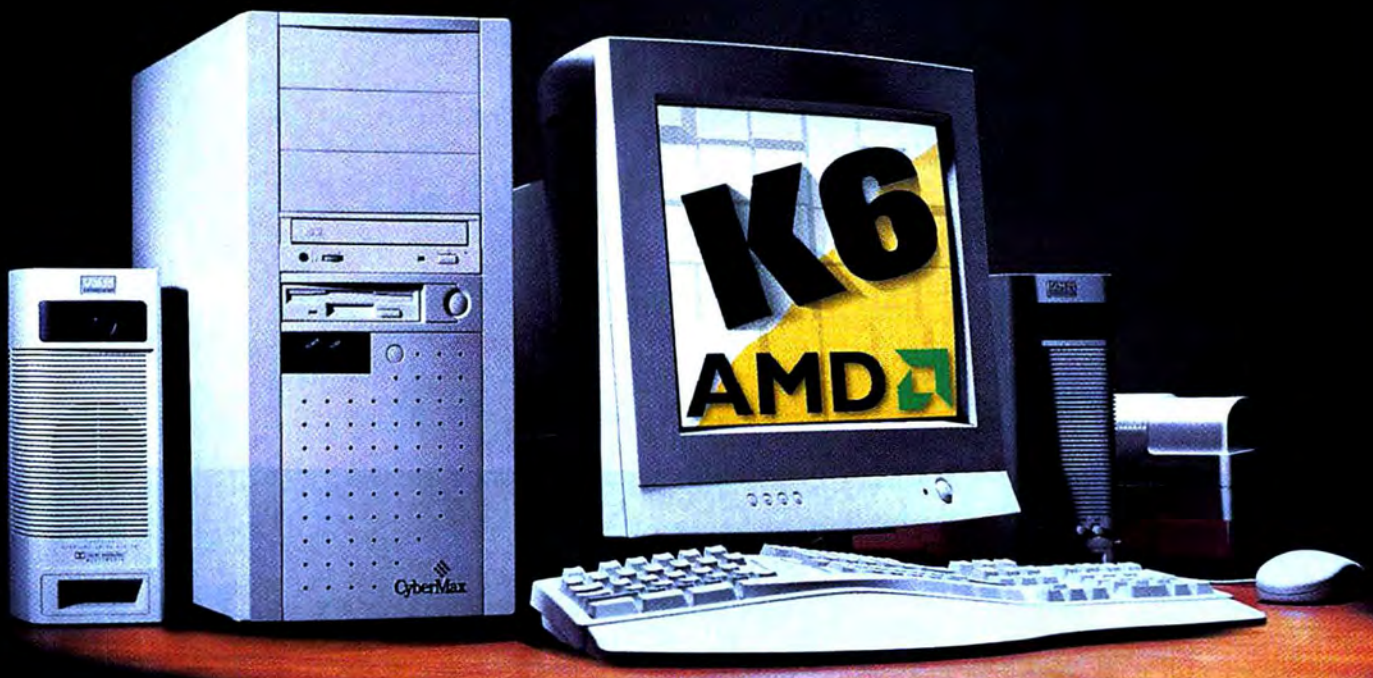

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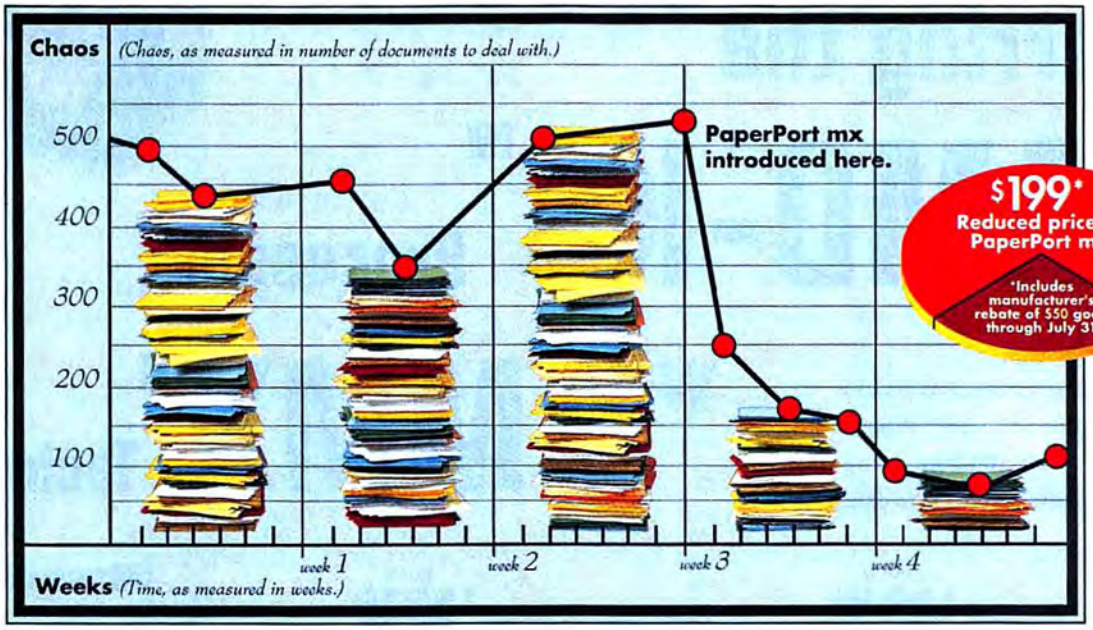
THE BUSINESS STRESS-REDUCTION INDEX



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Your Children Are Talking to Strangers

Kids want the free "cool stuff" offered at Web sites, but the price can be a loss of family privacy.

ILLUSTRATION: LOU BEACH

EVER SINCE HOUSEHOLDS with children started gaining access to the Web, parents and child-protection groups have been fretting about the issue of adult content and trying to devise products and schemes for shielding kids from inappropriate material. No less than ten filtering options are available, counting Microsoft's recent entry into the market with Microsoft Plus for Kids.

Now, I don't want my children stumbling across lurid pictures in their online wanderings any more than the next parent, but there's another issue that concerns me even more: the many attempts to collect from my kids personal information about our family. For example, I know of few children (or adults) who have "happened" onto pornographic Web sites, but just about everyone I know has landed on a site that asked for personal information in exchange for letting them join in the fun or take advantage of the site's services. As adults, we know that such information will be used to sell us products and services later on, but most kids have no clue. They just want the stuff.

Consider this scenario: Mom and Dad are in another room, and Mary is clicking away in the Fun Zone of the Toys "R" Us Web site when she comes across a great offer—a personalized electronic birthday card. All she has to do is enter her e-mail address, date of birth, and gender. There's no disclaimer about what else might be done with the information, no word of caution to check with Mom or Dad before giving it out. It's a seemingly innocent offer. How many kids will pass that up? Mary types in the information, and pretty soon her parents start receiving solicitations for toy products.

Offers of free gifts, screen savers, software updates, and chances to win a great prize abound in cyberspace. Here are just a few examples of the creative ways in which companies collect information from kids online:

- Children can send a personal letter to their favorite Street Shark (www.wid.com/sharks) just by typing in their message and passing along their name, e-mail address, and hometown. There's no on-screen notice indicating what this information will be used for or advising children to ask their parents for permission.
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Those are tough offers for kids to refuse.

In spring of 1996, the Center for Media Education, a national electronic-media watchdog group, released *Web of Deception: Threats to Children from Online Marketing*, a report docu- ▶

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menting the many ways that businesses use the Internet and online services to collect personal information and market their products to children. The group called for the Federal Trade Commission to review online marketing practices and to establish guidelines that would prevent the gathering of personal data from children.

But despite the initial furor that the CME report produced—the FTC held hearings, and several industry groups promised to review questionable sites—more than one year after the report's release not much has changed, according to Shelly Pasnik, director of children's policy for the CME and one of the report's authors.

If anything, the situation is more grave than when her organization first documented the abuses. "We're just as concerned today as when we issued the report—even more so," says Pasnik, noting that companies that took a wait-and-see approach to Web development in 1996 have now joined the online bandwagon. As a result, it's hard to find a toy-store chain, an action-figure producer, a cereal maker, or any other kid-product marketer that *isn't* online.

Using the lure of well-known product mascots, free gifts, and games, companies are attracting kids to Web playgrounds.

HEY, KID, WANT SOME CANDY?

USING THE LURE of well-known product mascots like Snap, Crackle, and Pop or Tony the Tiger, plus offers of free interactive games and other "gifts," companies are attracting children as young as preschool age to their new playgrounds on the Web. Certainly, marketing to kids is nothing new: Any parents who have ever watched Saturday-morning television or taken their children grocery shopping can see the impact that a single cartoon character or toy surprise can have on a young child. But however enticing they may be, commercials are still just that—a break from regular programming to sell a product. Online, these come-ons have a particularly strong influence and appear in many disguises: Kids can send cards, draw pictures, print out images of their favorite characters, even listen to sound clips from the latest animated hit. These activities aren't interrupting their online fun—they *are* the online fun.

So when 12-year-old Kim saw the banner in Yahooligans (the children's version of the popular Yahoo search engine), for a Lucky Charms Scavenger Hunt, she thought, "Cool. This will be fun." Enticed by the promise of a diploma for finding all the hidden marshmallows, she and a friend spent nearly an hour engrossed in the activity, without ever realizing that the game they were playing was just slick advertising.

Marketing to kids is big business. According to Dr. James McNeal, a leading children's marketing expert at Texas A&M University, children ages 4 through 12 had a direct influence on $170 billion in sales of products and services in 1995—and indirectly influenced twice that amount. Teens spend nearly $100 billion a year.

Although TV still gets the big bucks, many companies are looking to the Web as the next great advertising medium. "This is a medium for advertisers that is unprecedented," notes an advertising director for Saatchi & Saatchi. "There's probably no other product or service that we can think of that is like it in terms of kids' interest." The large advertising agency has an entire group, in fact, focusing exclusively on children's online habits and the best way to market to them.

What's the big attraction? First, there's the lack of regulations in the online world. In television, product mascots are prohibited from hosting full-length programs: You won't see a half-hour cartoon hosted by Tony the Tiger or Toucan Sam. No such prohibitions exist online.

As part of its Action for Children in Cyberspace project, the CME advocates that no personal information be collected from children online, that all advertising and promotions be clearly marked and kept separate from content areas, that children's areas not be linked directly to advertising sites, that no online inter- ▶

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Here are the numbers

And they speak for themselves. PCTest measured how much faster you can launch these applications, even while multi-tasking (four intense, concurrent disk access processes).

*While results may vary based on your system, applications and nature of multi-tasking, we think you'll be impressed.

and speaking of nice numbers, check out this control panel

show me the numbers

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Circle 232 on reader service card

WEB SMARTS

HOW YOU CAN DO YOUR PART

Few parents can sit with their children every minute they're online—particularly as kids approach the teenage years. But here are some steps you can take to protect your children's privacy and help make them smarter consumers. A full brochure, downloadable in Adobe Acrobat format, is available from the Center for Media Education (tap.epn.org/cme/adfct.pdf).

- Advise your children never to give out their name, e-mail, address, or physical location without first asking your permission. Make sure they realize that this rule applies to individuals who might request such information as well as to cereal-box characters or their favorite action heroes.
- Send e-mail to the Federal Trade Commission (www.ftc.gov) detailing your concerns and urging action on the behalf of children.
- Complain to companies whose deceptive practices target your kids.
- Spend time with your children online. Tour new sites together, so you can help them distinguish advertising- and marketing-driven sites from those with purely editorial or educational content.
- Find out your children's school policy regarding commercial Internet sites.

action take place between children and product mascots, and that microtargeting of and direct-response marketing to children be prohibited.

Unfortunately, as of now the FTC does not seem inclined to adopt such regulations. Instead, the commission has opted to hold more hearings and to study the matter further.

In the meantime, it looks like we parents are on our own. And so are our kids.

How do you feel about marketing to kids on the Internet? Send an e-mail with your comments on this topic or any consumer issue to consumerwatch@pcworld.com. Roberta Furger is a PC World *contributing editor. Her book on girls and computing,* Does Jane Compute? *will be published by Warner Books in December.* ■

Global Excitement

We're excited about the innovative features packed into our 15" *(13.7" viewable image)* AcerView 54e monitor. And we think you'll get excited about the 54e's incredible value, whether you're complementing an existing PC or gaining new access to the World Wide Web.

The 54e has many features often associated with more expensive monitors. Features like high-contrast screen surfaces, flicker-free images and digital controls that let you easily adjust the picture parameters, on-demand. And with a dot pitch of .28, you'll view nothing but sharp graphics and text with any Windows®-based word processing, business graphics or multimedia application.

The 54e—like all AcerView monitors—offers you the added security of a 3-year limited warranty and is backed by the strength and reputation of Acer, one of the world's largest quality monitor manufacturers. The AcerView 54e monitor proves that you don't have to pay a high price to get a solid, finely-crafted and reliable product.

So, if you're ready to see a more exciting view of the world, at an incredible value, call **1-800-379-2237, Ext, 124** today for the AcerView dealer nearest you.

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AcerView™ Quality Monitors

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"They thought that my new
just a big surge suppressor

1 User-replaceable Batteries
Cells can be easily swapped out, saving time and expense: no need to return to the factory for service. Batteries last 3-6 years under normal usage.

2 Integrates the Security of a Surge Suppressor with the Power of a UPS
Back-UPS Office provides enough outlets to protect your customers' entire system. Six outlets guard your hardware with full time surge protection. Three of the six provide instantaneous battery backup to keep your system from crashing in the event of a brownout or blackout.

3 Battery Replacement Warning Prevents Downtime
An LED signals when the Back-UPS Office's internal self-test finds the battery near the end of its life. Users have 6-8 weeks warning.

4 Site-Wiring Fault Indicator
Without a proper ground, most surge protection is useless. Back-UPS Office alerts you to wiring problems such as missing ground and reversed polarity, two common wiring mistakes which otherwise would require an electrician's visit to diagnose.

5 Convenient BlockSafe™ Outlet Spacing
Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks. No need to sacrifice the use of any outlets to accommodate large block plugs.

6 Circuit breaker
Provides protection in the event of an overload or short circuit; no fuse, no hassle.

LIFETIME EQUIPMENT PROTECTION $25,000

Under the Lifetime Equipment Protection policy, APC will repair or replace connected equipment damaged by surges, including lightning strikes, up to $25,000. See policy for details.

APC has won more awards for reliability than all other UPS vendors combined.

multipath Back-UPS® Office™ was – then the lights went out."

Back-UPS Office's compact design installs easily on desktop, floor, or mounts to wall. Its ninety-degree plug fits flush against the wall.

7 Recessed Master On/Off Switch
Prevents accidental shut-offs and conveniently controls power to the entire connected system.

Internet Ready Fax/Modem Protection

Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents data line surges from damaging internal and external modems, motherboards, input/output cards, and other system components.

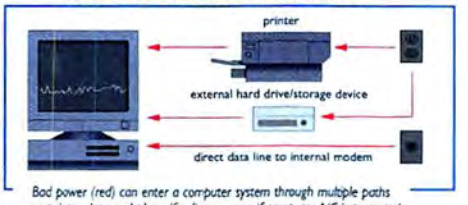
Power problems attack computers relentlessly. Did you know that you have a better chance of winning the lottery than of escaping power problems? They are the single largest cause of computer data loss and hardware damage.

Back-UPS Office provides clean, reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true multipath safety net under any remaining peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large transformer blocks.

Unique multipath protection keeps your PC and data safe

Plugging phone lines or other peripherals into your computer increases your vulnerability to power problems. When a surge hits an unprotected peripheral, it can blaze down serial cables and datalines, and toast your expensive PC. Multiple peripherals and datalines to and from your system are vital, but dangerous. Without them you can't do your job. If a power sag locks your keyboard or reboots your computer before you've saved work, or while you are downloading from the Internet, you can lose data, time

MULTIPATH MEANS TOTAL POWER PROTECTION



Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.

The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

and money. Don't spend another late night at the office to meet your deadline. Join over 6,000,000 computer users worldwide who prefer APC to protect hardware and data.

Back-UPS Office protects your entire system

Until now, protection for your entire system required several devices. Back-UPS Office means clean, safe power to every peripheral, and instant battery backup to keep your system from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

Only Back-UPS Office provides single device Multipath protection for all your equipment

The Multipath Power Protection Advantage	Traditional Surge Protector	Traditional UPS	Back-UPS Office
Protected Paths			
AC	•	•	•
Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives			•
Full-time surge protection for			
Fax/Modem	•		•
Laser Printer	•		•
Speakers	•		•
Dataline protection for			
Internet or Network			•

$30 REBATE

With the Purchase of a Back-UPS Office between April 1 and August 30, 1997.

Simply complete the attached redemption card and send along with an original UPC symbol from an APC Back-UPS Office box and the original store receipt with Back-UPS Office circled, and get a $30 Rebate.

See redemption card for more information. If redemption card is missing please call our PowerFax line at 800-347-FAXX and request literature #1301. Or, download the redemption card from our Web Site at: http://www.apcc.com/english/promo/promo025.htm. You can also fax the coupon below to APC at (401) 788-2797.

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Address: _____

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State: _____ Zip: _____ Country _____

Phone: _____

How many workstations on site? _____

Brand of UPS used? _____

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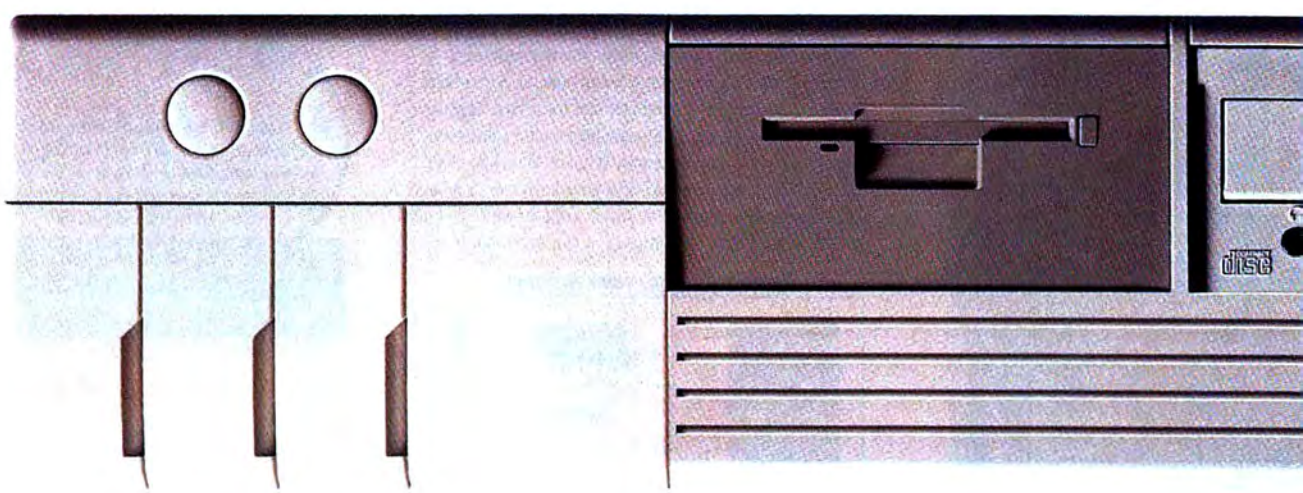
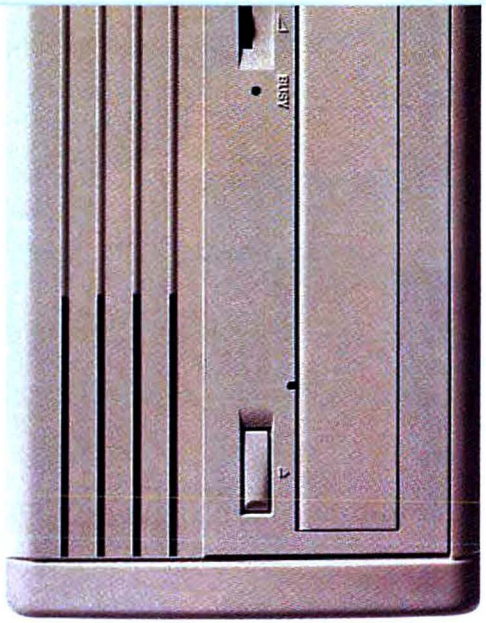


Turn this on its side.



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NEC, however, believes even an entry-level server should be more than just a glorified PC. That's why we're introducing the NEC ProServa™ V Plus. It may be our most affordable, but it's still fully scaleable, expandable, powerful and reliable. In short, it's a *real* server.

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Circle 201 on reader service card

intel inside
pentium PROCESSOR

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Max Resolution (NI)	1600 x 1280	1600 x 1280	1280 x 1024	1280 x 1024	1024 x 768
Dot Pitch/ Aperture Grill	.25AG	.26DP	.28DP	.28DP	.39DP
Digital Controls	•	•	•	•	•
On Screen Programming	•	•	•	•	
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Open your eyes wide to the brilliant 17" (15.7" VIS) GoldStar monitors from LG Electronics. With resolution up to a razor-sharp 1600 x 1280, vertical refresh up to 85 KHz and advanced features such as digital controls and on-screen menus, there is a GoldStar monitor for everything from general business applications, to graphics and DTP to CAD/CAM. What's more, GoldStar monitors deliver this big performance at a price much less than...well, you get the picture.

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Circle 96 on reader service card

GoldStar
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AST warranty woes ◆ Color printer that won't do color ◆ PC Connection really connects

MONITOR BURNOUT

I BOUGHT AN AST Advantage multimedia system with a 17-inch monitor in October 1994. I was very happy with the system until now: The monitor burned out after just over two years. The display alone cost me $880 back then, but fortunately it was covered by a three-year warranty—or so I thought. I phoned technical support and requested that they ship me a replacement monitor. But the technician I spoke to said my warranty covers the monitor for only one year. I checked my warranty's documentation and it states clearly that if the monitor is purchased with the system, it's covered for three years. Still, AST disagrees with me. What can I do?

Cathy Coghill, Lanham, Maryland

Editor's response: We forwarded Coghill's complaint to AST for investigation, and a spokesperson at the company confirmed that the warranty details Coghill quoted were absolutely correct. "At the time Ms. Coghill purchased her system and monitor, the three-year warranty was in place," the spokesperson said. "Due to a glitch in our database, Ms. Coghill's warranty record had mistakenly been rerecorded as one year."

AST authorized shipment of a replacement monitor immediately and apologized to Coghill for the frustration she experienced. At press time Coghill confirmed she had received the replacement unit.

Since Coghill bought her system, though, the warranty on AST's Advantage line of PCs has changed. Now the coverage is for only one year (parts, labor, and on-site service).

Many advertised systems are priced without monitors. If you buy a monitor manufactured by the company that made your PC, you might get a better deal on the warranty than if you bought the monitor from a third party. Also, when you register the system, be sure to register the serial numbers of *both* the PC and monitor.

WIN 95, BUT NO COLOR?

I BOUGHT AN HP DeskJet 540C printer and a Gateway Pentium in April 1995. The printer worked perfectly under Windows 3.1. But ever since I upgraded to Windows 95, I can no longer print correctly in color. The colors are faded: Red, for instance, comes out as a vague purple. Is there anything I can do?

Judy Barrett, Rohnert Park, California

Editor's response: We spoke to Bill Murdock, product support engineer at Hewlett-Packard. It turned out that Barrett's problem had nothing to do with her upgrade to Windows 95. Barrett's printer had an empty cartridge, and she also noted that its expiration date had passed. HP sent her four new ink cartridges overnight. (HP ink jet color cartridges cost from $25 to $28 each.) "I am very happy with HP's response, and the color printing is working fine," reports Barrett. "Now I know about the importance of checking the expiration date on the cartridge." HP's Murdock stresses that customers must use the cartridge before the expiration date.

If you have printing problems, Murdock advises you to run tests with different cartridges—if you get different results, then you have a cartridge-related problem. The toll number for HP support (208/323-2551) will connect you with a technician who can handle all warranty issues and how-to questions.

SPEEDY RESPONSE

I BOUGHT A Toshiba 200CDS laptop by mail order from PC Connection last January. Just three days after I got the computer, its 6X CD-ROM drive failed. I picked up the phone to call PC Connection's customer service, and within 1 minute I was talking with a technician. He verified that he had a replacement drive on hand, and he shipped it to me by overnight express delivery. I swapped the drives the following afternoon with great ease, and I sent back the defective one. I was very pleased with the company's immediate action and delivery—especially since PC Connection paid the shipping charges both ways!

Eric G. Lemmon, Lompoc, California

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is a staff editor for* PC World. ■

ILLUSTRATION: RICK SEALOCK

THE FINE PRINT

WHAT YOU SEE IS NOT ALWAYS WHAT YOU GET

EVER WONDER WHAT brands of components are inside your computer? The ad you read is not always the final word. You might be surprised to know that PC makers regularly substitute one brand for another, depending on the availability of parts.

This CyberMax advertisement, for instance, highlights the inclusion of several brand-name components with its systems, such as the Diamond Stealth 3D 2000 video card. But if there's a component shortage after the ad is published, it's remotely possible that your new system will come with a different brand of video card.

Some ads deliberately omit specifics as to the makers of hard disks or CD-ROM drives. In this case, CyberMax doesn't mention that its systems usually come with Western Digital or Seagate hard disks and with Toshiba CD-ROM drives (or Sony units, in the event of a shortage). So ask which brands of components will go in your PC when you place your order.

An exciting new of graphics

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NEW PRICE

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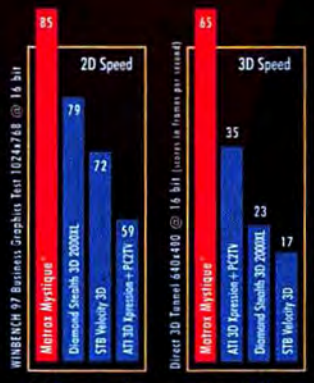

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* Estimated street price. All performance tests conducted by Matrox Graphics Inc. on a Gateway 200 MHz MMX system with 32 MB of SDRAM and 512K cache. Winbench 97 Business Graphics test conducted at 1024 x 768 @ 16-bit with 75 Hz vertical refresh under Microsoft Windows 95. Matrox Mystique, ATI 3D Xpression + PC2TV, Diamond Stealth 3D 2000XL and STB Velocity 3D were configured with 4 MB of memory for the PCI bus using driver releases 3.41, 3.03, 4.03.00.3105, and 1.24B respectively. Microsoft Tunnel test run at full screen 640 x 400 @ 16-bit at default manufacturer refresh rate based on Gouraud shading, perspective correct textures, point sampled with Z-buffer.

universe & video

MATROX

RAINBOW Runner

Matrox Rainbow Runner Studio lets you create and edit high quality videos just like a pro with full resolution Motion JPEG (MJPEG) technology. Just capture video from your camcorder, edit in special effects and then save your creation to VHS tape or send it over the Net.

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Over twenty years experience has earned Matrox a stellar reputation for quality products and reliable service. Matrox has been chosen by Compaq, Dell, Hewlett Packard and IBM to power their flagship systems. PC Magazine, PC Computing and PC World have all bestowed upon us their highest honors, making Matrox the only graphics manufacturer to receive over 200 awards. To power your graphics and video into the 21st century, there is no other choice but Matrox.

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Matrox Rainbow Runner Studio	✔	✔	✔	✔	✔	✔	$249
ATI All-In-Wonder	–	–	✔	–	✔	–	$379[3]
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Circle 143 on reader service card

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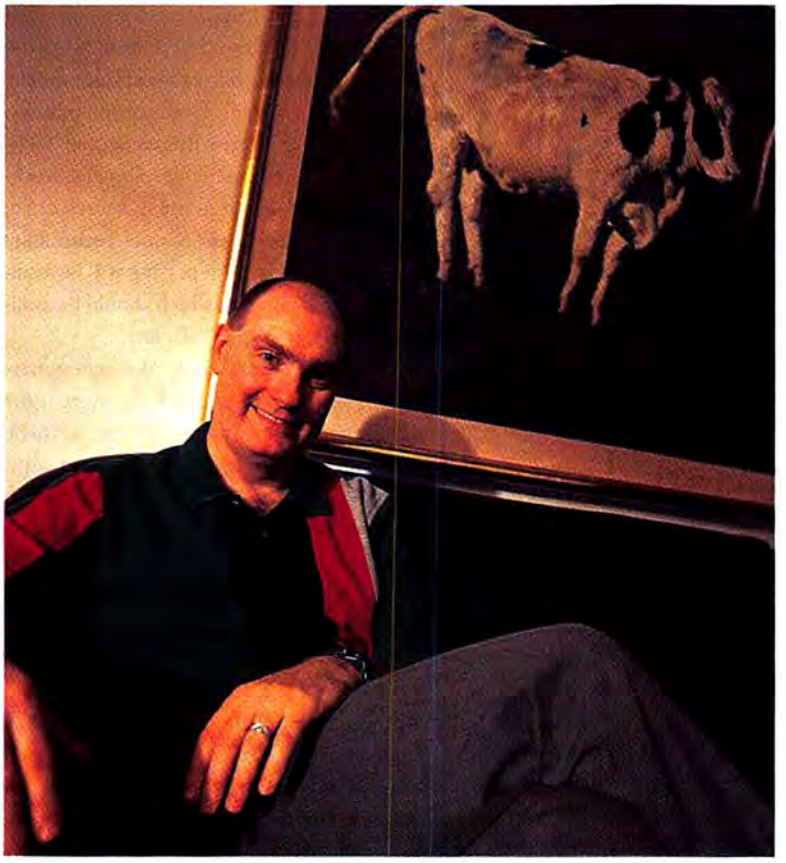
Circle 211 on reader service card

Cruise Control for Your Office

Everyone wants access to the Internet. John Alexander found a way to provide the robust, reliable on-ramp his employees need—and keep them from joy-riding.



PHOTOGRAPH: KEVIN HORAN

THE PROBLEM Providing Internet access to employees is like walking a tightwire. You have to ensure that the network can handle the increased traffic, but you don't want to invest in more bandwidth than you need. And how do you keep employees from wasting time on the Net, yet not come across as Big Brother? This month John Alexander, the technology planner for Lab Safety Supply, a reseller of safety and industrial supplies in Janesville, Wisconsin, tells us how his company walks the line. —*Editor*

We have about 60 employees who access the Net as part of their jobs. This has created a couple of challenges. We must make sure we have enough capacity to support the extra data coming in, because a slow network affects everyone. But we don't want to upgrade our network if we don't need to. In addition, some managers have expressed concern that employees might misuse their Internet access by surfing sites unrelated to work. While we haven't had any specific complaints, the potential exists—and we wanted to deal with it before it became a problem.

In short, we had to find a way to be proactive in our network planning. We needed a tool to track Internet usage and generate detailed reports. With that information, we could get a good idea of how much bandwidth we need, as well as which Web sites were being accessed, how often, for how long, and by whom.

THE SOLUTION: INTERNET MANAGEMENT SOFTWARE

A YEAR AGO, I DISCOVERED Internet management software, which does the kind of usage tracking and detailed reporting we'd been looking for. We bought Sequel Technology's Sequel Net Access Manager and installed it on a dedicated Windows NT server. We're mostly using the program for its reporting capabilities. Basically, it monitors what users do on the Net (or an intranet) and compiles data that can be stored in any Microsoft SQL Server 6.0 or 6.5 database.

Every month, I kick out a report that shows the volume of data that has passed from Internet sites to our employees. For example, I now know that in a typical month they make between 10,000 and 12,000 visits to Internet sites, causing somewhere between 200MB and 500MB of data to flow from the Net to their PCs.

In addition to generating that summary, I'm able to see how much traffic was generated by e-mail, how much was due to visiting Web pages, how much from downloading files, and so on. I can also find out what the top ten most visited sites are: Usually, they're search engines, our own Web site, and our competitors' sites. I can also generate reports on request. Some departments have asked me to find out what their Internet usage is on an hourly basis, which helps them learn when the biggest spikes are.

A couple of times I've been asked to find out what someone was doing at a particular time—say, which Web sites an employee visited last Friday between 3 p.m. and 5 p.m. So far, ▶

these requests have been made simply to test Net Access Manager's reporting capabilities, not to spy on people. All our employees have been told we can get this kind of data. But we're not using the program to prevent them from using the Net: Management wants the peace of mind that comes with knowing we can capture detailed usage data whenever we need it.

When we first set up Internet access for our employees, we denied access to any Usenet newsgroup that begins with "alt." That keeps users from straying into alternative, usually recreational, newsgroups. We set up the blocks through our UNIX-based firewall software, which we had before we installed Net Access Manager. In the future, we'll use Net Access Manager because it's more flexible and has a friendlier interface.

NO NEED TO UPGRADE

THE INFORMATION we've gotten from Net Access Manager has surprised us. For a long time we had been assuming that we would have to upgrade our networking equipment to accommodate increased Internet traffic—an expensive undertaking. Once we saw the actual usage statistics, though, we realized we didn't need to upgrade anytime soon. And whenever you can delay a technology expenditure, you're going to come out ahead.

For all of its detailed reporting, though, the program could be more flexible. For instance, if you generate a report on what someone did from 9 a.m. to 10 a.m., the activities are listed in order of volume size. I'd rather see them listed chronologically. When I mentioned this to Sequel Technology, the company developed a workaround and sent it to me in a week or so. (A spokesperson for Sequel Technology said chronological reporting will be available in version 2.0, which should be available by press time. —*Editor*)

Ironically, Net Access Manager generates so much data that I can store it for only two months; anything older has to be purged. I'd like to see the program summarize the data and automatically discard the details. That way, I could quickly get a report that compares a department's monthly Internet usage for an entire year, without having to invest hundreds of dollars in extra storage. (This feature will be offered in a future release. —*Editor*)

Still, Sequel Net Access Manager has given us something we didn't have before: the ability to make long-range plans for our network. Over time, we'll be able to use the data we're collecting to accurately predict when to upgrade our capacity.

Edited by James A. Martin

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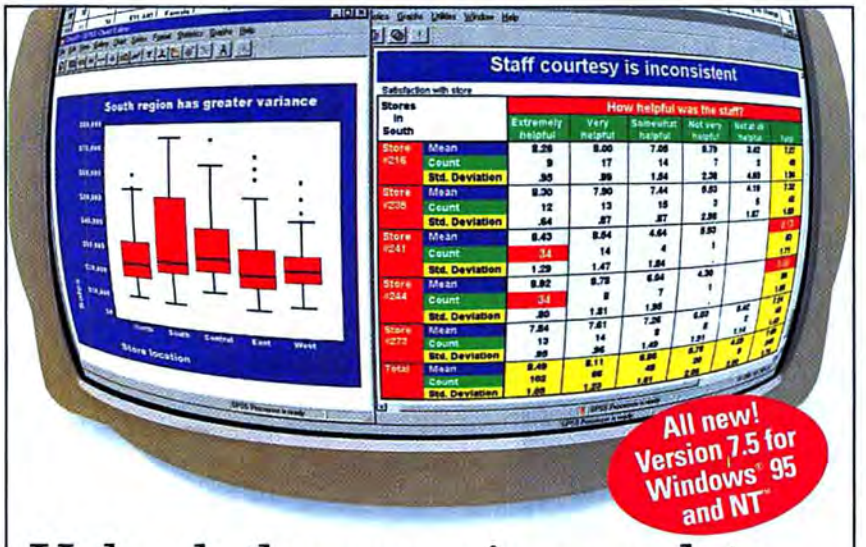
James A. Martin is a PC World *contributing editor. If you use PCs for management in your business, we want to hear from you. We pay $300 for published columns. See page 14 for contact information.* ■



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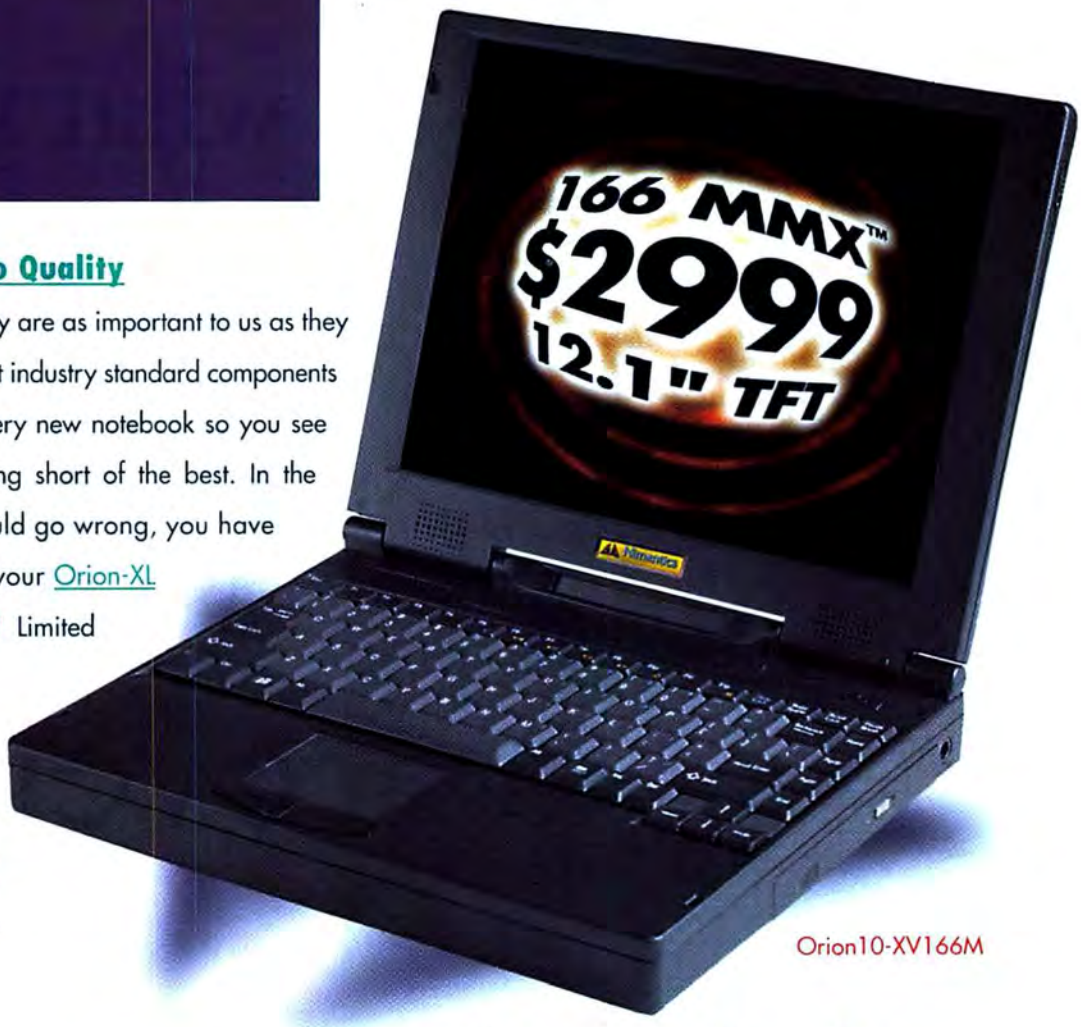

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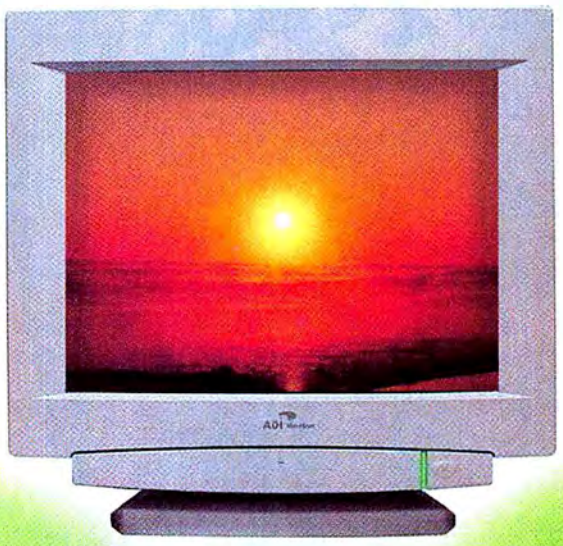

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Hard Times for Internet Explorer ◆ Shockwave Gets a Shock ◆ Flawed 56K Modems

Internet Explorer Security Flaws

YOU SAW IT ON the nightly news, you read about it in the paper—March was not a good month for Microsoft's Internet Explorer Web browser. First, students from Worcester Polytechnic Institute and the Massachusetts Institute of Technology discovered that IE allows Web pages to execute programs on your computer, bypassing Microsoft's security controls. Such a page could, for instance, delete an important file from your Windows folder (see www.cybersnot.com/iebug.html and web.mit.edu/crioux/www/ie/index.html for the full explanation).

What's more, University of Maryland researchers found a hole that lets a Web page bypass security to download and run potentially malicious programs on your system. For instance, someone could create a page that formats your hard drive (details at dec.dorm.umd.edu/index.htm).

The first security hole afflicts IE versions 2.0, 3.0, and 3.01; the second only version 3.0; Microsoft has fixed the problems in IE version 3.02. You can download the 3.35MB 3.01-to-3.02 upgrade from www.microsoft.com/msdownload/ie302upgrade.htm, or the full IE 3.02 (which weighs in at 6MB to 10MB depending on how many add-ons you select) from www.microsoft.com/msdownload/ieplatform/iewin95.htm.

SHOCKWAVE SECURITY HOLE

INTERNET EXPLORER ISN'T the only Web tool with security problems. Software developer David de Vitry has discovered that Macromedia's widely used animation browser plug-in, Shockwave 5, can be used to surreptitiously read and upload your private e-mail or any file on your hard drive. De Vitry's Web site (www.webcomics.com/shockwave/) explains how evil Shockwave developers could write applets that exploit the hole to violate your personal or corporate privacy.

Another developer, Dave Yang, has posted a demonstration Shockwave application (www.magic.ca/~qwi/insecure.html) that retrieves and displays the directory structure of your hard disk. Yang's trick is harmless, but it shows how someone could copy your files to a remote Web server without your knowledge.

Macromedia has posted a new 1.4MB version of Shockwave on its Web site (www.macromedia.com/shockzone/info/security.html), and says the fix will also be integrated into its new Shockwave 6 plug-in, which was still in beta as we went to press.

MOTOROLA REPLACES LAGGING 56-KBPS MODEMS

LESS THAN TWO WEEKS after it began shipping its new ModemSurfr 56K and VoiceSurfr 56K modems in early March, Motorola halted shipments due to problems with the modems' Rockwell chip set. According to Motorola and Rockwell, the chip set's firmware prevents the modems from connecting at speeds faster than 28.8 or 33.6 kbps in some parts of the country.

Fixing the problem requires a hardware exchange, but the company isn't recalling modems already shipped to distributors on the grounds that the performance problems don't affect most users. If you bought an early version of the modem and are having trouble with it, Motorola will exchange it with an updated model for free. Call 800/426-6336 for more information.

Motorola isn't the only modem manufacturer to use the Rockwell chip set. Boca Research stopped shipment on early versions of its 56K Internet Modem that used the same chip set as Motorola's modems. Other manufacturers using the chip set—including Hayes and Zoom—have either delayed shipment of their modems until they could get updated versions of the Rockwell firmware, or used software-upgradable FlashROM versions of the chip set. These software upgrades should be available by the time you read this.

Files mentioned in this article are available on PC World Online (www.pcworld.com/software_lib). Scott Spanbauer is a contributing editor for PC World. ■

ICON: JEFFREY PELO

B U G G E D ?

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I N B R I E F

QuickView Plus Patch

IF YOU USE NETSCAPE'S Navigator 3.01 and recently had difficulty installing Inso's QuickView Plus 4.0 file viewing program, you're not alone. For a solution to the installation problem, go directly to www.inso.com/frames/consumer/qvp/fix.htm. On that Web page you can find an updated .dll file and instructions for installing it.

OmniPage and NT Won't Talk

WINDOWS NT 4.0 USERS have reported problems getting OmniPage Pro 7.0 to install properly under Microsoft's high-end operating system. If you can't get OmniPage to install in NT, download and install Caere's 1MB compatibility patch from www.caere.com/live/content/support/downloads/win/op/op7-nt4p.exe. Version 7.01 doesn't need the fix.

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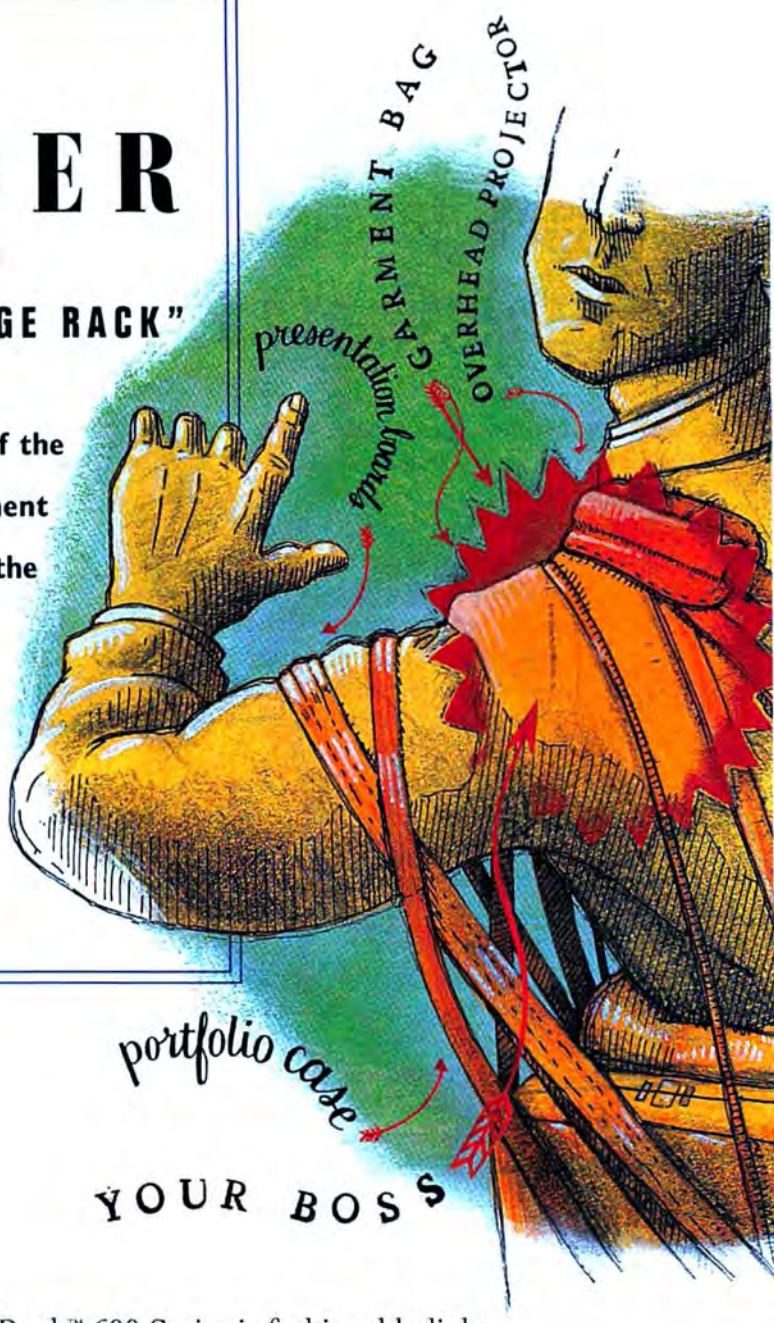

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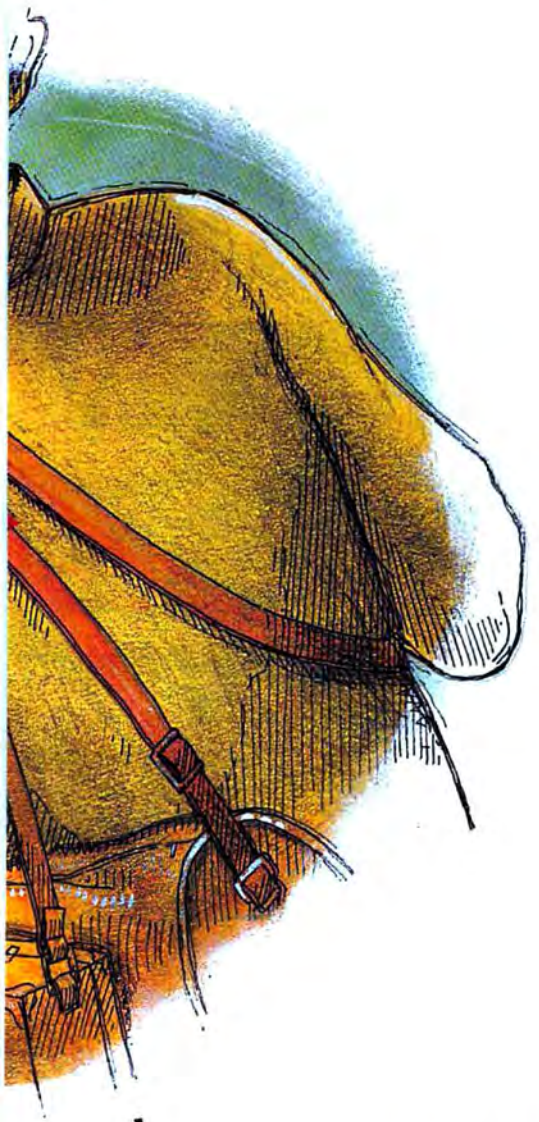

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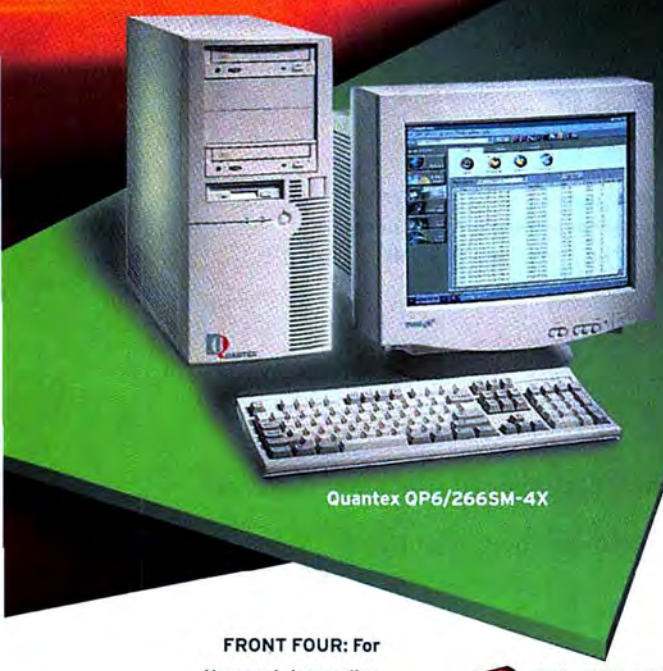
TOP OF THE NEWS

The New Power Players

Forget Pentium MMX and Pentium Pro. PC World tests prove that the **Pentium II and K6 PCs deliver** the best value and performance you can find.



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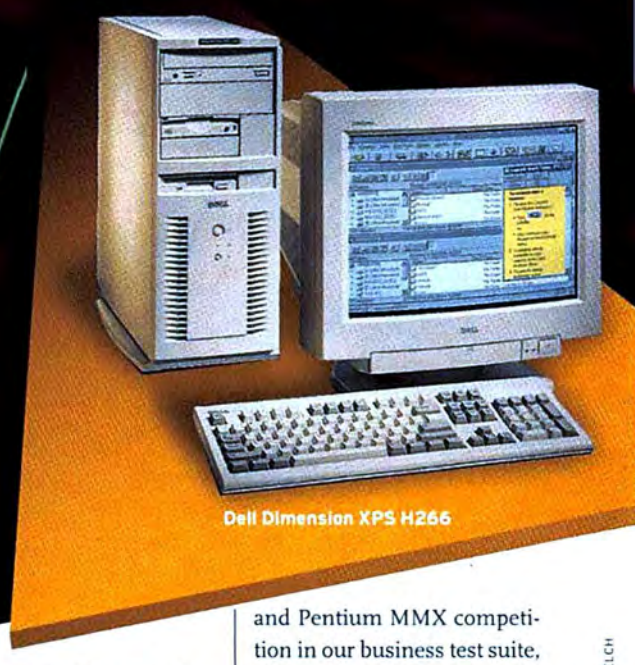


Dell Dimension XPS H266

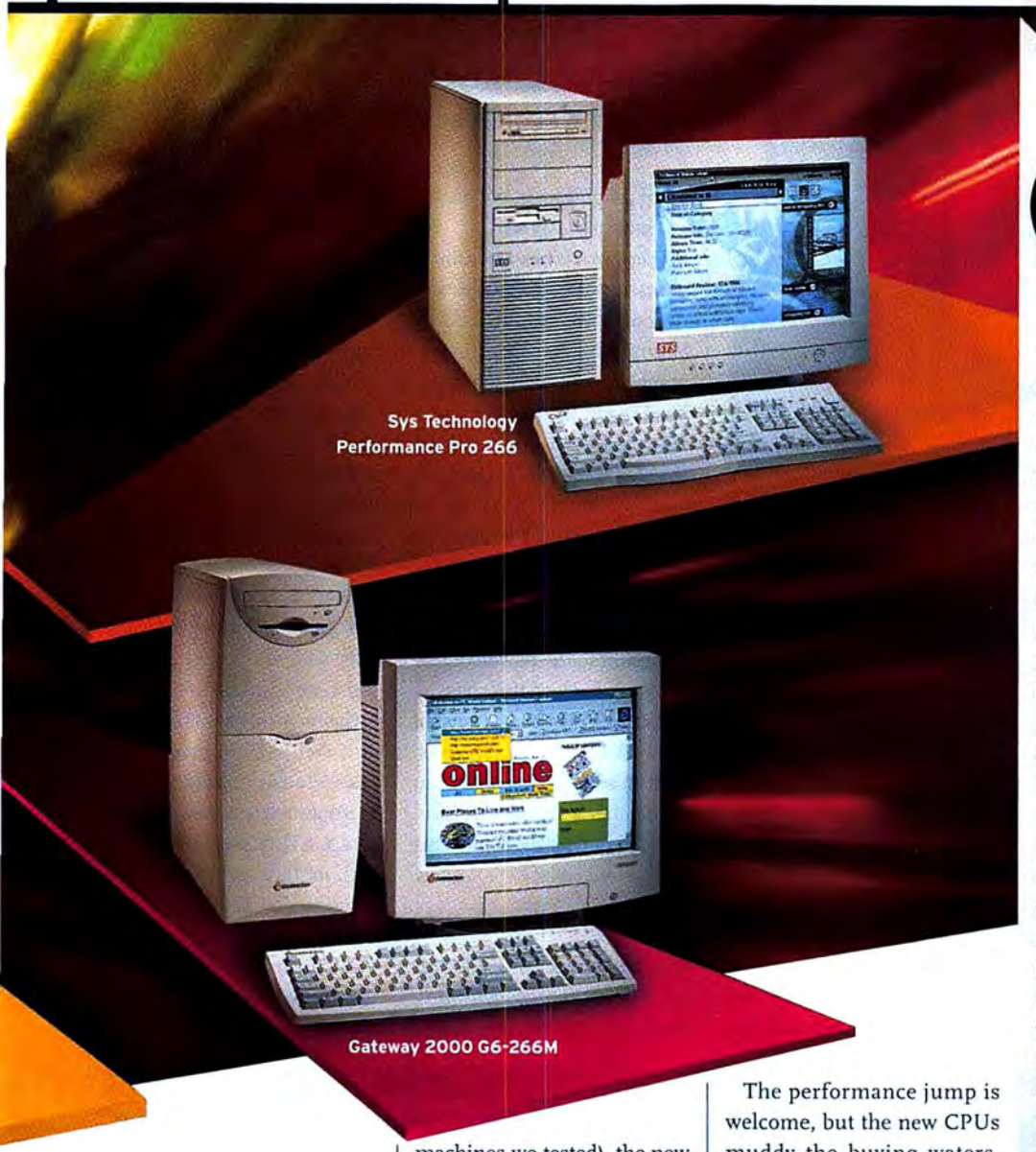
FRONT FOUR: For the most demanding applications, these 266-MHz Pentium II systems offer a nice balance of price and performance.

YES, YOU *can* have it all. That's the message PC makers are sending as they roll out the first systems based on Intel's Pentium II and AMD's K6 processors. We tested six Pentium II and two K6 PCs and found that the new CPUs provide a significant performance jump over Pentium Pro and Pentium MMX PCs for a comparable or—in a few cases—possibly lower price. Whether you want a swift bargain box or a mighty dual-processor workstation, these new CPUs make your choices more attractive than ever.

Even the least expensive K6 PC we tested, the $2569 200-MHz Polywell Poly K6200Mx, blasted past all Pentium Pro and Pentium MMX competition in our business test suite, with a PC WorldBench score of 241. The average PC WorldBench score of the six Pentium II-266 systems we tested was an astounding 261. By contrast, the fastest Pentium Pro-200 and Pentium MMX-200 PCs produced PC WorldBench scores of 236 and 235 respectively (see the Top 20 Power Desktops).

What's more, Pentium II systems raced through our MMX multimedia application

PHOTOGRAPHS: JOHN GREENLEIGH; PHOTO ILLUSTRATION: SANDRA KELCH



tests an average of more than 30 percent faster than previously tested Pentium MMX-200 systems.

Beyond speed, expect useful new technologies and features in these boxes. For example, all the Pentium II and K6 systems we looked at feature Universal Serial Bus ports for connecting USB-compliant mice, keyboards, cameras, and other peripherals. While USB peripherals have yet to make an impact on the market (and none was supplied with the machines we tested), the new standard should spell relief for peripheral-choked systems. Daisy-chaining eliminates the possibility of running out of ports, while autosensing eliminates lengthy reboots when plugging in the devices.

Vendors also plan to introduce the new Accelerated Graphics Port standard for heightened graphics performance, once AGP technology becomes available from Intel in July or August. If you want a Pentium II system for hot 3-D game play and imaging, it might be worth waiting for AGP-enabled systems.

The performance jump is welcome, but the new CPUs muddy the buying waters. Pentium II, with dual-processor support and Windows NT–savvy performance, muscles in on turf occupied by Pentium Pro. And PC makers are poised to take Pentium II into the mainstream. The Quantex QP6/266SM-4X costs just $2899, less than some loaded Pentium MMX-200 PCs, which can top $3000. Gateway 2000's G6-266M sells for just $3109. Such pricing may push Pentium and Pentium MMX prices even lower. ▶

ICONS: JEFFREY PELO

EDITED BY
Charles Piller and Randy Ross

JUST IN

56 Kbps Picks Up Steam

AMERICA ONLINE SAID it will support Rockwell's K56flex protocol for 56-kilobits-per-second modems in about 175 cities later this year. The online service currently supports only the x2 protocol, a competing 56-kbps technology developed by U.S. Robotics. Meanwhile, ActionTec Electronics, Global Village, and Practical Peripherals have announced 56-kbps modems in the $150 to $200 range.

WordPerfect Suite 8 Comes Loaded

COREL'S NEW SUITE will be inexpensive and crammed with software. Presentations, Quattro Pro, and WordPerfect are still the core applications. New additions include PhotoHouse, an entry-level image editing program; and CorelCentral, a PIM that's available free if you call the vendor. WordPerfect Suite 8 lists for $395, but most buyers will qualify for a $179 upgrade version when the product ships in May. (Microsoft Office lists for $499, and the upgrade costs $235.) WordPerfect Suite 8 Professional, which is expected to ship this summer, won't include PhotoHouse, but it will add the Paradox database manager and a Web authoring tool. Pricing had not been set at press time. ▶

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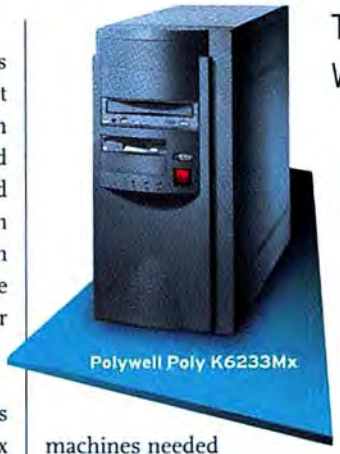
PENTIUM II GO

ONE THING IS clear: Intel's Pentium II-266 is the fastest x86 processor you can buy. In our tests, Pentium II–based systems consistently delivered unmatched performance in business applications, with an average PC WorldBench score that is about 11 percent faster than the swiftest system on our Top 20 Power Desktops chart, Sys Technology's Performance Pro 200. All six Pentium II systems performed similarly, with scores ranging from 258 to 263.

Pentium II system performance on our MMX-enhanced multimedia tests looks better still. While we saw a greater range of scores in these tests—in part because of the strain they put on the graphics and disk subsystems—all these systems significantly outpaced Pentium MMX-200 and K6 competition. The biggest lead came in 3-D graphics, where the Pentium II PCs took less than 1 minute to complete tasks that Pentium MMX-200 machines needed an average of 79 seconds to accomplish.



The lesson here: Pentium II delivers breathtaking speed without pricey tweaks like hardware disk caches or outrageous system configurations. We tested the Pentium II systems with 32MB of EDO DRAM and 512K of secondary cache. Expect Pentium II systems to get even faster when Intel introduces chip sets that support the SDRAM system memory now found in some Pentium MMX machines. The introduction of AGP technology later this year should boost graphics—in particular, 3-D graphics—as well.

The Polywell Poly K6233Mx ran up a solid PC WorldBench score yet costs just $2689.

These machines are similar in many ways. With the exception of the Hewlett-Packard Vectra VL 6/266 and Intergraph's dual-processor–capable TD-225, all use the same Intel-designed motherboard that features two USB ports and is able to hold up to 128MB of EDO DRAM. The Pentium II CPU and cache—housed inside the oversize Single Edge Contact cartridge—sit next to the power supply near the back of the chassis. The motherboards include three PCI and three ISA slots, with an additional slot that can hold either a PCI or ISA card. SIMMs sit near the front bezel for easy access.

TOP POWER BARGAIN

THE QUANTEX QP6/266SM-4X will make power-hungry buyers think they have died and gone to heaven. This minitower features a 17-inch monitor (as do all the units tested), a 4.3GB Enhanced IDE hard disk, a 12X CD-ROM drive, and a 4MB Matrox Millennium II graphics card. Performance is top-notch: a 260 PC WorldBench score and excellent results in MMX-enabled Fractal Design Ray Dream Studio 3D graphics and Macromedia Director playback tests. Note, however, that the Quantex unit we tested arrived with the sound card floating loose inside the chassis.

Gateway 2000's G6-266M and Dell's Dimension XPS H266 look remarkably alike in important ways. Each offers a 12X CD-ROM drive, a 17-inch monitor, and an internal Iomega Zip 100MB removable cartridge drive. The two PCs finished in a virtual tie in the PC WorldBench business application suite, with record-

TOP SPEED BARGAINS

SYSTEMS	Price [1]	CPU	Drive type/ size (GB)	CD-ROM drive	Graphics board/ RAM (MB)	Modem (kbps)	Warranty for parts/labor (years)	Reader service number
Dell Dimension XPS H266 800/388-8542 www.dell.com	$3529	Pentium II-266	EIDE/6.4	12X	Matrox Millennium II/8	33.6	3/1	775
Gateway 2000 G6-266M 800/846-2000 www.gw2k.com	$3109	Pentium II-266	ultra DMA EIDE/6.4	12X	STB Virge GX/4	56	3/3	776
HP Vectra VL 6/266 800/322-4772 www.hp.com/go/vectra	$3870	Pentium II-266	EIDE/4.1	24X	Matrox Millennium/4	–	3/3 [2]	777
Intergraph TD-225 800/692-8069 www.intergraph.com/express	$3524	Pentium II-266	EIDE/3.5	12X	G95 [3]/4	33.6	3/3 [2]	778
Polywell Poly K6200Mx 800/999-1278 www.polywell.com	$2569	K6-PR200	EIDE/5.1	12X	Diamond Stealth 2000 3D/4	33.6	3/5	779
Polywell Poly K6233Mx 800/999-1278 www.polywell.com	$2689	K6-PR233	EIDE/5.1	12X	Diamond Stealth 2000 3D/4	33.6	3/5	780
Quantex QP6/266SM-4X 800/896-4898 www.quantex.com	$2899	Pentium II-266	EIDE/4.3	12X	Matrox Millennium II/4	33.6	3/1	781
Sys Technology Performance Pro 266 800/613-9963 www.systechnology.com/	$4250	Pentium II-266	SCSI/4.3	12X	Matrox Millennium/4	33.6	1/1	782

[1] With 17-inch monitor.
[2] One-year on-site service.
[3] Based on Matrox Millennium.

All products: 913

breaking scores of 263. They also performed well overall in MMX performance tests, with Dell enjoying the advantage in both Photoshop and Director.

PENTIUM MMX

PROVEN and affordable CPUs routinely outpace Pentium Pro workstations in PC WorldBench tests. The next entry-level CPU.

NEW CHIPS BOOST BUYING OPTIONS

A QUARTET of fresh CPUs share a common theme—multimedia-savvy MMX support that provides a real kick for specially tuned software. Best of all, the new processors deliver better performance than the Pentium and Pentium Pro CPUs that ruled the market in 1996. With the exception of Intel's just-released Pentium II, these chips will appear in many systems boasting prices less than $2500.

AMD K6

BLOCKBUSTER price/performance, *and* it plugs into existing Pentium motherboards, making it easy for system vendors to build around it.

CYRIX M2

LATE TO MARKET and as yet untested, but the price is right, and there's room to grow with clock speed increases. Will compete with K6 for bargain-hunters' affections.

PENTIUM II

PEERLESS performance and room to improve. Especially impressive with MMX multimedia applications.

Each of these minitower systems has a large 6.4GB hard disk, as well as a three-year parts warranty and a 30-day money-back guarantee.

The similarities end there. The Dimension sells for $3529—$420 more than the $3109 Gateway 2000 unit—in part because of the Dell's Matrox Millennium II graphics card outfitted with an exceptional 8MB of memory. The Gateway, meanwhile, features a faster 56-kbps modem (based on U.S. Robotics' x2 technology), but its 4MB STB Virge GX graphics card may have held it back slightly in the graphics-intensive MMX tests.

The Gateway's ultra DMA EIDE hard disk and controller can theoretically access and transfer data more quickly than standard Enhanced IDE hard disks—though the system failed to show a performance advantage in our tests.

Sys Technology's Performance Pro 266 turned in the strongest balance of business and MMX graphics performance. The system excelled in our MMX multimedia tests, racing past the competition in Adobe Photoshop, and also posted an impressive 262 PC WorldBench score. The Performance Pro 266 comes loaded for corporate use, with an ethernet network card and a SCSI adapter and hard drive, but at $4250, it is the most expensive unit we review here.

HIGH-CLASS OPTIONS

HEWLETT-PACKARD'S $3870 Vectra VL 6/266 is also tailored for corporate buyers, with HP's TopTools remote management software for network administrators and a lock system for securing the unit against theft. The system includes a 4.1GB EIDE hard disk and a 24X CD-ROM drive—among the fastest available. While the preproduction model we tested finished near the bottom of the Pentium II group in both PC WorldBench and MMX testing, it still far outpaces previously tested Pentium MMX and Pentium Pro systems.

Finally, for workstation-class performance, consider Intergraph's $3524 TD-225. The dual-processor design allows users to install a second Pentium II processor. This pricey $1198 upgrade can provide extra kick to applications under a multiprocessor-aware operating system such as Windows NT or OS/2. The TD-225 includes a multimedia keyboard that puts speakers and audio controls at your fingertips—but the large device hogs desk space. Unfortunately, the single-CPU system we tested was not a top performer.

THE K6 CHALLENGE

WE REVIEWED two AMD K6-based Polywell systems, both outfitted with 32MB of fast SDRAM and 512K of secondary cache. The $2569 Poly K6200Mx uses a 200- ▶

Better Dictation, Less Typing

DRAGON SYSTEMS announced the first mainstream product that lets you dictate text into a PC without having to talk slowly and pause between words. (Existing dictation products are tricky to learn and use because they force you to pause when speaking into them.) The company expects to ship the $695 Dragon NaturallySpeaking this summer. The Windows 95 version of the product requires a PC powered by a 133-MHz Pentium processor, with 32MB of RAM and a 16-bit Sound Blaster-compatible sound card.

Windows NT 5.0: Easier on Users?

WINDOWS NT 5.0 will support many ease-of-use features found in Windows 95, including Plug and Play for easier hardware installation, and notebook power-management features, Microsoft said recently. Like the next version of Windows 95, code-named Memphis, Windows NT 5.0 will support the Internet Explorer 4.0 browser interface, DVD drives, the Accelerated Graphics Port high-speed graphics standard, and the Universal Serial Bus standard for connecting peripherals. You will be able to upgrade from Windows 95 to Windows NT 5.0 without reinstalling all your applications, the company said. The software giant would not commit to a ship date, but a beta version of 5.0 will be available in the third quarter of this year. ▶

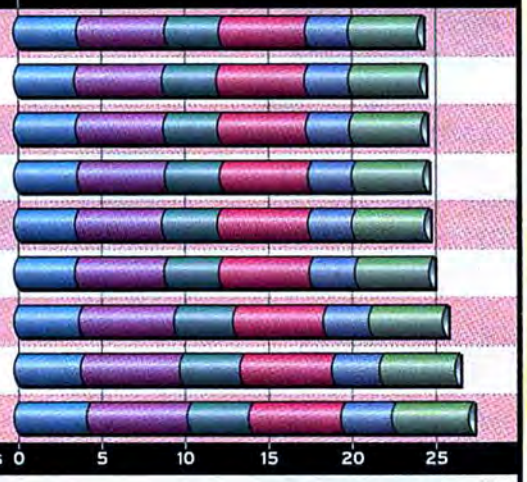
PHOTOGRAPHS: JOHN GREENLEIGH

The New Speed Champs Boost Business Productivity...

Top desktops rewrite the record books in your office.

A NEW PINNACLE FOR BUSINESS APPLICATIONS

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
Gateway 2000 G6-266M	Pentium II-266	32	512	263
Dell Dimension XPS H266	Pentium II-266	32	512	263
Sys Technology Performance Pro 266	Pentium II-266	32	512	262
Quantex QP6/266SM-4X	Pentium II-266	32	512	260
Intergraph TD-225	Pentium II-266	32	512	260
HP Vectra VL 6/266	Pentium II-266	32	512	258
Polywell Poly K6233Mx	K6-PR233	32	512	248
Polywell Poly K6200Mx	K6-PR200	32	512	241
Average for 10 Pentium-MMX 200PCs	Pentium MMX-200	32	512	231



How We Test

Business applications: We tested all systems with PC WorldBench, PC World's application-based benchmark. Higher PC WorldBench scores are better. For a description of PC WorldBench 1.0 tests, see PC World Online (www.pcworld.com).

Multimedia applications: We tested each system using a series of MMX-enabled applications. In Adobe Photoshop 4.0, we time several image editing operations. In Fractal Ray Dream Studio 3D, we time how long it takes to redraw rendered 3-D scenes at two levels of complexity. In Macromedia Director 5.0, we play a graphics-intensive Director executable file.

Data based on testing conducted by the PC World Test Center. All rights reserved.

MHz AMD K6-PR200 processor and achieved a PC WorldBench score of 241—slightly ahead of the fastest Pentium Pro-200 system we've tested. The Poly K6200Mx trailed Pentium MMX-200 competition in our MMX graphics tests, however.

The 233-MHz Polywell Poly K6233Mx, which runs on an AMD K6-PR233, posted a 248 PC WorldBench score yet costs just $2689. (The 233-MHz K6 units may not be available until after this article appears.) The Poly K6233Mx's MMX performance is significantly better than that of the Poly K6200Mx,10 seconds faster in our Adobe Photoshop and Fractal Ray Dream Studio 3D tests. With terrific price/performance, this system—and other 233-MHz K6 PCs like it—should appeal to all but the most demanding graphics professionals.

Both of the Polywell models come with large 5.1GB Enhanced IDE hard disks, 12X CD-ROM drives, and 17-inch monitors. These systems also include the Diamond Stealth 2000 3D graphics card with 4MB of DRAM, and a single USB port for hooking up fast peripherals.

If K6 has a weakness, it may be its performance with MMX-enabled applications. The Poly K6233Mx ran about 5 percent behind the average performance of the six Pentium II PCs in the PC WorldBench business suite, yet fell more than 20 percent behind in our MMX graphics tests. The shortfall was particularly steep in Adobe Photoshop—most of the deficit occurred in the image resize test, where the Poly K6233Mx took at least twice as long as some Pentium II PCs to complete the task. In image filter and color conversion Photoshop tests, the K6 ran close to the average for Pentium II competition.

THE PENTIUM II resides in Intel's Single Edge Contact cartridge, attached to a huge heat sink; NEC's version is shown.

PHOTOGRAPH: JOHN GREENLEIGH

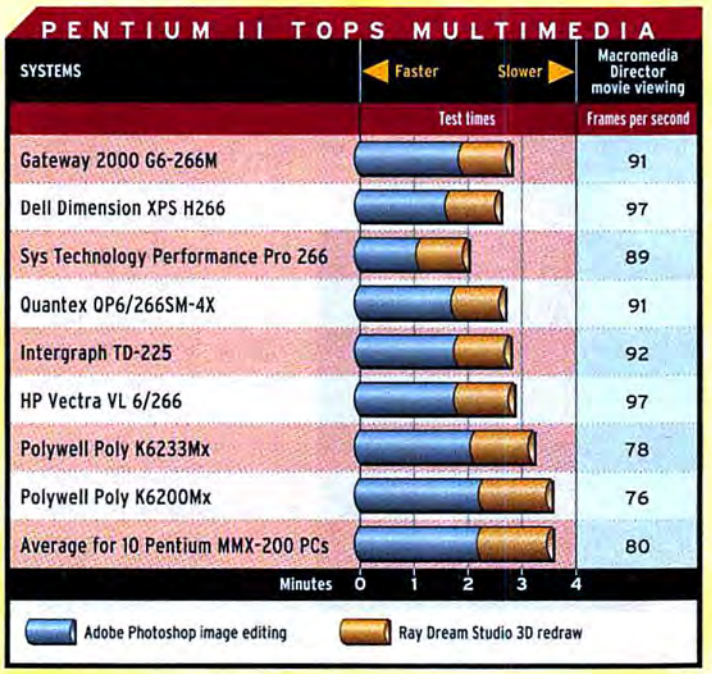
A BUYER'S MARKET

BUYERS AREN'T the only people confused by the hyperactive processor market. PC vendors must figure out how to present Pentium II alongside existing Pentium Pro offerings. And things will get more complicated soon: The forthcoming 233-MHz Pentium MMX, Cyrix M2, and faster versions of K6 running at 266- and 300-MHz all promise to put the squeeze on Intel's Pentium Pro and Pentium MMX franchises.

And new CPUs are just part of the story. Over the coming

...and Multimedia Authoring

Peak performance for your media studio.



months, improved chip sets, AGP support, and the emergence of MMX-enhanced software will further boost Pentium II performance. (Intel has already demonstrated a 450-MHz Pentium II, though it won't be available this year.)

Expect to see more on the K6 front as well. Shortly after this appears, 233-MHz K6 systems should be widely available. At press time, Everex, Micro Express, Robotech, and Sys Technology had all announced K6-based computers, and DEC said that it would develop K6 units. AMD suggests that at least one other major vendor will announce K6-based systems in the near future.

More good things are ahead. Patient power users will find Pentium II systems that feature faster SDRAM memory and graphics-boosting AGP support in the second half of the year.

So if you need top performance or want a system that will stay useful for years to come, Pentium II is your best bet. And bargains such as the Quantex and Gateway 2000 systems allow mainstream buyers to buy Intel's fastest processor. For a swift, more affordable PC, consider a K6-based system rather than a Pentium MMX model—our tests show that Polywell's K6233Mx runs faster than similarly priced Pentium MMX systems.

Complex as the market has become, there has never been a more compelling selection of systems. A little competition goes a long way.

—Michael Desmond ▶

Cheaper Net Access for Global Travelers

HOMEGATE HAS LAUNCHED a service that lets you get Internet access with a local telephone call, even if you're traveling outside the United States. The Global Internet Roaming Service provides local access in more than 690 cities in 160 countries. For additional information, see the company's Web page (www.homegate.net). Costs start at $5 per month, plus 50 cents a minute when you're overseas.

TidBytes:

FOIL NOTEBOOK NABBERS: Absolute Software's CompuTrace program tracks and reports the location of your notebook if it's stolen. CompuTrace hides on your hard drive, waits till the notebook's modem is plugged in, then calls a toll-free number at Absolute Software. Absolute then traces the call and alerts authorities. Cost: $29.95 per notebook, plus a $60-per-year service fee. Absolute Software, 800/220-0733, www.absolute.com. **MSN FACE-LIFT:** The Microsoft Network is revamping its interface and content lineup, axing 12 items and adding 14 new ones. For improved performance, the new MSN has fewer graphics, reducing download time. New content includes Personal Trainer, which offers health and fitness information, and interactive training programs. Music programming abounds: Hard Rock Live is an online companion to the weekly concert series broadcast on TV cable channel VH-1.

WAITING IN THE WINGS

More Competition Coming From Cyrix

INTEL and AMD may be duking it out, but it's far too early to write off Cyrix as a serious competitor. Last year the company impressed critics with its faster-than-Pentium 6x86 CPU. At press time Cyrix was on the verge of releasing its newest processor—M2. Like Pentium II and K6, M2 provides MMX instructions for speeding multimedia operations for MMX-compliant applications. And like K6, M2 plugs into the Socket 7 motherboards found inside Pentium and Pentium MMX systems, which should keep prices low. M2-based PCs could be available for under $2000, with most systems selling in a range close to that of competing K6-based PCs.

Martin Reynolds, analyst for research firm Dataquest, says that M2 will provide good performance on standard business applications at a low price. "It is going to be up there with the 233-MHz Pentium II and K6 parts, I would expect. They have a splendid design and great manufacturing capacity with IBM."

Reynolds says Cyrix's design wrings more performance out of each clock tick than the K6 does, allowing Cyrix's CPU to compete against the 233-MHz K6 while running at clock speeds of 187 MHz. But he says the slower clock and other design factors will make M2 MMX performance "quite a bit slower than the Pentium II."

E-Mail, Voice Mail, and Faxes From One In-Box? Getting Close

AS A BUSY sales professional, Marc Stuart has to reconcile two conflicting aspects of every business day: He's seldom in one place for very long, and he can't afford to be out of touch at any time.

"If someone calls me, they either need information from me or have information for me, and it usually can't wait," explains the technical sales manager for KDF Computer Services in Poughkeepsie, New York.

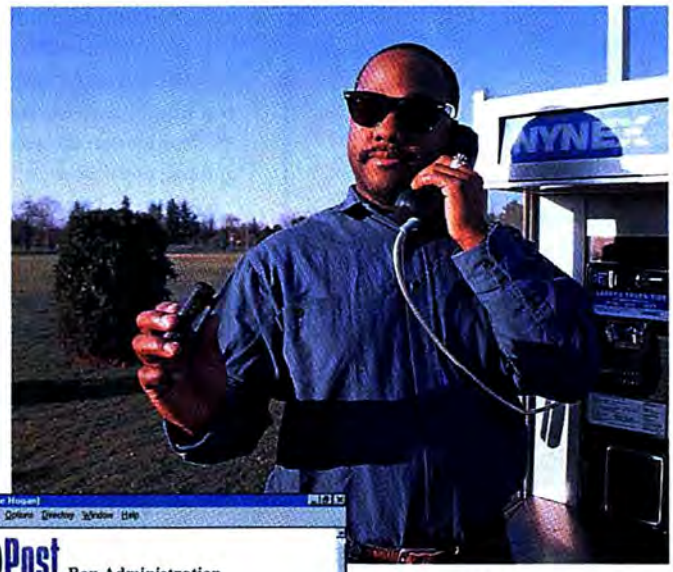
Stuart's solution is the iPost Universal Box. For $24.95 a month, this service forwards all his messages—telephone calls, faxes, and e-mail from eight locations—to his Web-based mailbox. iPost's technology lets him retrieve all the messages via his phone or a sound-enabled PC. iPost even pages him the moment a new message comes in.

iPOST'S CLEAN AND DIRECT INTERFACE assembles all message types in one place with minimal clutter.

Stuart is on the cutting edge of a messaging trend that has been a long time coming, but is finally here—sort of. Recently, a number of new products have appeared that get you very close to the dream of directing all your messages to a universal in-box.

A universal in-box would ideally let you pick up messages using the device of your choice regardless of the medium. So if you were near a phone, you could call your universal in-box and dictate or listen to e-mail or faxes. Connect via modem from a sound-enabled notebook PC, and you could listen to voice mail or view faxes. Prefer to read your e-mail over dinner? Have all message types sent to the hotel fax machine. One day, but not today.

In reality, it has taken years to get the incompatible data types of phone, fax, and PC to lie down together in one in-box. It could take years more tinkering with optical character recognition, text to speech, and voice recognition before you'll be able to pick up any type of message remotely using your choice of device.



SALES MANAGER Marc Stuart's universal in-box lets him get any kind of message anytime from anywhere.

THE SOHO IN-BOX

THE HOME-OFFICE worker or small company can find much of this functionality in new software and hardware products that cost $100 to $200 per user or in messaging services that charge less than $30 a month.

The newest options are universal in-box services that use the Internet for inexpensive remote access. These services have the least up-front investment and free you from dealing with hardware and software maintenance.

At $12.50 per month plus a $15 setup fee, JFAX's Personal Telecom is the cheapest. It's so inexpensive that you'll be tempted to set up different phone numbers in each city where you do business regularly, so your customers can leave voice mail and faxes at a local number. Messages are delivered over the Internet as e-mail attachments: Voice mail can be played on a multimedia PC; faxes can be read on screen. At this writing, though, you can't use a telephone to listen to your e-mail messages, a shortcoming the vendor expects to remedy in a future release.

By summer, CompuServe expects to offer a universal in-box service that lets you pick up e-mail, faxes, and voice mail by phone or PC. Neither the name nor the pricing for the service were available at press time.

As Stuart has found, iPost is the most complete solution for a busy sales professional with many points of contact. It collects messages from phone and fax numbers and e-mail accounts, does the necessary file conversions, and drops them into a single Web in-box accessible with any browser. The same messages are replicated in a voice mailbox, where they are available by phone.

OFFICE-BASED OPTIONS

IF YOU TYPICALLY work from your office PC, software products such as 01 Communique's Communicate and upcoming release Communicate Pro, Global Village's Focal Point 5.5, and Symantec's WinFax Pro 8.0, offer less expensive options. These products usually work fine in the office, but they're next to useless when you're on the ▶

PHOTOGRAPH: KATHY MCLAUGHLIN

QUARTERDECK

IT CAN REMOVE TIRED OLD PROGRAMS EVEN BEFORE THEY'RE WRITTEN.

(TOO BAD WE DON'T MAKE A VERSION FOR TV.)

New CleanSweep® 3 from Quarterdeck is so uniquely thorough, it can remove unwanted files and programs that won't even be on your PC for years.

Because with Update-It,™ CleanSweep is the only removal utility that can regularly and automatically update itself over the Internet. So right off, it has the ability to dispose of unnecessary files generated by programs that haven't even been written yet.

Of course, it can surely tidy up those that have.

Designed for Microsoft® Windows NT™ Windows 95

It already runs on Windows NT and Windows 95, and it comes with an application knowledge base of over 1,000 popular 16- and 32-bit programs. The same programs that spew debris all over the place every time you install them, or even when you download a file. Debris such as redundant DLLs, invalid registry entries, duplicate files and orphan files.

The law of personal computers: What goes in usually just stays there.

All in all, pretty messy stuff.

Eventually the inside of your computer resembles the inside of your closet, and you begin to wonder where all that valuable hard disk space went.

That's where CleanSweep's automated wizards come in.

With the determination of bloodhounds, they quickly locate the junk and either remove it automatically or, if you prefer, let you do it yourself. Furthermore, files you don't want deleted won't be. Our exclusive Safety Sweep™ provides the best protection available against accidental file deletion. It even automatically compresses and backs up the files it removes.

We may not know what tomorrow's software will look like, but we do know this – it won't be pretty.

CleanSweep 3 keeps your hard drive from getting stopped up.

So install CleanSweep, the only removal utility that can safely and successfully get rid of unnecessary files for years and years to come.

Get your own copy by visiting your nearest store today. Or call us at (800) 683-6696, code 01111, or pay us a visit at www.quarterdeck.com.

Circle 185 on reader service card

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UNIVERSAL IN-BOXES FOR SMALL OFFICES

PRODUCT	Cost	Description	Unique features	Reader service number
01 Communique Communicate Pro 800/668-2185 www.01com.com	not available	In-box software with contact manager, paging, telephony, and Internet phone. Due in July.	Good for heavy phone users; unlimited phone books and mailboxes.	756
CompuServe (service not yet named) 800/848-8990 www.compuserve.com	not available	Universal in-box service. Due this summer.	Retrieve messages with phone or PC.	757
Global Village Communication Focal Point 5.5 800/736-4821 www.globalvillage.com	$69	In-box software with contact manager, paging, telephony features.	Win 95-style in-box easy to navigate; good for manipulating files.	758
IRDG iPost Universal Box 888/476-7893 www.irdg.com	$24.95 monthly	Web-based in-box service with direct dial option.	Stores messages from many e-mail addresses and phone lines in one in-box.	759
JFAX Personal Telecom 888/438-5329 www.jfax.com	$12.50 monthly, $15 setup fee	Web-based in-box service for heavy fax users.	Inexpensive local presence in many cities.	760
SphereLink Communications TraveLink 888/774-3731 www.spherelink.com	$2000 for ten users	Web-based in-box with four-port modem.	Good option for small to medium-size business with Windows NT network.	761
Symantec WinFax Pro 8.0 800/441-7234 www.symantec.com	$99	In-box software; new version adds voice mail to popular fax, e-mail product.	Good for heavy fax users; integrates with Win 95 Inbox.	762
			All products:	912

road. You can retrieve voice mail messages over the phone, but the products won't read e-mail to you, nor will they let you read e-mail or faxes via a remote PC.

The most familiar product in this class is WinFax Pro. In its just-released version 8.0, the program adds voice mail support to its fax software. You get most of the messaging options in corporate universal in-box services. In 01 Communique's upcoming Communicate Pro, the company plans to add to its popular Communicate product an Internet phone and the ability to broadcast an alphanumeric paging message to many people.

One way for a small business to obtain full remote access features is with a local area network, a Windows NT server, and SphereLink Communications' new TraveLink. This server product puts your voice, fax, and e-mail messages into a Web-based in-box. You can access messages on the road using any standard Web browser. Still, TraveLink isn't cheap: the included four-port modem and software cost about $2000 for ten users—provided you already own the $3000 NT server.

BIG-COMPANY OPTIONS

YOUR BEST SHOT at experiencing the true convenience of unified messaging is to land a job at a Fortune 1000 company that can afford the $50,000-and-higher price tags for the most diverse products.

Large corporate telephone-management and data-processing departments have slowly hammered out the necessary political and technological compromises to create universal in-box systems with big-ticket client/server systems such as Lotus Notes, Novell GroupWise, and the new Microsoft Exchange 5.0.

Novell has been at it since 1994. GroupWise's Universal Mailbox links to voice and fax servers from vendors like CallWare Technologies. The new Callware 5.3, due this month, gives you several ways to retrieve messages from the road. You can play and record voice mail, hear e-mail with a phone or multimedia notebook, or attach a voice message or fax to an e-mail and forward it over the Internet to another mailbox.

Lotus has a similar strategy with Lucent Technologies: Universal Messaging service marries Notes to Lucent's Intuity Multimedia Messaging server (a Microsoft Exchange version is due in the third quarter). Intuity also provides remote access to all message types via PC or phone. And Intuity's tight links between servers lower administrative costs.

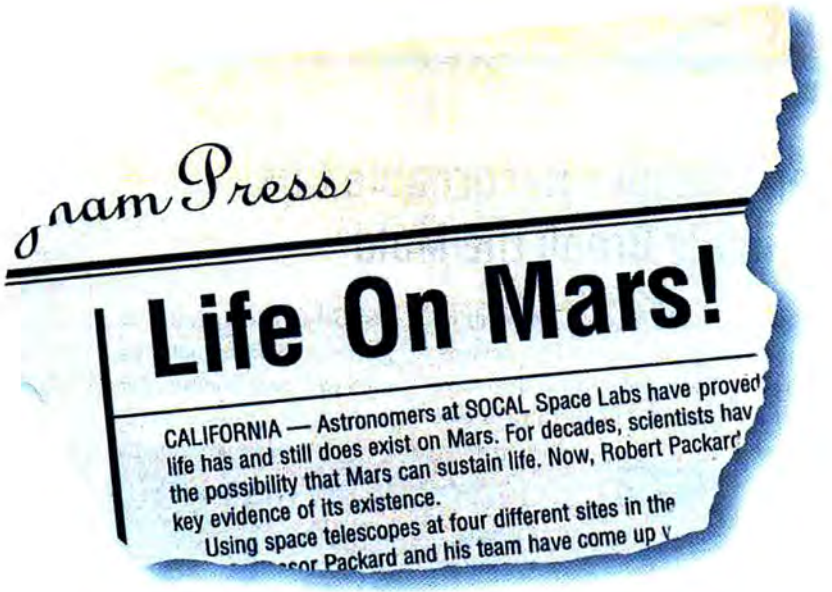
> None of these products—or any other—provides completely unified messaging.

The just-released Unified Messenger from Octel takes that ability to link servers a step further by actually performing voice mail functions on an MS Exchange 5.0 server. This product is also planned for Notes. The Unified Messenger has capabilities similar to those of GroupWise and Intuity. But the Octel product integrates so closely with the Windows 95 Inbox that you can use the group scheduling and other collaborative features of the new Microsoft Outlook 97, which ships free with Exchange.

But all still lack the necessary OCR and voice recognition capabilities that would enable you to hear your fax messages over the phone, receive your voice messages on a fax machine, dictate e-mail remotely, or convert fax or voice mail to e-mail.

Given the state of the technologies involved, none of these products—or any other solution, for that matter—provides completely unified messaging. The trick is to choose the one that matches your budget, messaging, and remote access needs. Marc Stuart went with the iPost service. "Overall, it's right on the money," he said. "Excuse me, I'm getting paged right now. I must have a message."

—Mike Hogan ▶

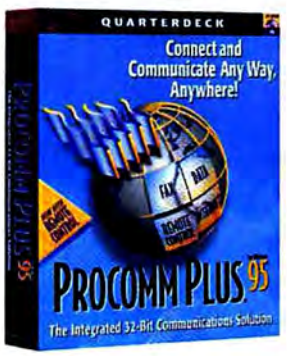


Great. Just when we'd perfected communications software for *this* planet.

We thought we had it all figured out. After all, our new Procomm Plus® for Windows 95 can connect you to virtually anyone, anywhere on this planet.

Especially now that we've integrated secure, fast remote control capabilities into the world's best-selling PC communications software. So you have quick, easy access to your files and applications wherever you are.

Our advanced fax features include OCR, annotation and scanner support for graphics and signatures. While our 36 terminal emulations help you link up to a wide variety of corporate host systems. We've also made life simple with access to the Internet via mail, a newsreader and state-of-the-art web browsing through the included Microsoft® Internet Explorer.



And we integrated it all with a Connection Directory that lets you fax, browse and transfer files without having to jump from one application to another or reconfigure your system settings every single time.

Basically, what we've created is the most advanced 32-bit multitasking communications package on earth. And for now, we'll just have to settle for that. To find out more call 1-800-282-0866, code 01718, visit your nearest store or come to www.quarterdeck.com.

QUARTERDECK.

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Circle 190 on reader service card

Easier, Cheaper Recordable CDs Finally Break the Mold

MAKING YOUR own CD-ROMs has just become practical, even if you're not a multimedia pro. The latest CD-Recordable drives are much faster and easier to use than their predecessors, and sell for about one-third the price that slower models commanded last year. Prices for recordable discs have also dropped—to about $6 each. At under a penny per megabyte, they're far cheaper than other mass storage options.

Moreover, today's disc recording software is much easier to use. CD-R drives finally offer a practical solution for backing up loads of data, making audio CDs, or sharing presentations, product catalogs, or other big files.

I tested three new CD-R drives: Smart and Friendly's low-price CD-R 2006, a 2X recorder and 6X reader; Olympus America's CD-R2x6, a midprice 2X/6X model (both use Sony drive mechanisms); and Yamaha Systems' high-end CDR400, a 4X/6X drive. All three are SCSI devices; Sony and Philips also have new SCSI CD-R drives (see chart below for details). Mitsumi, Yamaha, and Wearnes have announced IDE drives, which are typically less expensive but slower.

Smart and Friendly's $399 internal model offers the lowest price, but expect prices on many fully configured 2X/6X drives to drop below $250 by the end of the year. And faster CD-R drives should be available by then. At press time, Matsushita, through its U.S. partner ACS Innovations, was a few days away from shipping its Compro 4x/8x, a 4X/8X drive priced at about $600.

CD TWO-STEP: Easy CD-Pro (used on the Smart and Friendly CD-R 2006, above) lets you drag files from your desktop into the Data Track window (1), then click a toolbar icon (2) to create a CD-ROM.

My test units installed easily. I used Testa CD Labs' CD Tach to check each drive's reading performance in informal tests. Although their random access times, on average, were less than optimal—about 200 milliseconds, compared with 100ms for the best 8X or faster CD-ROM drives—these devices are fast enough to handle business tasks and most multimedia applications and games. You no longer need one drive for recording, another for reading. But beware that some drives, such as the Philips Electronics EasyWriter 2600, are slower—in that case you might need to keep your CD-ROM drive.

EASIER RECORDING

RECORDING HAS improved as well. Older CD-R drives suffered from "buffer underruns." If the hard disk paused while the CD-R drive was recording (not unusual in Windows 95), the process would stop and the disc would have to be junked. Virtually all CD-R drives now ship with 1MB or larger buffers. I experienced no buffer underruns, even when recording from devices other than a hard disk.

Finally, recording software has improved dramatically. Adaptec's Easy-CD Pro (soon to be updated and renamed Easy-CD Creator)—the effective standard—is bundled with most new CD-R drives. CeQuadrat and Elektroson also make easy-to-use CD-R software that lets you write large amounts of data in one session and are ideal for archiving data, creating ▶

CD-RECORDABLE DRIVES: PACKAGES AND PRICES

DRIVE	Street price internal/external	Write/read speed	Software	Hardware	Reader service number
Olympus America CD-R2x6 [1] 800/347-4027 www.olympus.com	$499/$649	2X/6X	Easy-CD Pro	none	750
Philips Electronics EasyWriter 2600 800/235-7373 www.pps.philips.com	$499/$599	2X/6X	Easy-CD Pro, Seagate Backup	none	751
Smart and Friendly CD-R 2006 [1] 800/959-7001 www.smartandfriendly.com	$399/$499	2X/6X	Easy-CD Pro	SCSI card, cable	752
Sony Computer Spressa 800/352-7669 www.sony.com/storagebysony	$499 to $599/$749	2X/6X	Easy-CD Pro or DirectCD, depending on price	SCSI card, cable	753
Yamaha Systems CDR400 [1] 800/543-7457 www.yamahayst.com	$749/$849	4X/6X	none	none	754

[1] Product tested. All products: 911

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audio CDs, and producing premastered discs for replication. Adaptec's other new software package, DirectCD, makes recording as easy as copying files to a floppy.

I created a variety of CDs, from simple data-only discs to multimedia, audio, and mixed audio and data discs, using Easy-CD Pro. I dragged and dropped the files or music selections, selected options, and clicked the Record button. A 2X unit records about 18MB per minute, but allow an extra few minutes for each recording because the drive must also initialize the session, test the system speed, and close the session. You can keep adding data to a disc, but you can't overwrite existing data.

All CDs made this way can be read on any CD-ROM drive. With other removable media devices, such as Zip and SyQuest drives, compatibility is always an issue.

Creating CDs with DirectCD is even easier. The program formats the CD-R disc much like a floppy, then lets you drag and drop files directly to it in fewer steps than with Easy-CD Pro. But to play the disc on a CD-ROM drive, users need DirectCD and Windows 95. Another option for letting CD-ROM users read a disc created in DirectCD is to "close" the disc, a process that consumes 16MB of disc space.

Clearly, CD-R drives have improved in both price and ease of use. Now is a good time to give this technology a second look.

—Jeff Sengstack

Rewritable CDs Arrive–But With Caveats

THE NEXT STEP in CD-R evolution is CD-Rewritable, or CD-RW (formerly called CD-Erasable). These discs are not only recordable but can also be erased and re-recorded–justifying their $25-per-disc cost.

I evaluated a shipping version of the first CD-RW drive, the Ricoh MP6200S, which carries a street price of about $600. This SCSI device installed easily. For recording, I used a slightly updated beta version of Adaptec's Easy-CD Pro, which can erase the entire contents of a disc. Adaptec's DirectCD and other packet-writing programs also work with CD-RW, allowing you to add, erase, or replace files by dragging and dropping them.

CD-RW technology has drawbacks, mostly software related. When you delete a file, the disc's directory reflects the change, but the file remains on the disc. If you "erase" a lot of files enough times, you will eventually fill the disc. You have to erase the entire contents of the disc to reuse it. The problem should be fixed in low-cost software upgrades.

A more significant problem: CD-RW discs are not readable on audio CD players, CD-R drives, or most CD-ROM drives (except for the newest models with MultiRead technology).

Finally, the MP6200S's performance failed to impress. Ricoh says that the drive reads at 6X, but my informal tests measured it closer to 4.4X.

• MP6200S $600 (street); Ricoh; 408/432-8800, www.ricohcpg.com

READER SERVICE NO. 763

WEB BROWSER

Sites That Spell Relief for Managers

A MANAGER'S LIFE is never easy. Once again, your chief accountant, Jim, yelled at an employee. He's an excellent number cruncher, but if he doesn't get rid of his temper, you'll have to get rid of him. Next week you address the Chamber of Commerce. Unfortunately, your last dinner speech ran on till breakfast, and Chamber members now call you The Mouth. To top it off, your boss wants you to work the next three weekends. Suddenly you feel like screaming.

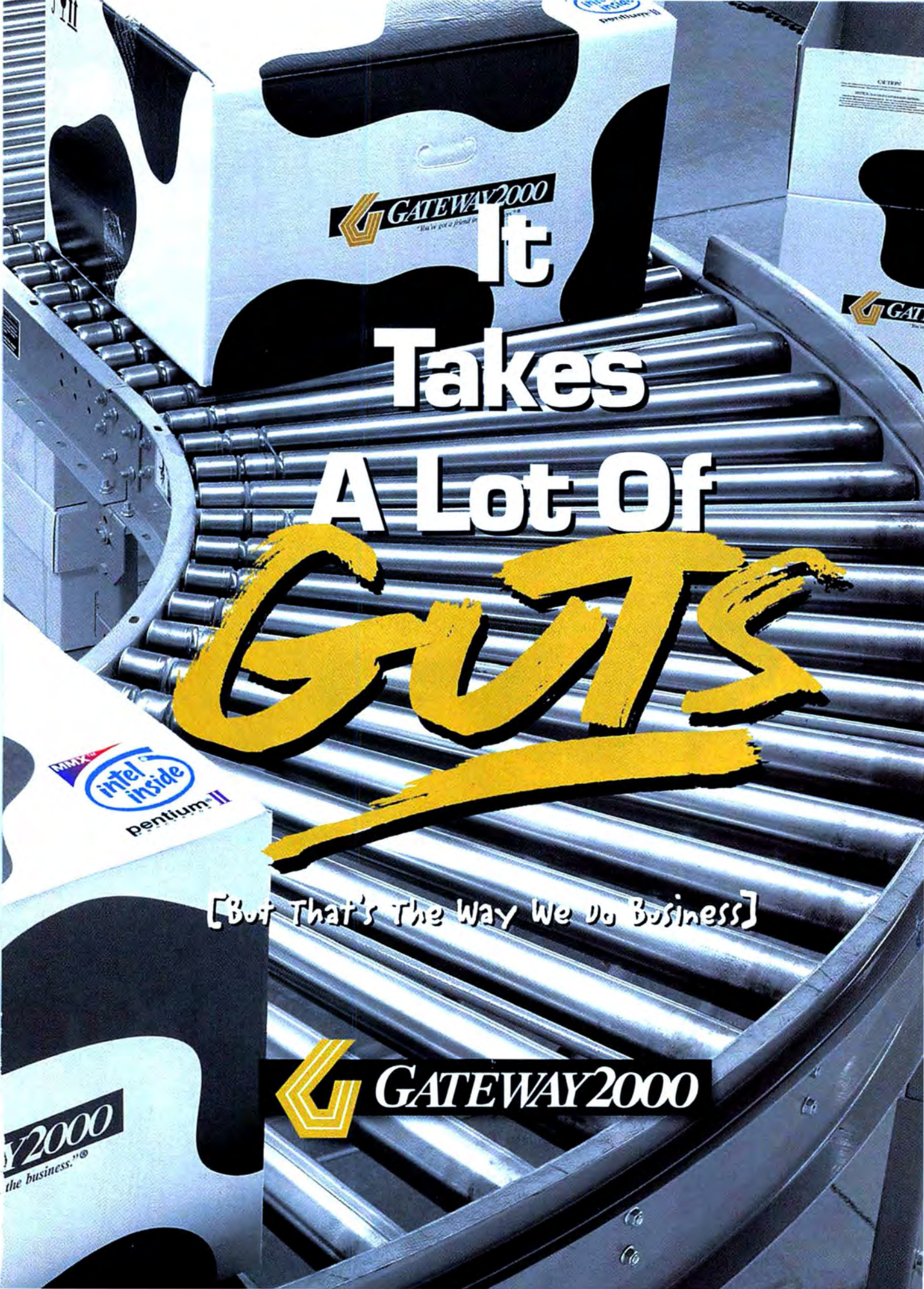
Relax–there are numerous sites to help you manage being a manager. **The Smart Business Supersite** (www.smartbiz.com) provides hundreds of tips on everything from marketing products to managing people. With Jim the accountant in mind, I typed 'Managing Anger' into SBS's Power Search feature. The site produced a scenario-rich essay on how to identify and deal with anger. Like other "free" sites, SBS is riddled with advertisements. But it offers great resources, including links to other sites and useful articles and books.

The Speaker's Companion (www.lm.com/%7Echipp/spkr home.htm) can help you earn a standing ovation for your next speech. Available at the site is an easy-to-use downloadable public speaking package. The $20 shareware program includes a variety of quotable quotes and a built-in timer for rehearsing. Though this site will not teach you all the skills you'd learn from public speaking organizations like Toastmasters International (www.toastmasters.org), it does use many of the Toastmasters techniques. And you can't beat the price.

THE SPEAKER'S COMPANION site offers resources to buff up your next presentation.

For stress management help, the **Cyber-Psychologist** (www.cyberp sych.com) is in. A click on the Stress Phobias Anxiety box provides coping advice and recommends books for those feeling burdened. The Career and Work Issues section covers a range of topics, including a page offering 21 tips for dealing with office politics. And the No Nonsense Personality Inventory is a humorous quiz in which you respond to probing statements such as "Spinach makes me feel alone." Sometimes a little nonsense is what you need to take the edge off of life in the business world.

—Randy Legge ■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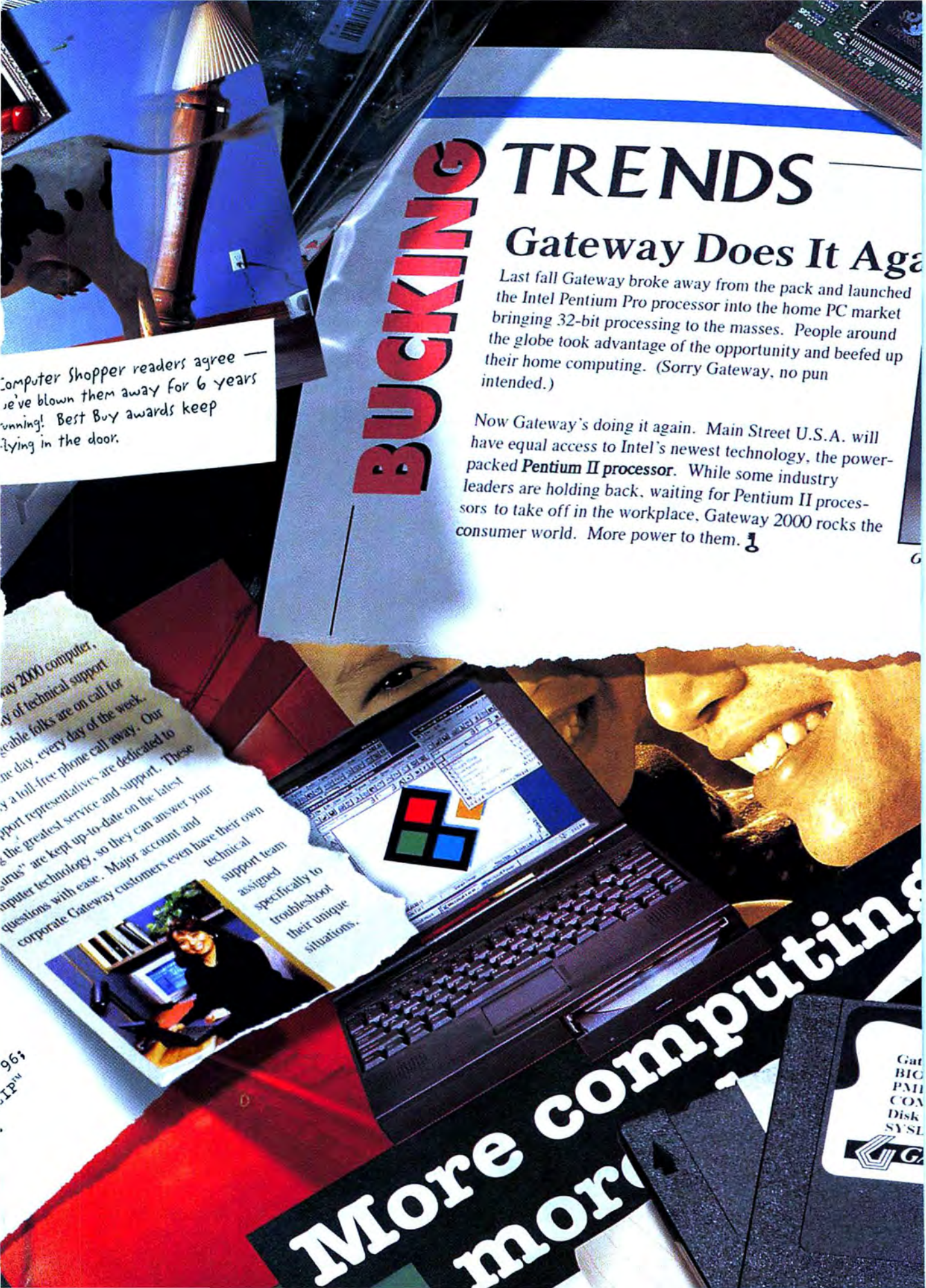

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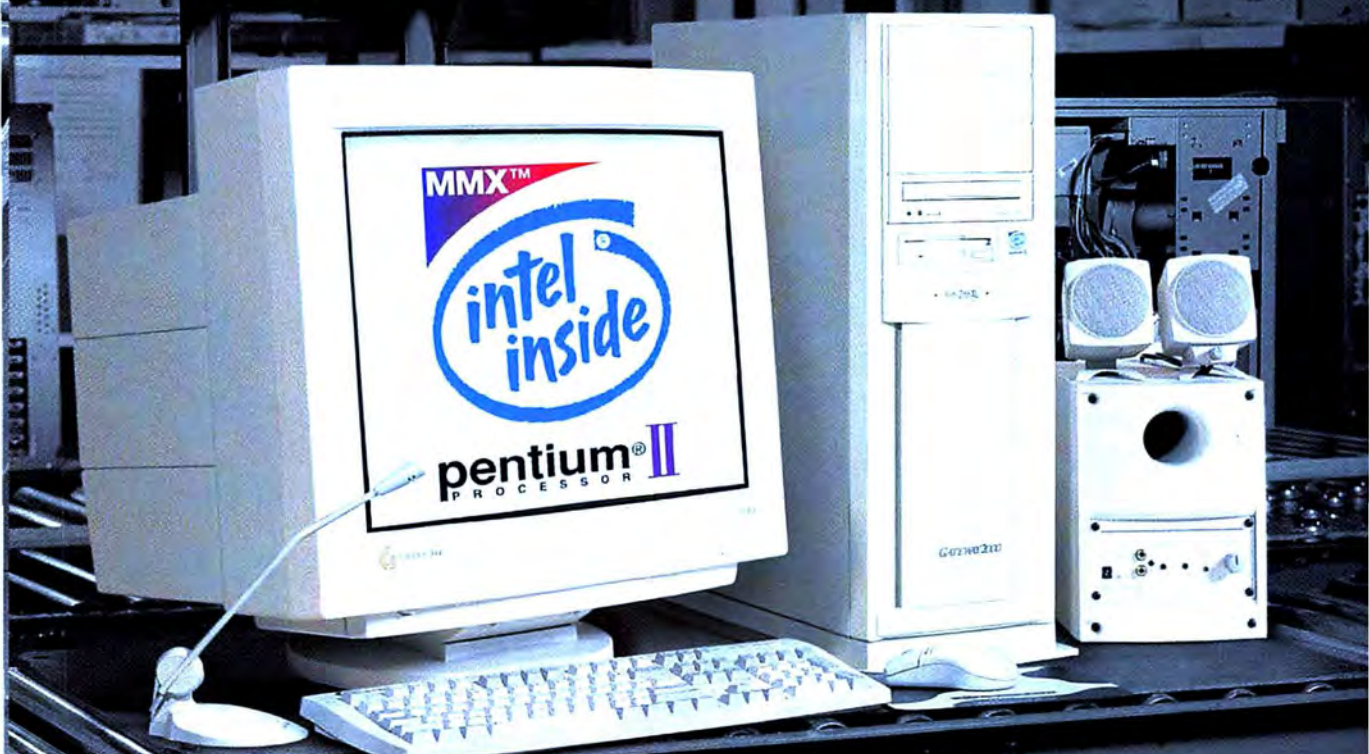

[This G6-266XL is loaded to the max, including a huge monitor with a 19.7-inch viewable area and the Boston Acoustics High-Fidelity 3-Piece Speaker system.]

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- 12X min/16X max CD-ROM & 3.5" Diskette Drives
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- 1.6GB 12ms EIDE Hard Drive
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- 256K Pipelined Burst Cache
- 2MB EDO Video RAM
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- Modular 3.5" Diskette Drive
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2200 S5-120

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- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
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- Modular 6X min/11X max CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- NiMH Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Works 95
- Gateway Gold Service & Support for Portable PCs

$2729 As low as× $95/mo.

2100 S5-120

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- 1MB EDO Video RAM
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NEW PRODUCTS

HP's New Vectras Are All Business

SERIOUS BUSINESS: Hewlett-Packard's new Vectra VL and Vectra XA series offer office PCs for all budgets, with new system management features that match the needs of a wide range of business users.

DESKTOP

IF YOU'RE BUYING PCs for a large business, it's easy to feel left out by the avalanche of systems designed for families, occasional Web surfers, or hard-core gamers. But you haven't been forgotten by the good folks at Hewlett-Packard.

HP's expanded **Vectra VL** and **XA** series are clearly meant for serious work in a corporate environment. Powerful and competitively priced, the Vectras are also equipped with HP's new TopTools application, which lets system administrators configure, manage, and troubleshoot networked PCs from a central location.

HP isn't unique in offering system management features, which can substantially reduce support costs for medium to large installations. But TopTools is the most extensive set to date, making these Vectras worth a close look for the corporate buyer.

The PC World Test Center tested a pair of high-end preproduction units—a VL with a Pentium MMX-200 processor, and an XA with a Pentium Pro-200. For those who don't need all the high-end features, the VL series includes models with street prices (sans monitor) ranging from $1181 (Pentium-133, 16MB of RAM, 1.6GB IDE hard disk, no CD-ROM drive or sound card) to $2211 (Pentium MMX-200, 32MB of RAM, 2.5GB IDE hard disk, 8X CD-ROM drive, and Sound Blaster 16 PnP audio). Graphics are provided by S3's Trio64, a common midlevel chip integrated on the motherboard.

For users who need all the extras, the Vectra XA series also offers a full range of choices for street prices (again, without monitor) from $1406 (Pentium-133, 16MB of RAM, 1.6GB IDE hard disk, no CD-ROM drive or sound card) to $3583 (Pentium Pro-200, 32MB of RAM, 4.5GB SCSI hard disk, 8X CD-ROM drive, and Sound Blaster 16 PnP).

All XAs come with network cards and Matrox's Millennium graphics card, a solid performer on *PC World*'s charts. On some models, a Quantum SCSI hard drive with Ultra-SCSI adapter offers massive storage, high performance, and the ability to add multiple

HP Vectra VL Series

PRO: Offers good mix of features and performance.

CON: No modem or speakers.

VALUE: Buy a bunch for your medium to large business.

HP Vectra XA Series

PRO: Network-ready; cutting-edge performance.

CON: Nothing major.

VALUE: Loaded systems at reasonable prices.

Hewlett-Packard Co.
800/752-0900
www.hp.com/go/vectracorporate
Street price: VL $1181 to $2211 (monitor not included), XA $1406 to $3583 (monitor not included)
READER SERVICE NO. 738

PHOTOGRAPHS: MARC SIMON

SCSI peripherals without having to install another card down the line.

None of the Vectras are equipped with modems, and even those with sound cards have no speakers, either—what you'd expect for an office system. Both series come with Windows 95 installed and a basic set of utilities. The XA series adds McAfee VirusScan antivirus software and Netscape Navigator; Windows NT 4.0 is a high-end option.

In our tests, versions of both systems turned in numbers slightly higher than those of a recently tested group of 19 Pentium Pros and 20 MMXs. Not surprisingly, the $2741 Pentium Pro 200–based XA that we tested edged out the $2211 Pentium MMX-200–equipped VL, but the numbers were surprisingly close. The VL system was helped by its 512K of secondary cache (the XA had 256K).

Sure, you can buy similarly equipped PCs for a bit less. But HP has a reputation for quality hardware and technical support. And with TopTools, the Vectras outdo competitors in lowering the cost of ownership for corporations that buy by the tens or hundreds.

—Stan Miastkowski

CONTENTS

82 HP Vectra VL and XA PCs
83 Recompute refurbished PCs
84 Digital HiNote VP 575, IBM ThinkPad 385D notebooks
84 Seagate Backup Exec 2.0
88 Cornerstone's Color 45/101sf monitor
88 HP JetDirect 150 X print server
88 HP DeskJet 672C printer
92 Hercules Stingray 128/3D graphics adapter
92 FirePort 40 Hard Drive Kit
94 Canon PowerShot 350, Kodak Digital Science DC120 Zoom
94 NoiseBuster Extreme stereo headphones
94 RapidRemote for Windows 95
96 HP 320LX Windows CE palmtop
96 Windrenalin HD accelerator
100 Print Shop PressWriter
100 i publish desktop publishing
107 Dr Solomon's Anti-Virus, PC-cillin II, VirusScan 3.0
110 LotusMail 4.5 Internet e-mail
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113 Adobe's PageMill 2.0
114 Astound's WebCast Personal

Recompute: Refurbished Brand-Name PCs at Unexciting Prices

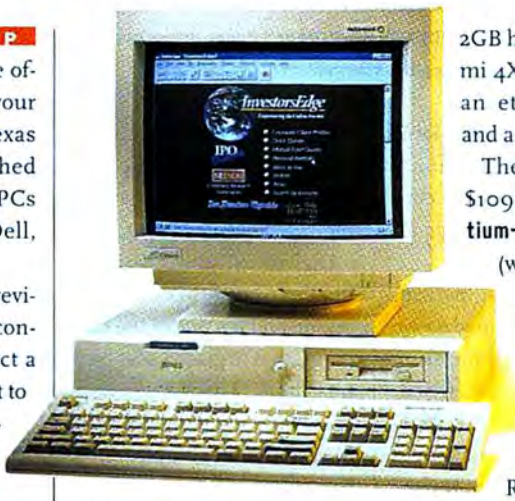
DESKTOP

NEED A BASIC PC for the office, or a second PC for your home? Recompute, a Texas company, sells refurbished Intel 486 and Pentium PCs from vendors such as Dell, Compaq, and IBM.

The systems may be previously leased units or discontinued models; you select a configuration but don't get to pick the vendor. Recompute tests these computers and adds RAM (for a total of 8MB to 16MB on most units), a new keyboard, a mouse, and a surge protector.

Recompute's advertised prices of $599 to $999 sound low—but prices jump if you want 16MB of RAM, Windows 95, and a hard drive large enough to accommodate a reasonable selection of software.

Recompute sent us two systems, one intended for home use, the other for business. The $1099 **Business Pro P-90,** a Pentium-90 desktop (in our case, a Dell), comes with 16MB of EDO RAM, a 256K secondary cache, a 1GB hard drive, an ethernet adapter, and a 14-inch monitor. It has no modem, sound card, or CD-ROM drive. The Business Pro P-90 produced typical Pentium-90 scores in PC WorldBench performance testing.



DOES NOT COMPUTE: Refurbished PCs from Recompute are pricey for what you get.

Its configuration, though, isn't generous compared to those offered by some brand-new systems in this year's wave of $1000 to $1500 PCs. For example, Vektron's $995 Corporate Station P-133 desktop packs 16MB of EDO RAM, a 256K secondary cache, a 2GB hard disk, a Mitsumi 4X CD-ROM drive, an ethernet adapter, and a 15-inch monitor.

The home-oriented $1099 **Recompute Pentium-90,** a tower unit (we got a Compaq), provides 16MB of EDO RAM, a 256K secondary cache, a 510MB hard disk, a Mitsumi 4X CD-ROM drive, a 14.4-kbps fax-modem, a 16-bit sound card and speakers, and a 14-inch monitor. Recompute also includes a small software package and its own QuickStart interface. However, you can buy a better-equipped home computer for the same money from AST.

Recompute Business Pro P-90, Recompute Pentium-90

PRO: Name-brand refurbished PCs.
CON: Skimpy configurations.
VALUE: Check out new systems in the $1000-to-$1500 range from other vendors instead.

Recompute
800/510-8414
www.re-compute.com
Street price: $1099 each
READER SERVICE NO. 739

Recompute PCs come with a 30-day money-back guarantee, a one-year limited warranty, and free tech support—but only for the first 30 days. You have to pay for support thereafter—a far less generous policy than the 90 days to one year of free support offered by the major vendors whose systems Recompute sells.

Unless prices or configurations get better, you should pass on these systems.

—Laurianne McLaughlin ▶

INTERNET

online

FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at www.pcworld.com/news.html.

EDITED BY
Yardena Arar and Laurianne McLaughlin

Floppy, CD-ROM Drives Double Up on New Notebooks From Digital, IBM

NOTEBOOK

WHILE NO notebook computer is a true desktop replacement, some new portables, including Digital's **HiNote VP 575** and IBM's **ThinkPad 385D,** are narrowing the gap.

These two are among the lightest units we've seen to offer internal floppy and CD-ROM drives. Compaq's Presario models have both drives as well, but they weigh almost 9 pounds. The VP 575 weighs 8.2 pounds, and the ThinkPad 385D checks in at 7.6 pounds.

Many other notebooks also offer both drives, but there's a catch—you can't have both inside the notebook at the same time. In most cases you either have to shut down the notebook to swap drive modules—which can eat up a lot of your time doing additional reboots—or you have to connect one of the drives as an external unit.

DIGITAL HITS ANOTHER HINOTE: CD-ROM and floppy drives make the VP 575 a strong, if pricey, desktop replacement candidate.

Performance results from the preproduction models we tested suggest that the shipping versions of the HiNote VP 575 and ThinkPad 385D will have an excellent shot at our Top 20 system review charts. The Pentium MMX-150–based 385D is by far the fastest and most feature-packed ThinkPad we've tested to date, and at $3899 it's one of the cheapest in the product line. With a PC WorldBench score of 200, the 385D performs more like the Pentium MMX-166 notebooks that we've tested, and it comes with some distinctly desktoplike features, including a 2.1GB hard disk and an 8X CD-ROM drive. Its 12.1-inch active-matrix screen provides roughly the same viewing area as a typical 14-inch desktop monitor and is a lot more pleasant to look at.

Digital's HiNote is based on the Pentium MMX-166 processor, and it's one of the fastest PCs yet to grace a seat-back tray table. The VP 575 kept pace with most of the Pentium MMX-166 desktops we've benchmarked. It, too, comes stocked with items that you'd expect to find on a desk-bound unit, including a 2.1GB hard disk and a 12X CD-ROM drive. The notebook also comes with a 12.1-inch active-matrix screen. Our main beef? The VP 575's steep $4499 price will put off many shoppers. Look for a review of the shipping model in July's Top 20 system review.

—Bryan Hastings ▶

Digital HiNote VP 575

PRO: Very fast, holds both floppy and CD-ROM drives.

CON: Expensive.

VALUE: Strong choice for people who need speed and don't mind paying for it.

Digital Equipment Corp.
800/344-4825
www.windows.digital.com
Street price: $4499

READER SERVICE NO. 740

IBM ThinkPad 385D

PRO: Fast, has floppy and CD-ROM drives, comfortable keyboard.

CON: IBM notebooks have been scoring below average in recent reliability surveys.

VALUE: Not a bad price for a prestige notebook.

IBM Corp.
800/426-2968
www.ibm.com/
Street price: $3899

TRIM, FAST THINKPAD: IBM's new ThinkPad 385D sports CD-ROM and floppy drives, and at $3899 it's unusually affordable for an IBM notebook.

QUICK TAKES

Seagate's New Backup Exec

Backing up is hard to do—especially for Windows 95 users confronted with a plethora of devices such as Zip, Jaz, optical, LS 120, and Power Drive, not to mention good ol' floppy and tape. But 32-bit backups need no longer be a nuisance with almost any appliance thanks to Seagate Software's $99 Backup Exec 2.0. The new one-button backup/restore feature works with virtually all mapped devices and even allows full restoration in the event of hard disk failure—without making you reinstall Windows 95 or the Seagate software. Other features include long file name recognition, Plug and Play, file searching, and backup scheduling. Seagate Software; 800/327-2232; www.seagatesoftware.com.

READER SERVICE NO. 741

—Randy Legge

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KM-511L	15" / 14.0"	1024 x 768	Digital	.28mm
KM-711L	17" / 15.8"	1280 x 1024	OSD	.28mm
Performance Series				
KM-520LP	15" / 14.0"	1280 x 1024	OSD	.28mm
KM-750	17" / 15.8"	1600 x 1280	OSD	.25mm
* KM-760B	17" / 16.1"	1600 x 1280	OSD	.25mm
KM-835	20" / 19.0"	1600 x 1280	OSD	.28mm

* Diamondtron Aperture Grill CRT. Diamondtron is a registered trademark of Mitsubishi Electric.

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PC WORLD TOP 10

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Circle 56 on reader service card

Big-Screen Debut: Cornerstone's New 19-Inch Monitor

MONITOR

IF YOU'RE LOOKING for a big screen on a somewhat constrained budget, you're likely to discover an image quality gap between high-end 17-inch monitors and bargain-price 20-inch models.

Now there's a 19-inch alternative. Cornerstone's new **Color 45/101sf** uses a 19-inch tube (engineered by Hitachi) that delivers an 18.1-inch viewable screen size—appreciably larger than the 15.9-inch viewable area of a typical 17-inch monitor, and only about half an inch shy of the viewable area of a 20-incher. The tube length is short, so it takes little more desk space than a 17-inch unit. And unlike low-end 20-inch models, the preproduction Color 45/101sf that I looked at delivered the same sharp image quality as a high-end 17-inch monitor.

CORNERSTONE'S 19-INCH monitor bridges the gap between 17- and 20-inchers.

There is a catch: At $1295, the monitor is priced more like a low-end 20-incher. Less expensive 19-inch monitors are coming—for example, Utobia's XT450 is slated to cost $895. But while these monitors use the same Hitachi tube, it remains to be seen if they'll have text and graphics that are as crisp and razor sharp as the Cornerstone's.

The Color 45/101sf's screen refresh rates are high—up to 81 Hz at an ultrahigh 1600 by 1200 resolution, and 115 Hz at 1024 by 768—which should reduce eye fatigue. The Cornerstone also displays far more detail than most low-end 20-inch models. The .26mm dot pitch tube has a new electron gun and special glass tinting that make text look sharper. Whether you're working on high-resolution CAD images or huge spreadsheets, that's good news if you want a big screen that doesn't flicker.

—John Goddard

Color 45/101sf

PRO: Big screen, high refresh rate, footprint similar to a 17-incher's.

CON: More expensive than upcoming competition.

VALUE: Large, sharp screen for serious users.

Cornerstone Imaging
800/562-2552
www.corimage.com
Street price: $1295

READER SERVICE NO. 742

QUICK TAKES

Better Small-Business Printing

You've got eight people and one printer in your small office. To share the printer, you could use a network file server or a PC as a print server, but neither is always easy to manage or troubleshoot. Hewlett-Packard's $150 JetDirect 150 X is the first print server in its price range for small businesses. This paperback book-size device connects to your printer's parallel port and your ethernet network. With HP's Jet Admin software and quick-start guide, you'll be up and running fast. The JetDirect 150 X works with Novell NetWare 3 and 4.*x* and Windows NT 3.5*x* and 4.*x* networks. Hewlett-Packard; 800/533-1333; www.hp.com/go/network_city.

READER SERVICE NO. 743

—Laurianne McLaughlin

Dual Cartridges Rev Up HP's Budget Ink Jet

PRINTER

HEWLETT-PACKARD has joined Lexmark and Epson in the migration away from single-cartridge ink jet printers. HP's new $199 **DeskJet 672C** competes head on with Lexmark's 2030 Color JetPrinter and Epson's Stylus Color 400.

What's so bad about ink jets that can hold only one cartridge at a time? Nothing, sometimes. Single-cartridge ink jets (such as HP's DeskJet 400, which the 672C supersedes) produce reasonable text with a black cartridge installed. But with a CMY color cartridge, they print *awful* blacks and muddy colors, as cyan, magenta, and yellow slop together in a miserable attempt to fake black or vary the shades of colors.

Preliminary tests show that the 672C, with side-by-side black and CMY cartridges, prints decent black text, very fine-grained gray-scale images that could use a little more contrast, and heavily saturated colors that swallow up some detail. Not perfect, but pretty good for $199.

The 672C handles letter- and legal-size prints, transparencies, labels, and card stock. It's easy to install and comes with a top-notch manual and the PrintPaks Pop-up Greeting Card Kit.

Fast, however, this printer is not: HP was just a tad overenthusiastic when it rated the 672C at 4 pages per minute for black text at 600 dpi. Look for more detailed PC World Test Center reports in an upcoming issue.

—Dan Littman ▶

Hewlett-Packard DeskJet 672C

PRO: Bargain price for dual-cartridge printer; great manual.

CON: Slow; so-so print quality.

VALUE: A very good deal if you're shopping on a budget.

Hewlett-Packard
800/752-0900
www.hp.com
Street price: $199

READER SERVICE NO. 744

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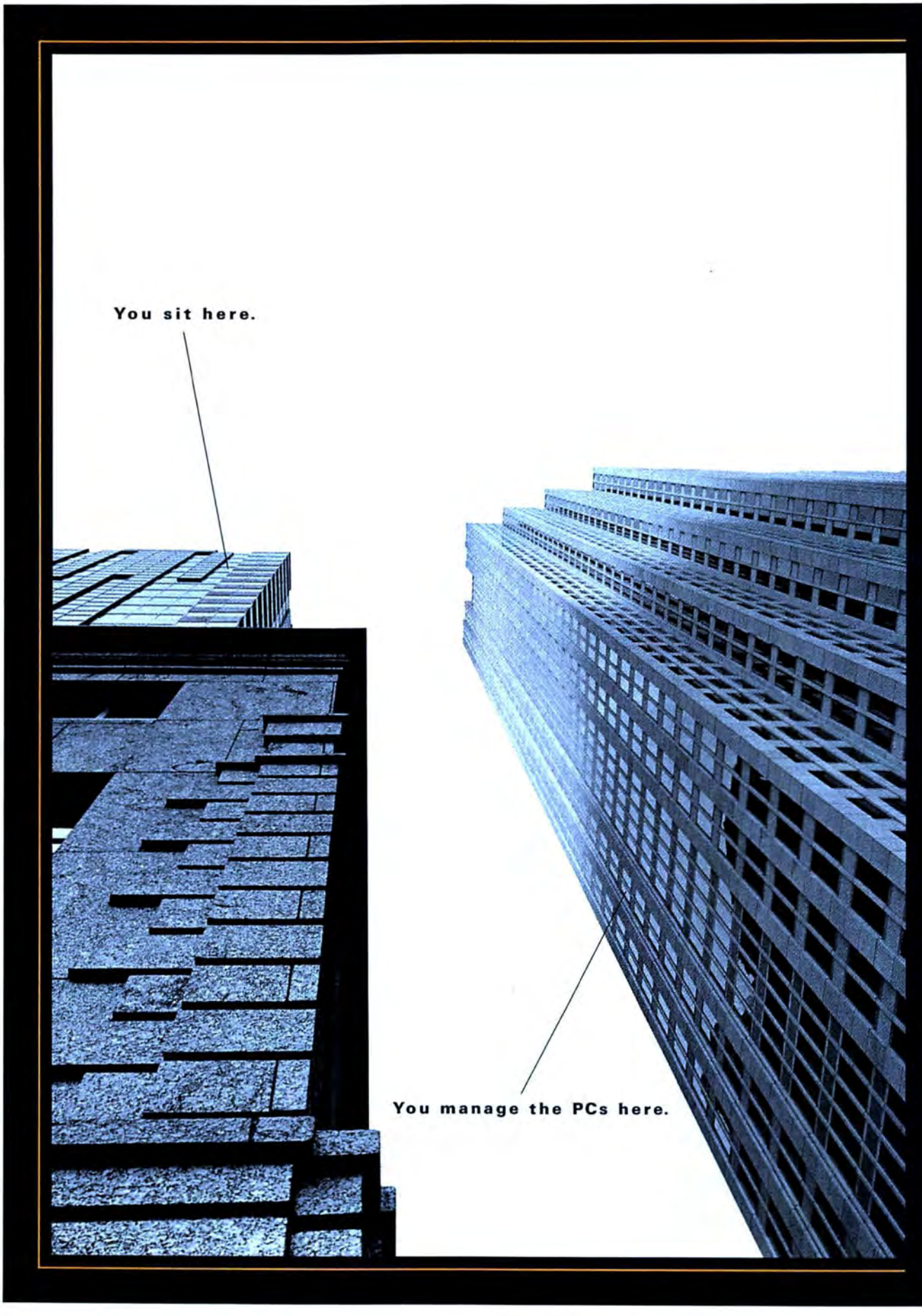
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Hercules Puts the Sting in 3-D

GRAPHICS CARD

TO GET THE BEST 3-D graphics on your PC, you once had to buy a separate add-in card, such as Diamond's Monster 3D or Orchid's Righteous 3D. Now you can get that same cool technology on a board that also handles standard 2-D graphics—at only slightly more than the price of the old stand-alone 3-D video cards.

Hercules' $299 **Stingray 128/3D** combines a standard graphics adapter and a small daughtercard featuring the new 3Dfx Voodoo Rush chip set. The Voodoo Rush marks the first significant upgrade to 3Dfx's flagship Voodoo Graphics chip set and delivers the same kind of realistic 3-D images as its predecessor.

Aside from the stunning 3-D graphics, the Stingray 128/3D is a sensible purchase because it also runs 2-D programs well. The Stingray has an Alliance 128-bit graphics chip and 4MB of EDO DRAM for moving highly graphical data to the monitor. It also has 2MB of extra memory for holding texture maps, which make 3-D objects look more full-blown and realistic.

An early version of the board with preproduction drivers performed solidly on our PC WorldBench tests. It's not as fast as boards that are based on Tseng Labs' 128-bit ET-6000 chip, but the finalized drivers should produce a speed boost.

The only significant drawback is a temporary one: All the 3-D games written for the older Voodoo Graphics chip set will require a patch that will be available at the Hercules and 3Dfx Web sites.

You can still play Microsoft Direct3D games with the Stingray 128/3D—and they'll look fine—but you'll have to wait a bit for games that take full advantage of the Voodoo Rush chip set.

—Brad Grimes

Hercules Stingray 128/3D

PRO: Requires only one PCI slot; fast 3-D.

CON: The best games aren't available yet.

VALUE: A sensible upgrade.

Hercules Computer Technology
800/532-0600
www.hercules.com
Street price: $299

READER SERVICE NO. 746

Diamond's SCSI Storage Fix

STORAGE

HARD DRIVES ARE like closets in a new home: They seem large when you move in, then inevitably fill to overflowing within a few months. Moreover, you probably access that jam-packed disk via an IDE bus, which limits the number and types of devices you can add to your system.

Diamond Multimedia's **FirePort 40 2.1GB Hard Drive Kit** tackles these problems by bundling Diamond's FirePort 40 Ultra-SCSI adapter with a 2.1GB Quantum Fireball TM Ultra-SCSI hard disk. The FirePort 40 offers throughput of up to 40MB per second, which won't noticeably speed up most business apps but would come in handy for disk-intensive tasks like heavy-duty video editing or CD-ROM mastering. The FirePort 40 also supports up to 15 devices in the different SCSI flavors (Fast, Wide, Ultra-Wide), so you'll be all set when you want to add a SCSI scanner, tape drive, CD-ROM or CD-R drive, or even a third hard drive.

ONE-STOP Ultra-SCSI storage shopping: Diamond Multimedia's new hard drive kit has everything you need to add 2.1GB of storage.

The benefit of this kit is convenience rather than price. At $500, you'd normally save no more than $25 compared to the cost of buying the principal components separately. But the kit gives you all you need for the installation, including the right cable and drivers. (Diamond also throws in some CD-Recordable software, a bonus if you have or plan to buy a CD-R drive.)

Installation of a shipping unit took me less than an hour; the trickiest part was setting the jumpers on the card so as not to conflict with other SCSI devices. If other devices are involved, you also need to make sure the termination jumper is properly set. While not difficult, these tasks could intimidate novices.

I wish Diamond had gone to the trouble of supplying one complete set of instructions instead of simply packing the manuals for the FirePort 40 and the Quantum Fireball TM plus an additional sheet of directions. Still, the FirePort 40 2.1GB Hard Drive Kit is a quick and fairly easy way to add storage to your PC—and prepare for further expansion down the line.

—Yardena Arar ▶

FirePort 40 2.1GB Hard Drive Kit

PRO: Convenient storage upgrade; SCSI interface allows for future expansion.

CON: Three sets of instructions.

VALUE: Reasonably priced package for do-it-yourselfers.

Diamond Multimedia
800/468-5846
www.diamondmm.com/
Street price: $500

READER SERVICE NO. 745

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Circle 204 on reader service card

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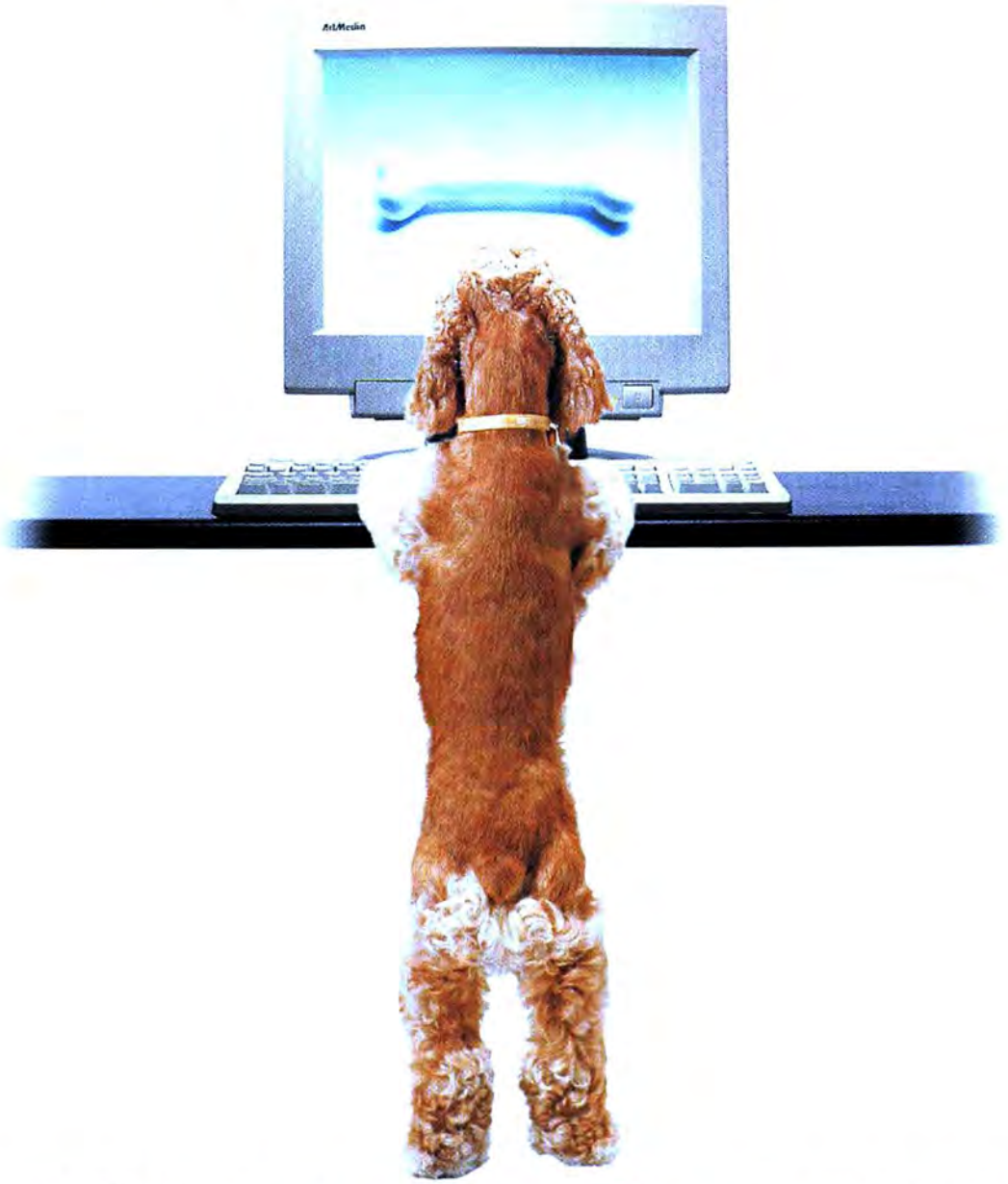

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New Digital Cameras Provide Fast Feedback

DIGITAL CAMERA

DIGITAL DELIGHT: Kodak's top-of-the-line Digital Science DC120 Zoom delivers 1280 by 960 images, but costs a hefty $999.

THE HOTTEST TREND in digital cameras is a built-in LCD screen, which lets you instantly view the images that you've taken so you can erase any you don't like. Two new digital cameras from Canon and Kodak both include color LCDs, which can provide critical feedback in the field for insurance claims adjusters, realtors, and other mobile users.

Canon's $699 **PowerShot 350** has a 1.8-inch LCD and a fixed-focus f2.8 (43mm) lens. It captures images at standard 640 by 480 resolution, in three different compression modes. Kodak's $999 **Digital Science DC120 Zoom** sports a 1.6-inch LCD and 3X autofocus f2.5 to 3.8 (38 to 114mm) zoom lens; it delivers images at higher resolutions—up to 1280 by 960—in three different compression modes plus an uncompressed option. Depending on the compression mode, the PowerShot 350 can store 11 to 47 images; the Digital Science holds 2 to 20. Prerelease versions of both cameras performed well and produced handsome images.

The compact, square-shaped PowerShot 350 takes some getting used to, because you must compose shots using the LCD screen; there's no optical viewfinder. Still, I found the PowerShot 350 easier to use than its higher-end cousin, the LCD-less PowerShot 600, and its image quality better than most other standard-resolution digital cameras'.

Both cameras include a built-in flash, a digital control panel, and a serial port connector (for downloading images to a PC); both support postage stamp–size memory cards for additional storage. Each is bundled with software (including a TWAIN driver) for editing images. For anyone who needs fast photos, either the Canon PowerShot 350 or the Kodak Digital Science is a worthwhile choice.

—Richard Jantz

Canon PowerShot 350

PRO: Quality images, LCD, removable memory.

CON: No optical viewfinder, short battery life.

VALUE: Produces sharper images than similarly priced competitors.

Canon Computer Systems, Inc.
800/848-4123
www.ccsi.canon.com
Street price: $699

READER SERVICE NO. 747

Kodak Digital Science DC120 Zoom

PRO: High-resolution images, 3X zoom lens, LCD, removable memory.

CON: No video output connector.

VALUE: Versatile, top-of-the-line camera.

Eastman Kodak Co.
800/235-6325
www.kodak.com
Street price: $999

READER SERVICE NO. 748

Procomm RapidRemote Connects the .docs

REMOTE ACCESS

QUARTERDECK'S **Procomm RapidRemote for Windows 95** resides in a rarefied realm—software that's easy to use, reliable, and a bargain. If you need to control your office PC from home or just log on and transfer documents, this $69 program offers access at less than half the cost of some competitors.

RapidRemote requires 5MB of hard disk space. Wizards make configuration easy. I connected to my office PC with no further tinkering.

Remote control functions and file transfer and synchronization are speedy. You can revert to the local desktop view via a toolbar button, as opposed to the obscure keyboard shortcuts required by rivals such as LapLink.

RapidRemote prints from the host computer to printers at either end. You can set the program to launch on start-up so your PC is always prepared to accept a call.

The program supports TCP/IP for connecting through the Internet, IPX for Novell LANs, and direct modem connections. But it doesn't support Windows 3.*x*—Windows 95 is required at both ends.

—Paul Heltzel ▶

Procomm RapidRemote for Windows 95

PRO: Easy, low-cost remote access.

CON: Needs Windows 95 at both ends.

VALUE: Mobile computing bargain.

Quarterdeck
800/354-3222
www.quarterdeck.com
Street price: $69

READER SERVICE NO. 755

QUICK TAKES

Quiet, Please!

I'd like complete peace and quiet, but I'm willing to settle for eliminating the racket from the cubicle next to mine. With the $69 NoiseBuster Extreme stereo headphone system, I got my wish. It's specifically engineered to cancel out external sounds while providing high-quality sound reproduction. Tiny microphones in the headphones analyze the frequencies of ambient noise in any environment and then generate a precise wave to neutralize it. The result: I hear only what the headphones are amplifying. Particularly startling is the price–competing noise-reducing headphones cost from $100 to $300. The small processor (about the size of a pager) uses two AAA batteries. A selector switch toggles between portable audio (for PCs) or airplane audio use. Noise Cancellation Technologies; 800/278-3526; www.nct-active.com.

READER SERVICE NO. 749

—Michael S. Lasky

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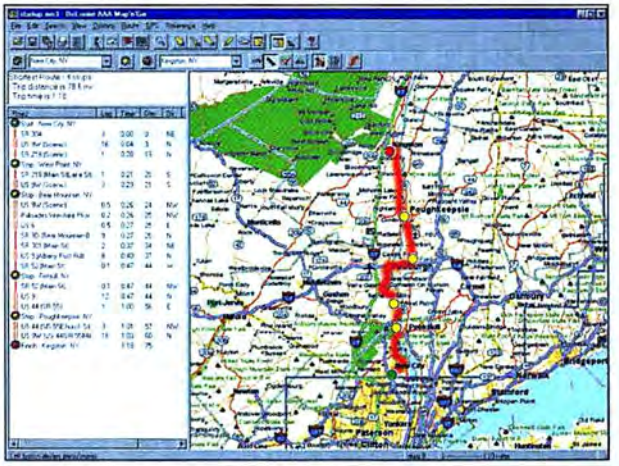

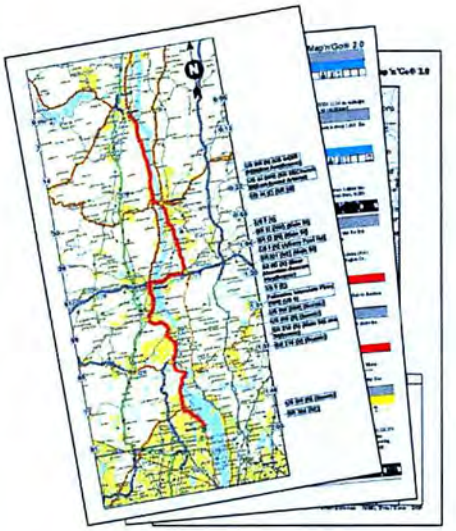

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HP 320LX: A Big Little Palmtop

PALMTOP

IT DOESN'T ALWAYS pay to be first. Hewlett-Packard has taken its sweet time delivering its Microsoft Windows CE–based palmtop, but the result was well worth the wait.

I tested a preproduction **HP 320LX,** the $699 top-end sibling to the $499 base model, the HP 300LX. The extra $200 gets you an additional 2MB of RAM (for a total of 4MB), an AC adapter and docking cradle, a dedicated CompactFlash card slot for easy data backup and restoration, and a surprisingly bright, low-power, backlit display. HP also includes drivers that let you print directly from the palmtop via serial cable or infrared, a feature no other Windows CE machine offers.

HP'S 320LX boasts the largest screen–and price–of any current Windows CE handheld.

HP 320LX

PRO: Well engineered, great software bundle.

CON: Windows CE still offers little user customization.

VALUE: Expensive, but you get what you pay for.

Hewlett-Packard
800/443-1254
www.hp.com/handheld
List price: $699

READER SERVICE NO. 764

The screen alone makes HP's Windows CE palmtop superior to early arrivals from Casio, Compaq, and NEC. I was particularly impressed by the 640-by-240-pixel dimensions; up to now, Windows CE machines have been limited to 480 pixels wide, which meant any document imported from a desktop would be scrunched up to fit on the screen until reformatted. HP has also reduced the irritating glare you get with touch screens.

The keyboard on this 15.6-ounce palmtop has well-spaced, responsive keys. The touch screen also is more readable than most, particularly with HP's specially rendered fonts.

My major complaint with Windows CE units has been the software itself. Pocket versions of Excel and Word are short on user customization and features, and there's little or no compatibility with non-Microsoft products. HP transcends this by bundling third-party software for LAN-based e-mail, faxing, and synchronizing major PIMs with the palmtop's calendar and contact manager.

The $449 Psion Series 3c, a Best Buy in May (see "Put a PC in Your Pocket"), is still my handheld of choice. But although the HP 320LX is the most expensive Windows CE palmtop at this writing, its smart engineering and bundle make it the one to beat.

—Michael S. Lasky

Windrenalin Promises Faster Hard Disks

ACCELERATION

WAITING FOR massive programs like Microsoft Word and Netscape Navigator to open can make you grind your teeth. Syncronys Softcorp's **Windrenalin** bills itself as an alternative to expensive system upgrades or dental work: It claims to perk up poky hard disks by streamlining data transfers and caching frequently launched programs.

Windrenalin installs easily from a single floppy disk, though the mandatory hard disk defragmentation step can take nearly an hour to complete. To boost program launches, you right-click application icons and Shortcuts and select the Accelerate command: Windrenalin processes the link for future launches. If the acceleration makes a program seem buggy, select Unaccelerate from the right-click menu to make future launches Windrenalin-free.

You can turn acceleration on or off and schedule disk defragmentation routines. An uninstall button returns your system to its original configuration if you run into trouble.

Does the software work? Well, sort of. We tested a shipping version of Windrenalin on a Pentium-90 PC with 16MB of RAM, and found it can improve system performance in some situations. Some application launches were over 10 percent faster in our tests—a gain of about a second off the launch times for Picture Publisher and Word. But there was no gain when launching Excel. The benefit within applications was even less compelling, with only the rotate-TIFF-image test in Picture Publisher showing significant speedup. Excel file operations actually slowed after installing Windrenalin, while Word performance remained flat.

If you're desperate to pick up the pace of program launches, you might consider Windrenalin. But like similar products tested for our April issue (see *Top of the News*), Windrenalin delivered only marginal improvements in our tests and came nowhere near the high-flying promises emblazoned on the box.

—Michael Desmond ▶

Windrenalin

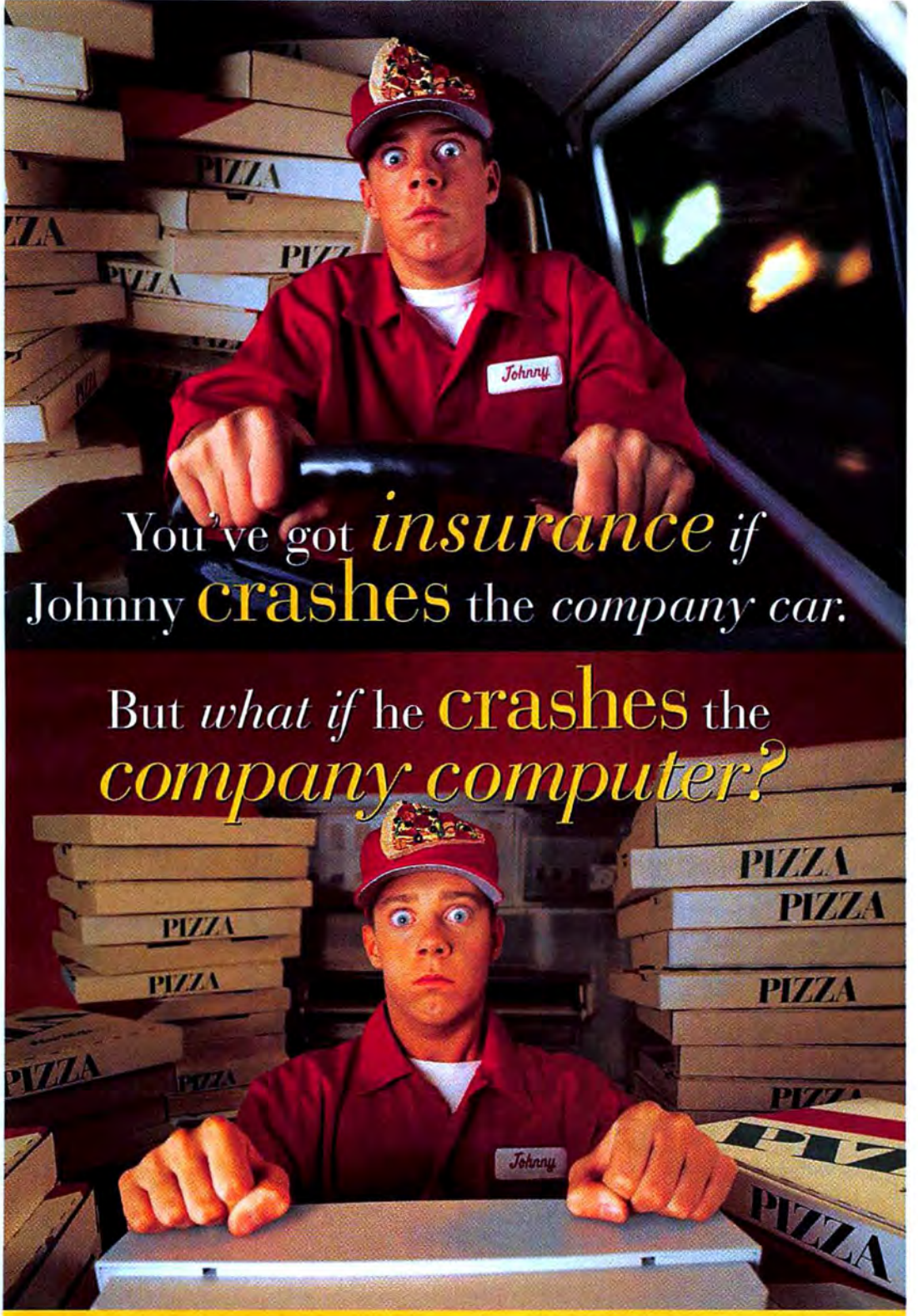
PRO: Speeds some program launches; simple interface.

CON: Little benefit within most applications.

VALUE: Marginal overall speedup limits value.

Syncronys Softcorp
888/777-5600
www.syncronys.com
Street price: $30

READER SERVICE NO. 765



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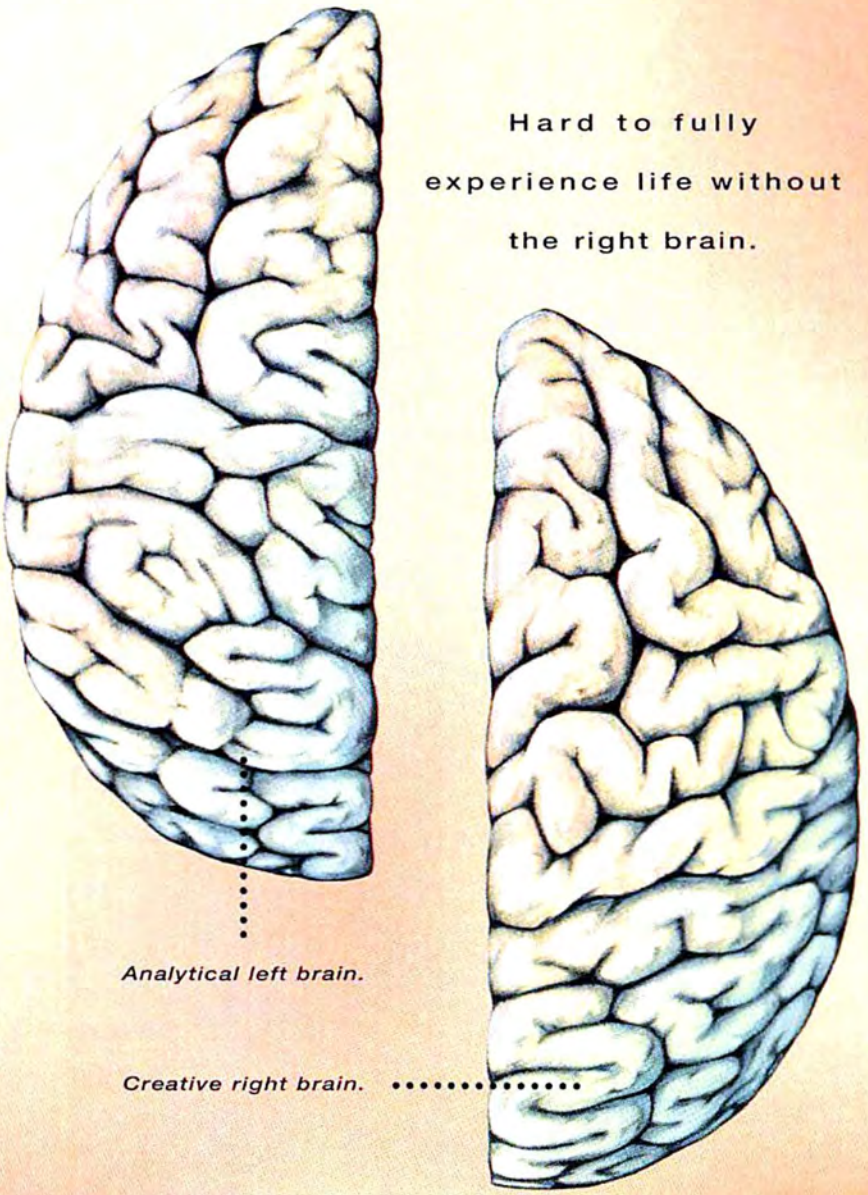

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MMX™ intel inside pentium®

Eyes and ears rejoice to Sony-tuned MPEG and 3D SRS® Sound.

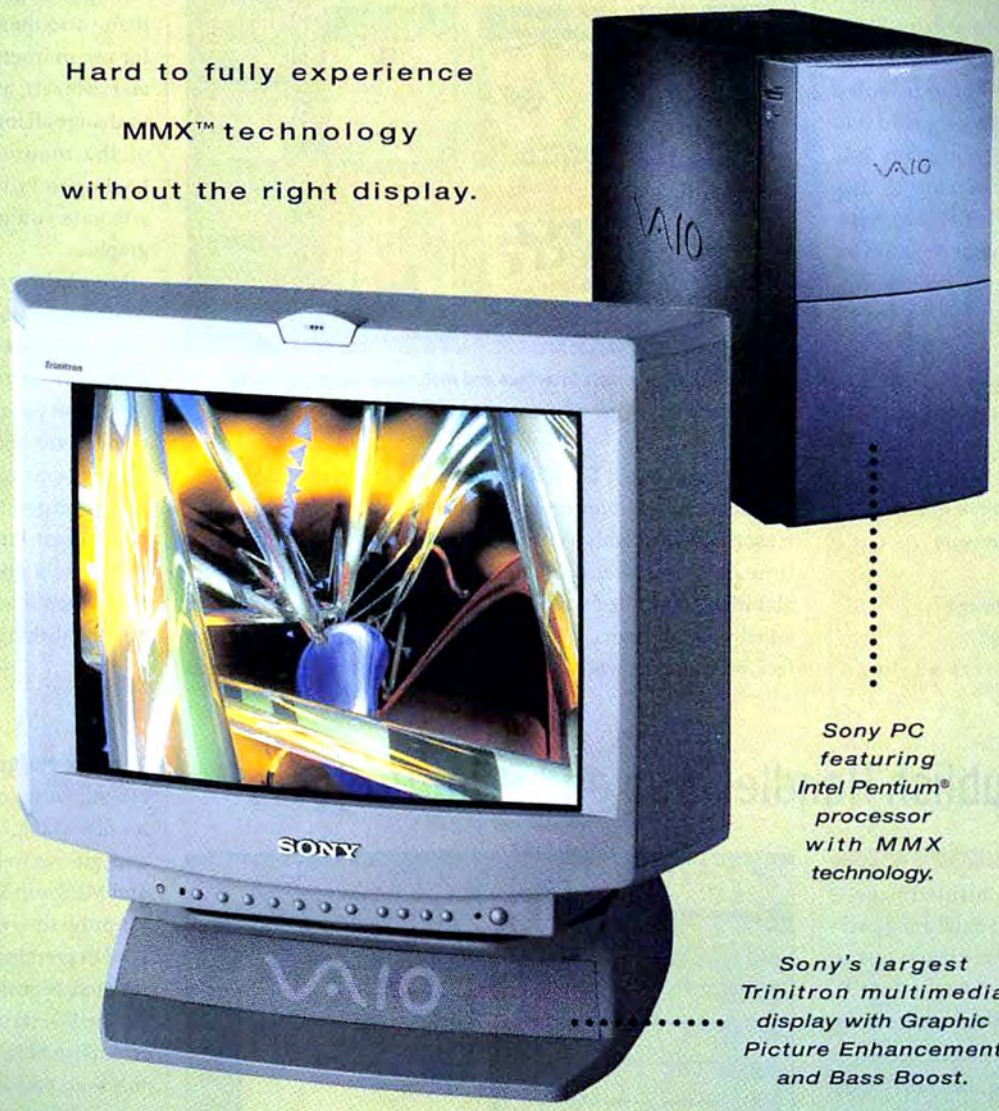
Subwoofer and speakers with Bass Boost so you can crank it up.

Exceptional online support whenever you need it and at-home service.

Intel Pentium processor with MMX technology for incredible multimedia.

SONY

Hard to fully experience
MMX™ technology
without the right display.



Sony PC featuring Intel Pentium® processor with MMX technology.

Sony's largest Trinitron multimedia display with Graphic Picture Enhancement and Bass Boost.

pc *by* sony

Hit the ground running with over 30 pre-installed software titles.

Graphic Picture Enhancement (GPE) makes things perfectly clear.

New 17" Trinitron® multimedia display with 16.0" VIS* delivers the big picture.

Get it together, and maximize your MMX technology experience.

1.800.4SONYPC
(1.800.476.6972)
www.sony.com/technology

Broderbund's Business Publishing Package a Boon for Beginners

PUBLISHING

BRODERBUND'S Print Shop, a publishing and graphics package for home-oriented projects such as cards and banners, has won many fans because it's so easy to use. Broderbund's **Print Shop PressWriter** is a similar program for small or home businesses.

Print Shop PressWriter

PRO: Easy business publishing, super multimedia tutorials.

CON: Graphics and template designs seem old-fashioned.

VALUE: Fine choice for novices.

Broderbund Software

800/521-6263

www.broderbund.com

Street price: $40

READER SERVICE NO. 766

EASY DOES IT: A simple interface and multimedia tutorials make Print Shop PressWriter a good choice for novice desktop publishers.

This Windows 95 CD-ROM package stands out for several reasons, most notably its multimedia help system. Clear, abundant, and filled with detailed walk-throughs, it's perfect for beginners who want to create a letter, résumé, newsletter, report, or brochure. Learning how on a full-featured word processor would be far more painful.

PressWriter is no slouch in the supplies department either, with 125-plus templates, 5000-plus graphic elements, and 100-plus fonts, all easily perused with built-in browsers. Features uncommon in budget desktop publishing packages include more than 1000 quotes and verses for use in insets; a thesaurus; and style sets, which allow you to change all fonts with a click of the mouse. One-button hookup to Print Shop's Web site gets you more tips and graphics.

My main gripe with the shipping version I saw is that many layouts and graphic elements seem kitschy and dated. But you can create your own layouts and import more contemporary graphics.

Don't expect to like all 5000 pieces of art, but at $40, PressWriter is a good choice for Print Shop veterans and business publishing novices.

—Yardena Arar

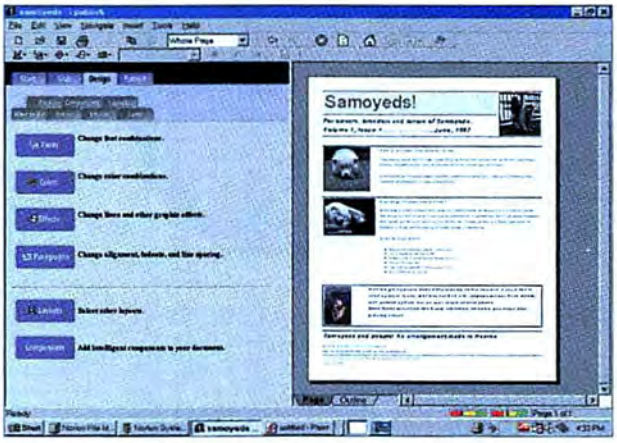
i publish Handles Web and Print Projects

PUBLISHING

WEB PAGE, printed page—most desktop publishing packages make you choose one or the other. Design Intelligence's **i publish** handles both, as well as on-screen presentations, and requires little expertise. This is truly desktop publishing for the rest of us.

i publish lets you crank out nifty-looking newsletters, brochures, marketing material, and of course that Web page—fast. Simply select from an assortment of templates or create your own using drag-and-drop tools and objects.

i publish also makes design adjustments easy. For instance, if you add a picture to an existing page, the program compensates by either creating another page or resizing the elements to fit on the page.



VERSATILE, EASY DESKTOP PUBLISHING: i publish makes Web, print, and presentation design easy, even for relative beginners.

You can embed graphics and text from Web sites—including i publish's—using Microsoft Internet Explorer or Netscape Navigator. The package supports common graphics files—.jpg, .bmp, .esp, .tif, and .gif—as well as ASCII text and Microsoft Word.

i publish—which I examined in prerelease form—isn't for professional designers. But for the SOHO user who wants to publish both online and off, this $149 package is a bargain.

—Joseph R. Gomolski ▶

i publish

PRO: Easy, professional print and Web publishing.

CON: Document templates somewhat limited.

VALUE: Excellent SOHO choice.

Design Intelligence

888/278-2547

www.design-intelligence.com

Street price: $149

READER SERVICE NO. 767

A handful of companies create great PC's.

Only Quantex creates great PC's **for less.**

MMX™ intel inside pentium® II PROCESSOR

QUANTEX GOOD CHOICE.℠

The Quantex PC.

No one creates longer lasting

Let's be honest. Technology never stands still. And even the greatest PC you can buy today may need upgrading tomorrow.

With one notable exception A Quantex. Because only a Quantex affordably offers you advanced technology like Intel's latest Pentium® II Processor, DVD, Universal Serial Bus and K56flex™ modems. And because of Quantex's quality system designs, you'll enjoy advanced performance for longer and for considerably less than you'd pay for any other great PC.

Pentium® II processor

The highest-performing Intel processor. Combines the power of a Pentium® Pro processor with the magic of MMX™ technology. At 266MHz, this processor is capable of delivering nearly two times the processing power over a 200MHz Pentium® processor.

We create advanced technology. We work only with recognized industry leaders at the design stage to ensure we always have advanced, proven technology.

We create enhanced performance. Meticulous engineering and use of top-performing , name-brand-only components ensures that the performance characteristics of every Quantex PC are unrivaled. And, all systems are built in ISO 9002 certified manufacturing facilities so quality is assured.

We create uncompromising service. We deliver the finest technical support in the business with hundr ds of highly-trained professionals on call 24-hours a day, seven days a week p you. No recordings here.

We create value. We (eliver the best value in the PC industry, hands down. When you consider our purchasing power, fast inventory turnover and the lowest overhead in the business, our value offering simply cannot be outdone.

Check out our technology-packed QP6/SM-4x for an incredible $3,199.

PC World 5/97

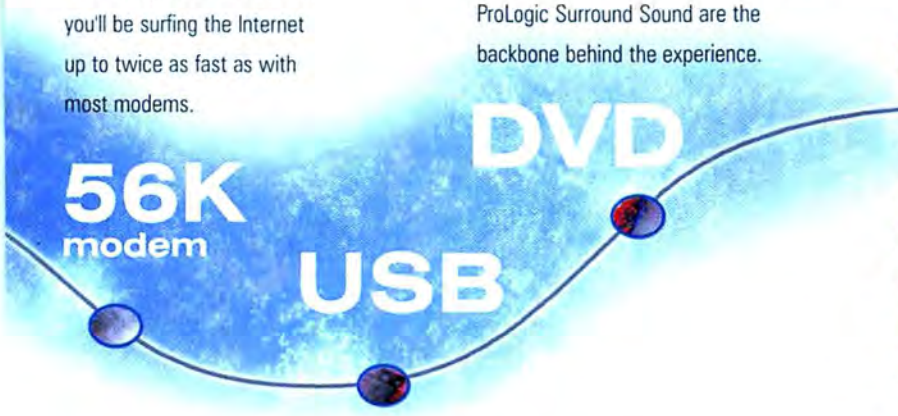
"With a PC WorldBench score of 230, this minitower is one of the fastest (200MHz Pentium® Pro processor-based) system we've seen."

performance for less.

MMX™ intel inside pentium® II PROCESSOR

Conforming to the K56flex™ standard that has been endorsed by more than 400 leading high-tech companies, you'll be surfing the Internet up to twice as fast as with most modems.

Where video CD and high-capacity CD-ROM converge. DVD will turn your PC into a home theater experience by providing superb quality audio and video. MPEG-2 compression and Dolby ProLogic Surround Sound are the backbone behind the experience.



Finally, true plug & play. No more IRQ or COM port conflicts when it comes to connecting hardware. Two USB ports come standard on most Quantex systems so you can take advantage of the new, hot USB peripherals.

QP6/266 SM-4x

(featuring the Pentium® II Processor)

$3199 Business lease: $ 104/Mo.

- 266MHz Pentium® II Processor
- 64MB EDO Memory /512KB Secondary Cache
- 6GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-400 Speakers w/ ACS-250 subwoofer
- ATX Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Quantex Software Bundle (including Corel WordPerfect Suite)
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/166 SM-4 (with MMX Technology).....$2449
QP5/200 SM-4 (with MMX Technology).....$2649
QP6/200 SM-4 (with Pentium Pro processor)...$2699

DVD Upgrade Package

- Toshiba DVD ROM (upgrade from 16X Max CD ROM)
- DVD Decoder Board
- Altec Lansing ACS-500 Speakers w/ ACS-250 subwoofer (upgrade from ACS-400 Speakers)

Add $499

PC Computing 4/97

"The best priced MMX(™ technology) machine you'll find - and it's loaded with extras."
Winner of ★★★★★ *rating.*

Computer Shopper 3/97

"The Quantex QP6/200 Pro-4 gets kudos for overall value, delivering a superior balance of features, price and performance."

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www.quantex.com

No one engineers more multimedia power.

QP5/200 SM-3

(with MMX™ Technology)

$2299 Business lease:$ 80/Mo.

- 200MHz Pentium® Processor with MMX™ Technology
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory / 512KB Pipelined Burst Cache
- 4GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-45 Speakers w/ subwoofer
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Quantex Software Bundle (Including Corel WordPerfect Suite)
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/166 SM-3 (with MMX Technology)..... $2099
QP6/200 SM-3 (with Pentium® Pro Processor*).....$2399
QP6/266 SM-3x (featuring Pentium® II Processor)...$2799

History continues to repeat itself as Quantex is once again among the first to incorporate the latest technology advances from the leading industry manufacturers into high-performing, high-quality systems. This month, it's K56flex™ protocol modems, DVD*, Universal Serial Bus technology and Intel's latest processor technology, the Pentium® II processor*.

The perfect compliment to MMX™ Technology

Intel's newest TX chipset will really make your MMX instructions fly. Supporting all types of memory, you'll be rewarded with lightening-fast data transfer. This chipset is available on all Quantex systems featuring the Pentium processor with MMX technology.

Surf the Web at two times the speed

Utilizing the most widely-accepted standard, K56flex™ adopted by over 400 leading high-tech companies, your days of patiently waiting for files

*available as an upgrade

Did You Know ?

Quantex PC's consistently offer top-notch performance and

Along with many other awards, Quantex was recently awarded PC Computing's coveted "★★★★★" 5-star rating in April, 1997!

UPGRADES (available with system purchase)

- Special DVD Upgrade ..... See Below
- Panasonic PD/CD-Rom Drive w/ one 650MB PD cartridge.. $279
- Three(3) Panasonic PD cartridges $99
- APC Back UPS Office (price reflects $30 manuf. rebate)... $169
- 3Com 3c905 PCI NIC $89
- Motorola ISDN Terminal Adapter $189
- Microsoft Natural Keyboard (upgrade from 104-keyboard) .. $39
- Microsoft Sidewinder 3D Pro Joystick $59
- HP Deskjet 692C Printer (w/ photo color kit) $299
- HP Laserjet 5L-FS Printer $399

(all upgrades are covered by manufacturer's warranty)

to download are over. K56flex technology was specifically created to allow you to download as much information as quickly as possible. We think that's very good news for you power Net surfers.

Hop on the Newest PC Bus

Say goodbye to IRQ and COM port conflicts when adding hardware. Most Quantex systems now come standard with two Universal Serial Bus ports so you can take advantage of the newest USB peripherals like digital cameras, joysticks and more.

DVD - A whole new world

You've read all the hype, but now it's really here. Quantex is proud to be among the first to offer this revolution in CD technology. DVD (Digital Video Disk) technology offers unsurpassed video, provided by MPEG-2 compression and outstanding audio, thanks to Dolby ProLogic Surround Sound. Add to that an enormous 4.7GB storage capacity. Experience movies and multimedia in a whole new way.

DVD Upgrade Package:

- Toshiba DVD ROM
- DVD Decoder Board
- Altec Lansing ACS-500 Speakers w/ACS-250 subwoofer

Your system purchase:	SM-1 or SM-2	SM-3	SM-4
DVD Upgrade Package Cost:	$599	$569	$499

QUANTEX SOFTWARE BUNDLE

- Corel WordPerfect Suite
- Comptons Interactive Encyclopedia
- Comptons Reference Collection
- Comptons Zoo Explorer
- Quicken SE
- Mocern Age Books Windows 95 Primer
- BodyWorks 5.0
- Key Master Maps
- Mecklermedia's Official Internet World Yellow Pages
- Epoch Dial Internet Service
- One-month trial memberships to AOL, CompuServe and Prodigy
- POD*
- The Third Dimension*

*included with systems with MMX technology only

Power Multimedia Series

QP5/166 SM-1 (with MMX™ Technology) $1749

Business lease: $61/Mo.

- 166MHz Pentium Processor with MMX™ Technology
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory / 512KB Pipelined Burst Cache
- 2.5GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- 64-bit PCI 3D with 4MB
- 15" Digital Monitor (14.0" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-40 Speakers
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Quantex Software Burdle (Including Corel WordPerfect Suite)
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/200 SM-1 (with MMX Technology)..... $1949
QP6/200 SM-1 (with Pentium Pro Processor*).... $2049
QP6/233 SM-1 (featuring Pentium II Processor).... $2399

QP5/166 SM-2 (with MMX™ Technology) $1949

Business lease: $68/Mo.

- 166MHz Pentium Processor with MMX™ Technology
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory / 512KB Pipelined Burst Cache
- 3.2GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Mystique 3D w/4MB SGRAM (Free 3D game included!)
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-40 Speakers
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Quantex Software Bundle (Including Corel WordPerfect Suite)
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/200 SM-2 (with MMX Technology)..... $2149
QP6/200 SM-2 (with Pentium Pro Processor*)..... $2249
QP6/233 SM-2x (featuring Pentium II Processor).. $2599

QP5/200 SM-4 (with MMX™ Technology) $2649

Business lease: $92Mo.

- 200MHz Pentium Pro Processor with MMX™ Technology
- 2 Universal Serial Bus (USB) Ports
- 64MB EDO Memory /256KB Internal L2 Cache
- 6GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-400 Speakers w/ ACS-250 subwoofer
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Quantex Software Bundle (Including Corel WordPerfect Suite)
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/166 SM-4 (with MMX Technology)..... $2449
QP6/200 SM-4 (with Pentium Pro Processor*) $2699
QP6/266 SM-4x (featuring Pentium II Processor)..... $3199

*(includes 256KB Internal L2 Cache)

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No one delivers an easier network-ready solution.

Out-of-the-box-and-onto-your-Network

We've partnered with 3Com® to bring you a combination of peak system performance and unquestionable reliability on your network. All Quantex WS systems are 3Com-certified because the network-cards are pre-installed, pre-tested and certified to work within your network environment. And Novell® and MS Windows NT® certification give you real peace of mind.

Featuring the Pentium® II Processor

Intel's latest Pentium II Processor was engineered specifically for high-performance desktops, workstations and servers. You'll get the best performance available for 32-bit apps running on advanced operating systems. Integrated 512MB cache makes it the right choice for power workstations.

QP5/120 WS-1

$1249 Business lease: $ 44/Mo.

- 120MHz Pentium® Processor
- 16MB EDO Memory/512KB Pipelined Burst Cache
- 1.2GB EIDE Mode 4 HD/3.5" 1.44MB Floppy Drive
- 64-bit PCI 3D w/2MB
- 15" Digital Monitor (14.0" viewable)
- 3Com 3c509 ISA Combo NIC
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/133 WS-1.....$1279
QP5/166 WS-1.....$1349
QP5/166 WS-1.....$1449
(with MMX™ Technology)

QP6/266 WS-4x

(featuring Pentium® II processor)

$3699 Business lease: $ 120/Mo.

- 266MHz Pentium® II Processor
- 64MB EDO Memory/512KB Secondary Cache
- 4GB Ultra Wide SCSI HD / 3.5" 1.44MB Floppy Drive
- Adaptec 2940UW PCI Ultra Wide SCSI Controller
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- 3Com 3C905 PCI 10/100 NIC
- Toshiba 12X 115ms SCSI CD-ROM Drive
- ATX Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows NT 4.0 Workstation
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/166 WS-4.....$2899
(with MMX™ Technology)
QP5/200 WS-4.....$3099
(with MMX™ Technology)
QP6/200 WS-4.....$3149
(with Pentium Pro Processor - includes 256 Internal L2 Cache)

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www.quantex.com

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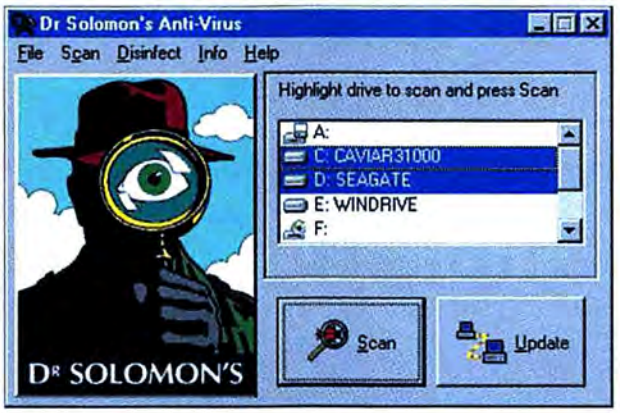
Antivirus Update: Lower Prices, More Features

ANTIVIRUS

COMPUTER VIRUSES are a genuine threat, but there's no need to be paranoid. The best defense is to use an antivirus utility, an essential part of every PC user's tool kit. We looked at three of the latest: **Dr Solomon's Anti-Virus, McAfee's VirusScan 3.0,** and **TouchStone's PC-cillin II.**

Although each claims to be the ultimate antivirus utility, the bottom line is that all do an excellent job of finding and removing viruses. All have been certified by the National Computer Security Association as being able to detect all viruses known to be "in the wild"—that is, at large. All three sport similar features, including the crucial abilities to perform virus scans on demand and to detect viruslike activity continuously and unobtrusively in the background.



THE EYE HAS IT: Dr Solomon's Anti-Virus sports a simplified interface, Web updates, and a competitive price.

All offer protection from Office 97 viruses, which are quickly becoming a common source of PC infections because they can travel in e-mail attachments. And all three programs cost about $50. Nonetheless, there are some differences.

Dr Solomon's Anti-Virus (yes, Dr Solomon is a real person) is from the company with the longest experience in computer viruses, and the software has a well-deserved reputation for effectiveness. An earlier version with the same virus detection engine—Dr Solomon's Anti-Virus Toolkit—won a Best Buy in our March roundup (see "Virus Killers: The Best Software for Protecting Your PC"). But it also had a reputation for high cost, and updates weren't available online. The newest version (for Windows 95 and 3.1) changes that, with a $50 price and an Update button that connects to the company's Web site and downloads monthly virus-signature-file updates. However, only one update is free; you'll need to spend $29.95 for a year's subscription to additional updates.

McAfee is the market leader in antivirus products, and the latest version of VirusScan has some tempting extras. Versions for Windows 95, NT, and 3.1, and DOS and OS/2 Warp 4.0 are all included in the box, and the base price gives you a full year's worth of free virus-signature updates.

In addition, McAfee is the first antivirus maker to use "push" technology to automatically download updates to your PC when you're connected to the Web. Called SecureCast, the service is optional and free. But some users might prefer to avoid the advertising that comes with pushed data.

TouchStone's PC-cillin II includes support for Windows 95 and 3.1. In addition to the usual features, it has a unique —albeit busy-looking—Smart Monitor screen that provides you with a wealth of information about your level of virus threat. It also takes a singular approach to updates. Via the Web, three virus-signature updates are free for the first 90 days, and it costs $29.95 for a year's worth of Web updates after that. But if you connect to the company's BBS via an 800 number, unlimited updates are free for the life of the product.

Pay your money and take your choice. When it comes to antivirus software, just do it.

—Stan Miastkowski ▶

Dr Solomon's Anti-Virus

PRO: From most experienced antivirus company.
CON: Just one free update.
VALUE: New lower price.
Dr Solomon's Software
888/377-6566, 617/273-7400
www.drsolomon.com
Street price: $50
READER SERVICE NO. 768

PC-cillin II

PRO: Threat assessments for specific systems.
CON: Busy user interface.
VALUE: Can't beat the free updates via BBS.
TouchStone Software
800/531-0450, 714/969-7746
www.checkit.com
Street price: $50
READER SERVICE NO. 769

VirusScan 3.0

PRO: One year of free updates, multiplatform support.
CON: Nothing major.
VALUE: Solid product from market leader.
McAfee
408/988-3832
www.mcafee.com
Street price: $49
READER SERVICE NO. 770

FEELING THREATENED? PC-cillin II's Smart Monitor offers centralized control and keeps you informed of virus infection routes.

"This free CD will increase your productivity _____ % (number) in _____ days, making (number) you _____ , (adjective) so you can spend more time _____ ." (verb)

For more information visit us at www.symantec.com. CD available in PC format only. Symantec is a registered trademark and ACT!, WinFax PRO, Internet FastFind, LiveUpdate and Norton AntiVirus are trademarks of Symantec

Just imagine what the real stuff can do.

Everyone who runs a small business has different goals. You just need some time to accomplish them. That's why our software was designed to save time. So you can do more business.

Let's say you came out with a new product. And you want

to let the world know. Well, at least potential customers. Just plug in the information and ACT!™ provides you with your contacts' names, their addresses, phone numbers, the last orders placed, the name of your prospect's spouse and dog.

You could then fax the details to your sales leads

simultaneously from your computer with WinFax PRO.™ No more hours printing, standing at the fax machine

or battling pesky paper jams.

As for the Internet, the million dollar question remains: time saver or black hole? But thanks to Internet FastFind,™ you can now harness several search engines at once without duplication. Translation: you can find stuff on the Internet really fast.

Of course, you won't be harnessing anything if you have a computer virus. If someone brings in an infected floppy, then zap. Meltdown. Fortunately, Norton AntiVirus™ detects and destroys viruses and repairs infected files.

All of these small business solutions include LiveUpdate,™

which automatically gives you the latest software updates. And in the case of Norton AntiVirus, the very latest virus definitions, free of charge.

You see, although you may have filled in some of the blanks differently, Symantec's small business solutions will help everyone have time to do more

business. Check out our CD that allows you to test them in your own work environment.

There's no_____to waste.

(noun)

Order your free trial CD.

Get ACT!, WinFax PRO, Internet FastFind and Norton AntiVirus, free for 30 days. Call now for your trial CD.

1-800-835-6222 ext. 9257

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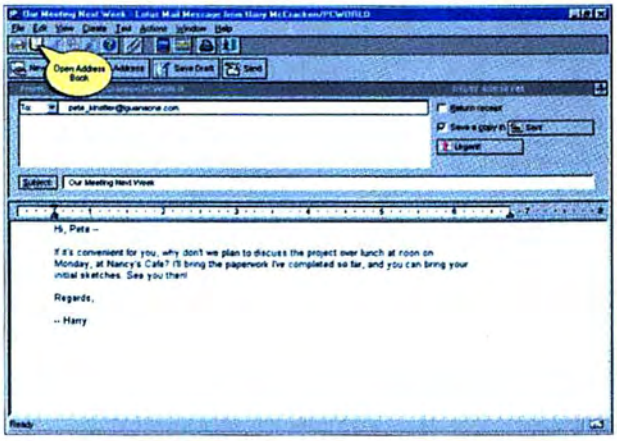
LotusMail: cc:Mail, Net Style

E-MAIL

LotusMail 4.5 may be a new kid on the e-mail block, but its face will look familiar to many office workers. That's because this $35 Internet e-mail client, which I used in prerelease form, has a user interface nearly identical to that of Lotus's cc:Mail, the longtime market leader among LAN-based e-mail systems.



DÉJÀ VU: LotusMail brings the familiar interface of cc:Mail—the popular LAN-based e-mail system—to Internet e-mail.

But while cc:Mail uses a proprietary communications backbone, LotusMail uses the standard SMTP and POP3 Internet e-mail protocols, so you can use it with any dial-up Internet service provider.

If you're feeling limited by a bare-bones e-mail client that your ISP provided, some of LotusMail's advanced features will be very attractive. Its rules-based filtering is a powerful antidote to in-box clutter: For instance, you can create a rule to automatically trash spam messages. The package also supports LDAP, a burgeoning standard designed to provide Internet e-mail with the same sort of shared address books that have always been a basic feature of cc:Mail.

Where LotusMail falls notably short is in features that take advantage of the World Wide Web. While Web addresses within messages do get converted into clickable links, you can't use HTML to compose messages with fancy fonts and colors. Also, there's no easy way to look up e-mail addresses using Web-based directories such as Four11.

For these features, you'll need a more Web-savvy mail client, such as the Messenger module in Netscape's Communicator suite.

—Harry McCracken ▶

LotusMail 4.5

PRO: Powerful rules-based filtering, reasonable price.

CON: No rich formatting, can't easily use Web directories.

VALUE: A familiar interface, but weak on Web features.

Lotus Development Corp.
800/448-2500
www.ccmail.com
Street price: $35

READER SERVICE NO. 771

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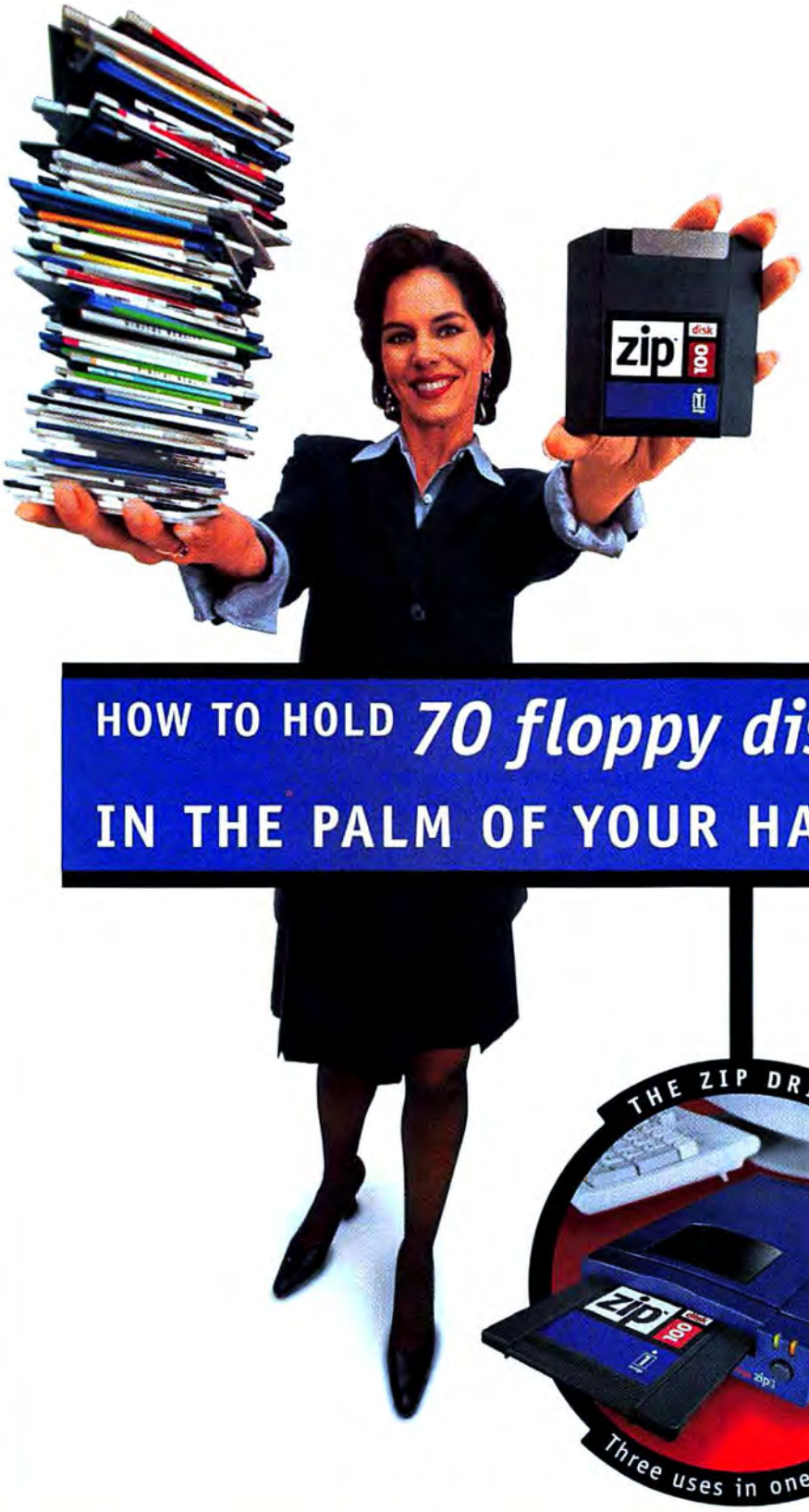

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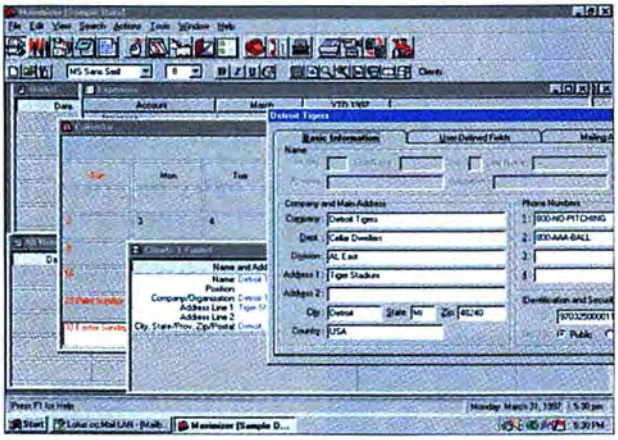
Maximizer 97is: Too Much of a Good Thing?

CONTACT MANAGER

CONTACT MANAGERS should save you time by organizing contacts and streamlining communications. But when time-saving features become too time-consuming to learn, you've got a problem.



A CROWDED INTERFACE makes for a steep learning curve, but Maximizer 97is boasts a lot of power for the price.

At $149, **Maximizer 97is**—the upgrade to a product with a following among salespeople and other heavy-duty business users—boasts contact tracking features comparable to those of Symantec's $199 market-leading ACT 3.0. There are endless fields for text or scanned images, a word processor with letter and envelope templates, and mail merge tools for fax or e-mail.

But I found the browserlike interface in the shipping version to be extremely cramped. It wants everything—phone dialer, database editor, calendar, and so on—to be one click away, and each click opens yet another crowded window. The default configuration alone is jammed with two fully stocked toolbars and three windows.

New features include online access to a business listings database, and macro wizards for customization. But if it takes too long to nail down a working system, then your system isn't working.

—Glenn McDonald

Maximizer 97is

PRO: Powerful features, good price.

CON: Cramped interface, difficult to learn.

VALUE: Good deal for current users wanting to upgrade.

Maximizer Technologies

800/804-6299

www.maximizer.com

Street price: $149, upgrade $100

READER SERVICE NO. 772

The executive can run all of his stuff with 16MB memory standard. *The fast thinker churns through work with a 150 MHz[1] Pentium® processor.* *The organizer likes the integrated hard disk, floppy and CD[2] built in.* *The deep thinker has a 2.1GB[3] hard disk to file away every brainstorm.*

[1]MHz denotes internal clock speed of the microprocessor only; other factors affect application performance. [2]Integrated CD on select models. [3]GB = billion bytes. [4]Model TOU. Estimated IBM authorized retailer price. M-F, 8am-8pm EST. In Canada, call 1-800-465-3299 (ID# 45356). IBM, ThinkPad and Solutions for a small planet are trademarks of International Business Machines Corporation. Lotus and SmartSuite are

Introducing the affordable new ThinkPad 380. The power

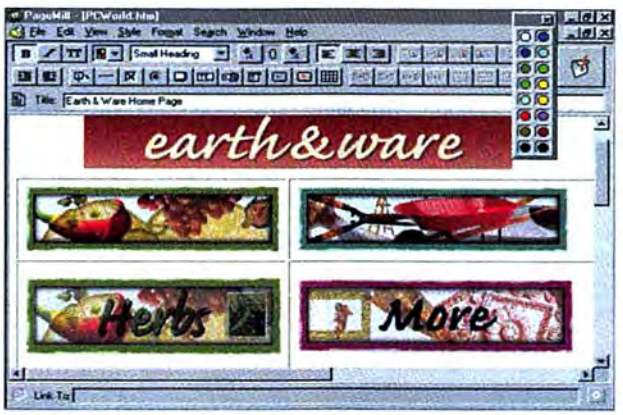
Adobe PageMill: Grist for the PC

WEB AUTHORING

ADOBE PAGEMILL, the popular Macintosh Web authoring package, makes a strong bid for the PC market with **PageMill 2.0** for Windows 95.

Created specifically for small businesses that want to put up a 5- to 50-page Web site, PageMill lacks the fancy features of higher-end titles, but provides strong basics.

The program works with text and graphics like a solid word processor. It handles most plug-ins and multimedia files, link creation is a simple drag-and-drop operation, and switching to HTML editing takes two mouse clicks. Best of all, PageMill is darn near truly WYSIWYG.



PAGEMILL WORKS much like your word processor. Use a table for formatting, then copy and paste—or drag and drop—images.

Minor annoyances include no Web site publishing or management functions, and a crowded work space.

PageMill ships with a Java applet creator, 1000 images, sample Web sites, and a graphics editor—all for $99. More robust and stable than Claris's equally priced Home Page, and $30 cheaper than Microsoft's more full-featured FrontPage, PageMill's ease of use and simplicity make it a solid choice for the nonprofessional Web page designer.

—Jeff Sengstack ▶

PageMill 2.0

PRO: Reasonably easy-to-use Web page tool from Mac market leader.

CON: No Web site management, crowded work space.

VALUE: Solid performer for nonprofessional Webmasters.

Adobe Systems Inc.

408/536-6000

www.adobe.com

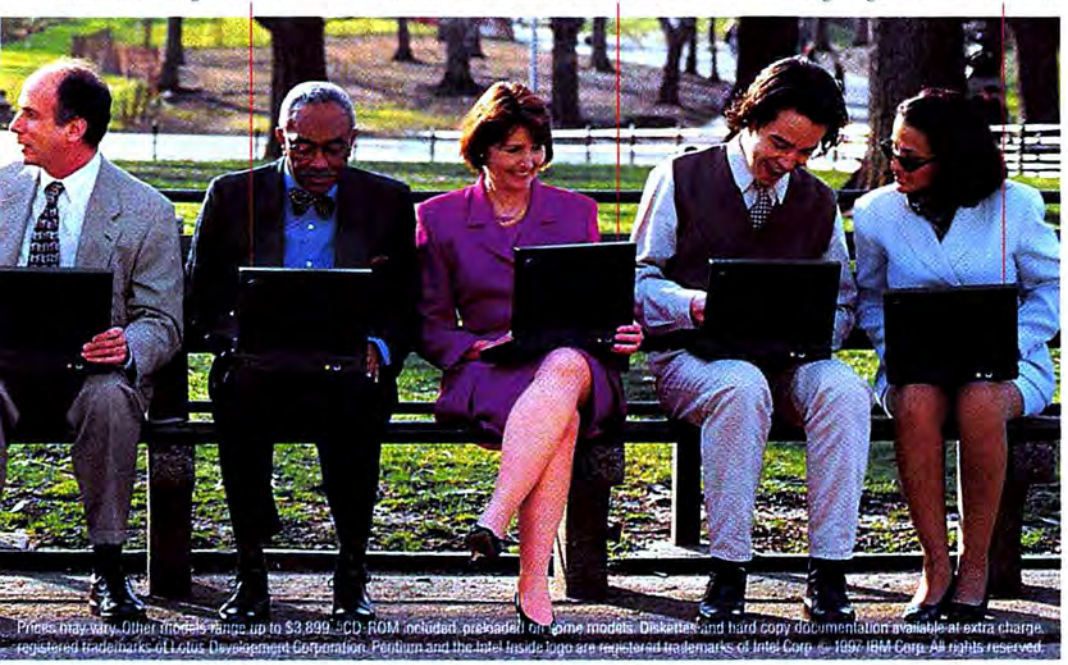
Street price: $99

READER SERVICE NO. 773

The money guy loves the idea of a ThinkPad starting at $2,199.[4]

The office manager is in full command with Lotus SmartSuite.®[5]

The colorful thinker sees her work on a big, bright 12.1" color screen.



Prices may vary. Other models range up to $3,899. CD-ROM included, preloaded on some models. Diskettes and hard copy documentation available at extra charge. [5] registered trademarks of Lotus Development Corporation. Pentium and the Intel Inside logo are registered trademarks of Intel Corp. © 1997 IBM Corp. All rights reserved.

of a desktop, the personality of a ThinkPad.

ThinkPad 380: Now there's an affordable way to give people the power of a desktop computer, wherever they work. For more details, and to find out where to buy one, call 1 800 426-7255, ext. 5165,[6] *or visit us at www.us.pc.ibm.com/thinkpad/tp380.*

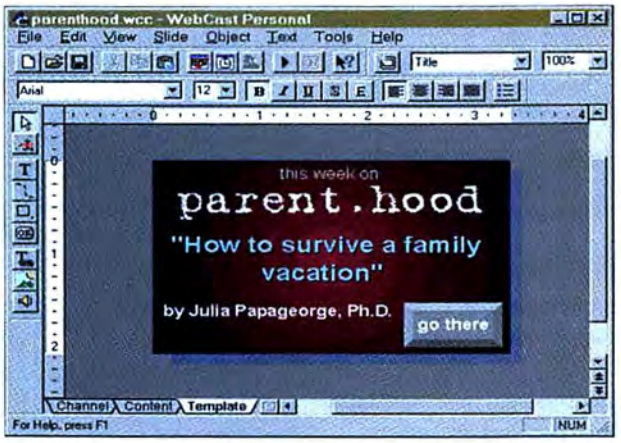
IBM

Solutions for a small planet

Astound's WebCast Helps You Act Pushy

WEBCASTING

WEBCASTING is in. Every big-time Web site these days offers its content via "push" or "pull" channels, which broadcast to subscribers or send content on demand, respectively. Now Astound's **WebCast Personal** lets small businesses and individuals get into the act—for a modest $199.



CHANNEL HOPPING: Astound's WebCast Personal creates push-style channels that deliver personal or business content.

WebCast lets you create a single flash screen or slide show viewable with the free player. The WebCast Studio authoring module supports a variety of special effects.

Using a preproduction version, I created a professional-looking channel in five minutes and uploaded it to my site with WebCast's publishing wizard. Visitors who want to subscribe just follow instructions on my home page.

WebCast is a pull service that sends updates when users launch the player—no expensive server software required.

Push, pull—who cares? My little Web site now acts like a major-league Webcaster.

—*Yael Li-Ron*

For more information about a product, contact the manufacturer or circle the number on the reader service card. ■

WebCast Personal

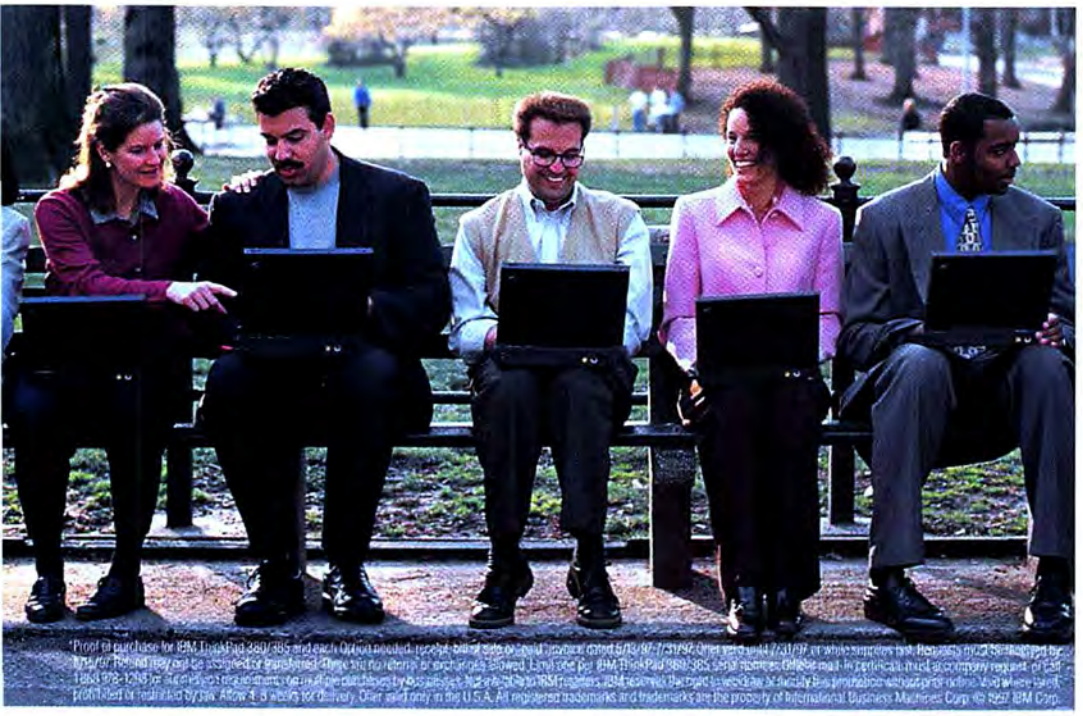
PRO: No need for complex server software.

CON: Yet another channel that users would need to subscribe to.

VALUE: Simple, fun, and affordable broadcast tool for small businesses, nonprofits, and individuals.

Astound
800/982-9888
www.astound.com
List price: $199

READER SERVICE NO. 774



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Affordable Options. Get up to $290 back on selected Options when you also buy a ThinkPad 380 or 385 between 5/13/97 and 7/31/97. Options include: PC Card Modem, PC LAN Card, IR LAN Adapter, IR Printer Adapter, Port Replicator, carrying case and more. For details, call 1 800 426-7255 x5167 or visit www.us.pc.ibm.com/thinkpad/tp380.*

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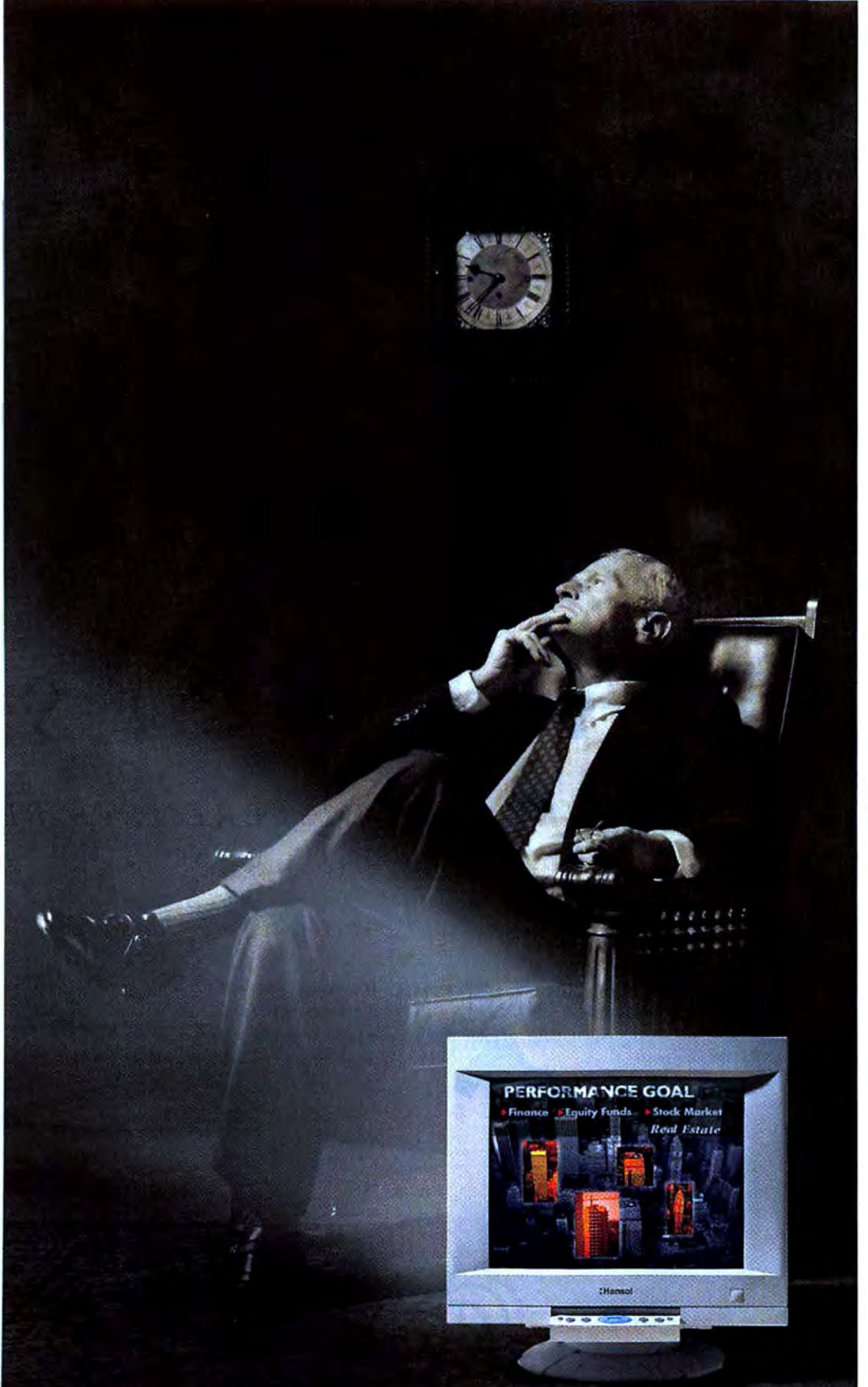
Solutions for a small planet



Robert Schienberg plans hostile takeovers for a living. But at least his monitor is user friendly.

When Robert Schienberg plans a corporate takeover, he has a lot to think about. Profit and loss statements, price/earnings ratios, product potential, and much more.

But the one thing he doesn't have to think about is the monitor he uses to do it all on. The Hansol 700P (15.7" viewable). Its .26mm dot pitch really helps him see clearly. While its quick set-up, drop down control panel with 20 on-screen settings, modern design, reliability, and simplicity of operation, can't help but make his life a little bit easier.

Designed for Microsoft Windows 95

So whether you're planning a takeover or a makeover, downsizing or upgrading, get the monitor that treats you like a friend.

After all, you never know when you may need one. Especially if you're Robert Schienberg.

Ideas that Shine

Hansol

www.hansol-us.com
1-888-HANSOL1(1-888-426-7651)
Hansol Multitech, Inc.
6 Centerpointe Dr., Suite 220
La Palma, CA 90623

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Circle 125 on reader service card

MMX™ Technology: The Compaq Deskpro line now offers the fastest processors available — the Pentium® II and the Pentium Processor with MMX™ technology. Each provides the additional performance and functionality that are essential for applications like visual computing and communication-based applications.

Memory: RAM famished? You'll find it amply provided in a Compaq Deskpro. There's up to 64 MB EDO standard memory, expandable to 256 MB. Additionally, in a secondary cache, there's either 256 K or 512 K that gives you faster access to your data.

Multimedia Sound: The new Compaq Multimedia Sound System creates outstanding 5-watts per channel sound and sports a space-saving design that fits seamlessly with most Compaq monitors. It features an integrated microphone, digital volume controls and audio in/out jacks.

SMART Hard Drives: Another aspect of Intelligent Manageability that we innovated is our SMART Hard Drive technology. It helps prevent catastrophic data loss. Fire insurance is one thing. This is the best kind of all. Prevention.

HOOHAH *vers*

(OR, A GUIDE FOR SPOTTING THE DIFFERENCES BE

Inherent Value: What distinguishes the Compaq Deskpro line is its overall value. Everything from Asset Management and Info Messenger to LS-120 Drives and SMART Hard Drives to the quality and reliability. Ultimately, you get a lower cost of ownership over your desktop's lifecycle. Prices start at $1,070.*

Technical Support: You won't be left hanging. Because every Compaq Deskpro comes with what is possibly the most comprehensive technical support in the industry. It includes a dedicated 7x24 toll-free technical support number. Additionally, with each Compaq Deskpro you get a standard three-year limited warranty† for parts and one-year on-site labor (with custom upgrades available too).

Asset Management: Asset Management is a part of the industry-standard technology that we pioneered called Intelligent Manageability (which supports the DMI standard). Asset Management lets you take inventory of all of your Compaq hardware and software from one location. No more time wasted running around. Time is, after all, money. And who has enough time? To say nothing of money.

Information Access: You'll find that the Compaq Web site offers the most extensive software support known to PC-kind. Also, as software upgrades become available we send them to you via CD-ROM. Just two of the ways that you will find Compaq gives you access to the information you need.

*Price mentioned is estimated street price for entry-level models. Dealer prices may vary. Prices do not include monitors. †Certain restrictions and exclusions apply. © 1997 Compaq Computer Corporation. All rights reserved. Compaq and Deskpro registered U.S. Patent and Trademark Office. Features vary by model. Some features available with Compaq Deskpro and independent software applications. Other features only available on Windows 95. The Intel Inside Logo, Pentium and Pentium II are registered trademarks and MMX is a trademark of Intel Corporation. Other products mentioned may be trademarks or registered trademarks of their respective companies.

Ease Of Integration: Want compatibility? You've come to the right ad. Because all of our desktops are designed with an open architecture to ensure compatibility and integration into any network. Also our Insight Manager is compatible with top leading LAN management software now on the market, like Microsoft SMS, Intel LANDesk, Norton Administrator and others.

Info Messenger: Info Messenger is a new Compaq Internet service that lets you create your own profile and choose what Compaq software updates and technical information you want. It notifies you automatically by e-mail and will search the Compaq Web site to collect customized information and transfer it to your custom Web page.

Smart Cover Sensor: If someone happens to get into your PC unexpectedly, you'll know about it, thanks to our Smart Cover Sensor. It's like having an invisible, full-time security force.

Any Questions: If you'd like any further information, please visit us at www.compaq.com or call 1-800-392-8883. A wannabe is fine in a trendy restaurant. But not on a desk.

us SUBSTANCE.

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Maximized Storage: Did we hear someone say storage? How does 120 MB of floppy storage sound? First offered by Compaq, the LS-120 Drive provides increased storage, performance and is backwards compatible with current 1.44 MB diskettes. And on selected Compaq desktops, you get something that many other PCs don't offer: PD-CD Drives. This gives you the option of reading current CDs or utilizing 650 MB of rewritable storage.

The Compaq Deskpro. *Innovation, value and reliability. Just what you'd expect from the world's leading desktop.*

Performance Monitors: You'll find our P50, V70 and P70 monitors offer a super-fast refresh rate and flicker-free image. And since Compaq engineers designed them, they're as reliable as our CPUs.

COMPAQ

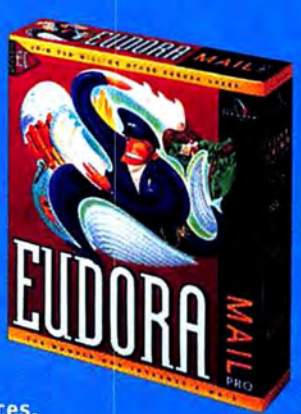
Has It Changed Your Life Yet?

Circle 47 on reader service card

$15 Rebate
See www.eudora.com/pcw5 for details. Valid through May 31, 1997.

In the time it takes to read this ad, you could get 25 e-mails.

(Let's talk filters.)



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Unlike the Web browsers and online services, Eudora Pro 3.0 has powerful message filtering and mail management tools that help you handle large volumes of e-mail in seconds. You can automatically sort all your messages by date, subject, priority, or sender. Or have your mail automatically forwarded to other locations. You can even set up automatic responses to e-mail you receive frequently.

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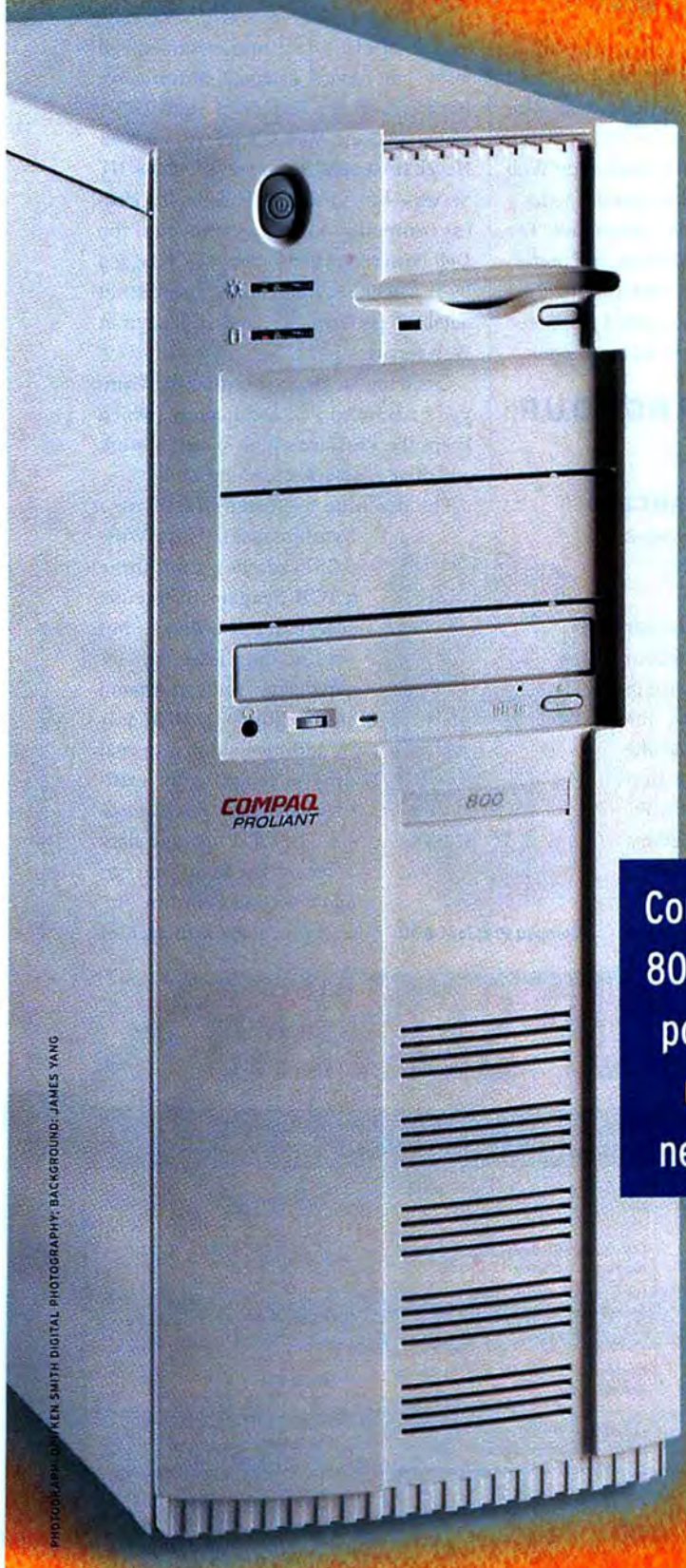
Circle 193 on reader service card

TOP 5 WORKGROUP SERVERS

Real Servers Real Cheap



PHOTOGRAPH: KEN SMITH DIGITAL PHOTOGRAPHY; BACKGROUND: JAMES YANG

Compaq's ProLiant 800 is top dog in a powerful pack of under-$6000 network servers.

BY WILLIAM L. RINKO-GAY

LOOKING FOR A NEW network server to run your small business, department, or Web site—for cheap? Suddenly you've got lots of good choices.

Dozens of PC vendors are now touting machines that are truly built for network service, not just cobbled together from standard PCs. These systems are about twice as powerful and only two-thirds as expensive as last year's models. And they often pack features that cost plenty a year ago, such as hot-swappable disk drives (which can be replaced without shutting down the network).

THE BEST BUY COMPAQ PROLIANT 800 is easily the fastest workgroup server we've tested.

These **budget servers** each come with a **Pentium Pro** and **64MB of memory,** lots of **disk storage,** and extras like **management tools.** What do you give up? In a word, expandability.

This month we look at workgroup servers priced under $6000. Each of them comes with 64MB of memory, a single Pentium Pro processor (often upgradable to dual processors), and a 10/100-megabits-per-second ethernet adapter. All but one come with at least 4GB of disk storage. Most also include server management software from Intel or the vendors themselves. The Best Buy Compaq ProLiant 800 even lets an administrator reboot and control it via modem.

What do you give up with these inexpensive servers? In a word, expandability: Some are housed in small boxes with few or no free drive bays or open PCI slots.

While the product specifications may sound very similar, you'll get quite different out-of-the-box experiences with each of these machines. The ProLiant 800 and second-ranked Hewlett-Packard NetServer LD Pro 6/180 both come from long-time server suppliers that have built reputations on their engineering strengths and on their service and support offerings. In contrast, Micron is known for doing an excellent job of fashioning standard components into cost-effective desktop PCs, and takes this approach in its Vetix server line. AST and Dell create their own management tools and do some other development work as well.

We're launching performance tests with PC WorldBench 2.0 for Servers, a revamp of our benchmark suite that adds Web server testing and better handles today's powerful hardware and applications. For details on our test procedures, full performance results, and Best of the Rest reviews of servers not listed here, see www.pcworld.com/networking/servers.

TOP 5 WORKGROUP SERVERS

1 COMPAQ PROLIANT 800

PRO: Top performance, excellent features and manageability

CON: No open drive bays

COMPAQ'S PROLIANT 800 is an excellent low-cost workgroup server. Priced at $5465, the ProLiant is far and away the fastest server in our first roundup using our new PC WorldBench 2.0 for Servers benchmarks. It's also easy to install and manage.

Compaq ProLiant 800

The ProLiant 800 was the leader in every last one of our speed tests—file service, database performance (Oracle Server7 version 7.3 and Lotus Notes 4.1), and Web service, under both Novell IntranetWare 4.1 and Windows NT Server—by significant margins. Its closest competition overall came from the Dell PowerEdge 2100/200, which lagged by 11 percent in file service, 9 percent in database performance, and 13 percent in Web service.

Credit this sterling performance to Compaq's advanced PCI architecture, which keeps the ProLiant's high-speed network and drive adapters screaming along.

The machine we tested came with a Symbios Logic Ultra-Wide SCSI adapter and three 2.1GB Seagate Barracuda internal hard disks, but with no open drive bays for expansion. You can expand storage (up to 27.3GB) only by adding a single external drive or replacing the existing drives with 9.1GB models. The CPU upgrade story is better: For $899, you can add a second Pentium Pro-200 processor with 512K of

PHOTOGRAPH: DPI/KEN SMITH DIGITAL PHOTOGRAPHY

PC WORLD TOP 5 WORKGROUP SERVERS

	SERVERS	Street price (4/2/97)	Overall rating [1]	PC WorldBench for Servers score [2]	Comments	CPU/RAM (MB)	Number of drives/ total capacity as tested (GB)
1	Compaq ProLiant 800 800/345-1518 www.compaq.com	$5465	94	100	First-class speed, features, and manageability; no open drive bays as tested.	PPro-200/64	3/6.3
2	HP NetServer LD Pro 6/180 800/752-0900 www.hp.com	$5372	90	76	Expandable, solid design and manageability; middling performance.	PPro-180/64	3/6.3
3	Dell PowerEdge 2100/200 800/388-8542 www.dell.com	$4563	88	89	Speedy, clean design; slowest NT Web server on the chart.	PPro-200/64	3/6.3
4	AST Manhattan D6200 800/876-4278 www.ast.com	$4047	77	70	Inexpensive, expandable; slow file service, limited storage.	PPro-200/64	1/2
5	Micron Vetix EL 1000 800/634-8799 www.mei.micron.com	$4824	61	57	Expandable storage; few free slots as tested, slow, lacks management tools.	PPro-200/64	2/4.2

Best Buy

[1] Weightings: Features and expandability (30 percent), performance (30 percent), price (30 percent), reliability and service and support (10 percent).

[2] Relative to Compaq ProLiant 800 performance.

Make That a *Real* Server, Please...

OKAY, YOU CAN do it. Take a standard PC; give it 32MB or 64MB of memory, a network adapter, and a couple of hard drives; and install IntranetWare or Windows NT Server. Now it can handle files, printing, and a few applications on a small network.

But you're wasting your money if you try this approach for anything more ambitious than that—and remember that just about any server's jobs will get bigger by the month.

What does a dedicated server bring to the party? Power, expandability, compatibility, robustness, and ease of management—for cheap. Here's a face-off between a dedicated server and a bulked-up desktop PC, using two highly ranked Dell systems for comparison, with street pricing as of April 2. -Eric Bender

Dedicated Server VS. Desktop PC on Steroids

System: Dell PowerEdge 2100/200
CPU: 1 PPro-200 (expandable to 2)
SCSI disk storage: 6.3GB
Maximum storage: 99GB (with external chassis)
Redundant Array of Inexpensive Disks (RAID 5) support: optional
Compatibility tests as server: yes
Performance tuning as server: yes
Bundled management software: Intel LANDesk (retail value $1500)
Dial-up control/reboot: yes
Initial cost as configured: $4563

System: Dell OptiPlex GX Pro 200
CPU: 1 PPro-200 (expandable to 2)
SCSI disk storage: 6.3GB
Maximum storage: 27GB
Redundant Array of Inexpensive Disks (RAID 5) support: no
Compatibility tests as server: no
Performance tuning as server: no
Bundled management software: none
Dial-up control/reboot: no
Initial cost as configured: $4835

secondary cache into a ZIF socket.

The ProLiant 800's chassis is a typical minitower. Three thumbscrews remove a side panel. The placement of the keyboard and mouse icons on the back is confusing—more than once we installed the two devices in the wrong ports.

The PCI and ISA adapter bus is mounted on a daughtercard that can be removed with a single pull; you don't even have to unplug the monitor and network connectors (although you must disconnect the hard drives to pull the daughtercard totally free). You can easily replace option cards such as those for a modem or video adapter, and the entire system board is easily available for servicing. Our only serviceability complaint is that the hard drives are mounted with Torx screws, which require an unusual tool to remove.

You set up the ProLiant beginning with Compaq SmartStart, a bootable CD-ROM that installs the operating system and a few applications such as Oracle Server. The disc also provides programs for diagnostics and system setup, as well as documentation. Compaq's Software Support floppy disk makes it easy to tell which of the system's drivers need upgrading.

An Integrated Remote Console feature lets you shut down and reboot from another system via modem (not supplied). If the server shuts down unexpectedly, the console can log the problem automatically and restart. Compaq offers round-the-clock phone support and a three-year warranty for on-site, next-business-day service.

The ProLiant 800 is an outstanding value among low-cost workgroup servers.

ILLUSTRATION: JAMES YANG

Max. CPUs/ max. RAM (MB)	Max. number of internal drives/ total capacity (GB)	Available slots/bays as tested	Features [1]	Expandability	Reliability	Service and support	Reader service number
2 PPro-200/512	3/27.3	6/0	very good	good	very good	very good	623
2 PPro-200/512	5/35	5/2	very good	outstanding	outstanding	very good	624
2 PPro-200/256	3/27	5/1	good	good	good	good	625
1 PPro-200/512	6/24	5/7	good	good	fair	good	626
2 PPro-200/256	3/27.9	2/8	good	fair	fair	good	627

[1] Tested configuration, design, and setup/documentation. All products: 903

2 HP NETSERVER LD PRO 6/180

PRO: High-reliability features, good design and manageability, expandable

CON: Middling performance overall

TO REACH OUT to the entry-level workgroup server market, Hewlett-Packard had to cut costs on its respected L-series ▶

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Strengthening Our Server Tests

EIGHT PENTIUM Pros and a gigabyte of memory, anyone? When you're testing performance of network servers, you race to keep up with ever more powerful machines and the latest applications that run on them. To meet the challenge, we've upgraded our performance benchmark suite and expanded our test bed at the Network World–PC World Network Test Center.

For complete details on our revamped tests, check out www.pcworld.com/networking/servers. Here are the highlights:

PHOTOGRAPH: PAM FRANCIS

TEST CENTER DIRECTOR William L. Rinko-Gay has upgraded our performance benchmarks and added new Web server tests.

■ **We've added Web server tests,** reflecting the astonishing growth of the Internet and intranets. These tests run under Windows NT Server and Novell IntranetWare, requesting typical Web pages. When testing NT servers, we also run a search test using OpenText's LiveLink Search.

■ **We've increased server memory** to reflect the growth of RAM-hungry applications. We test workgroup servers with 64MB of memory (up from 32MB) and enterprise servers with 256MB (up from 128MB).

■ **We've added 16 clients to our test bed** to test the latest multiprocessor enterprise servers, and introduced a program that puts further stress on server I/O functions. We run our usual application suite on between 1 and 16 clients, then add I/O loading in groups of 4 clients up to 32 clients.

■ **We're now using upgraded applications,** including Oracle Server7 version 7.3, Lotus Notes 4.1, and Corel WordPerfect 7.0.

–W. L. R-G.

line by cutting back on some features and using a less-expensive CPU. The resulting NetServer LD Pro doesn't skimp on reliability and management features, and it's a strong contender at a street price of $5372.

The LD Pro came in third in performance, behind the Compaq ProLiant and the Dell PowerEdge. Though it sports only a Pentium Pro-180 processor, the LD Pro employs multiple hard drives and an advanced PCI architecture that allows its 33-MHz bus speed to be independent of the processor's speed.

Housed in a slightly smaller chassis than the LH Pro we reviewed in March ("The Pros Take Over"), the LD Pro holds a total of five bays, three of which can take hot-swappable drives. The machine we tested came with three 2.1GB Seagate drives; you can upgrade to a total of 35GB internally. (Score one important point over the Compaq ProLiant 800.)

There are six expansion slots—two EISA and four PCI—five of which are available. HP integrates only one Adaptec Fast & Wide SCSI controller in this server, compared with the LH Pro's two.

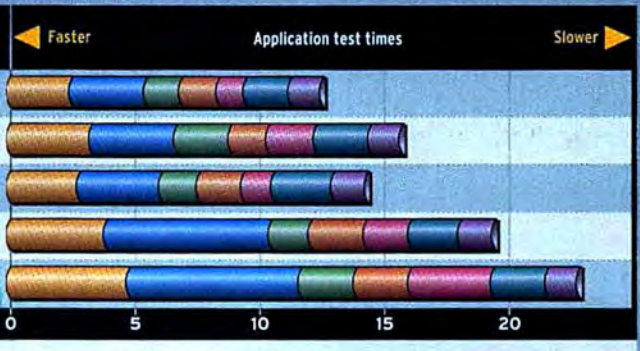
The LD Pro is easy to support and service. A single chassis lock keeps intruders from removing the drives. The cover is ▶

TOP 5 WORKGROUP SERVERS

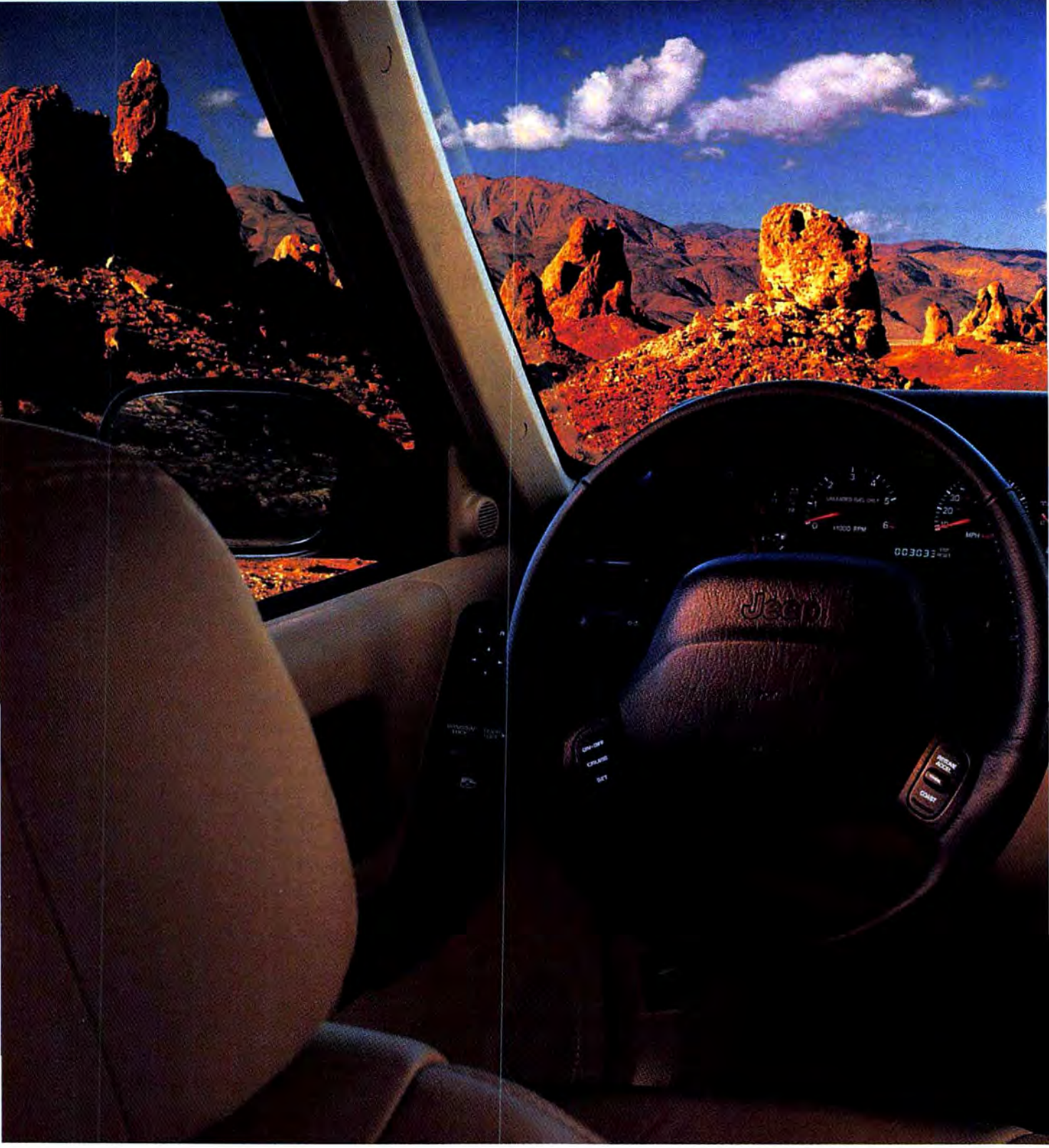
PERFORMANCE

	SYSTEMS	CPU	Number of drives/individual capacity (GB)	PC WorldBench for Servers score
1	Compaq ProLiant 800*	PPro-200	3/2.1	100
2	HP NetServer LD Pro 6/180	PPro-180	3/2.1	76
3	Dell PowerEdge 2100/200	PPro-200	3/2.1	89
4	AST Manhattan D6200	PPro-200	1/2	70
5	Micron Vetix EL 1000	PPro-200	2/2.1	57

*Best Buy



HOW WE TEST All systems are tested with PC WorldBench 2.0 for Servers, PC World's application-based benchmark. We test file service, Oracle, and Web server performance under Novell IntranetWare 4.1 and Windows NT Server, and Lotus Notes under Windows NT Server. The PC WorldBench for Servers score is a sum of the weighted result of these tests: file service (40 percent), Oracle Server 7 version 7.3 (20 percent), Lotus Notes 4.1 (20 percent), and Web server (20 percent), using the Compaq ProLiant 800 as a baseline system. Times shown are average per client with 16 clients. A higher PC WorldBench for Servers score is better. For more information, see www.pcworld.com/networking/servers.



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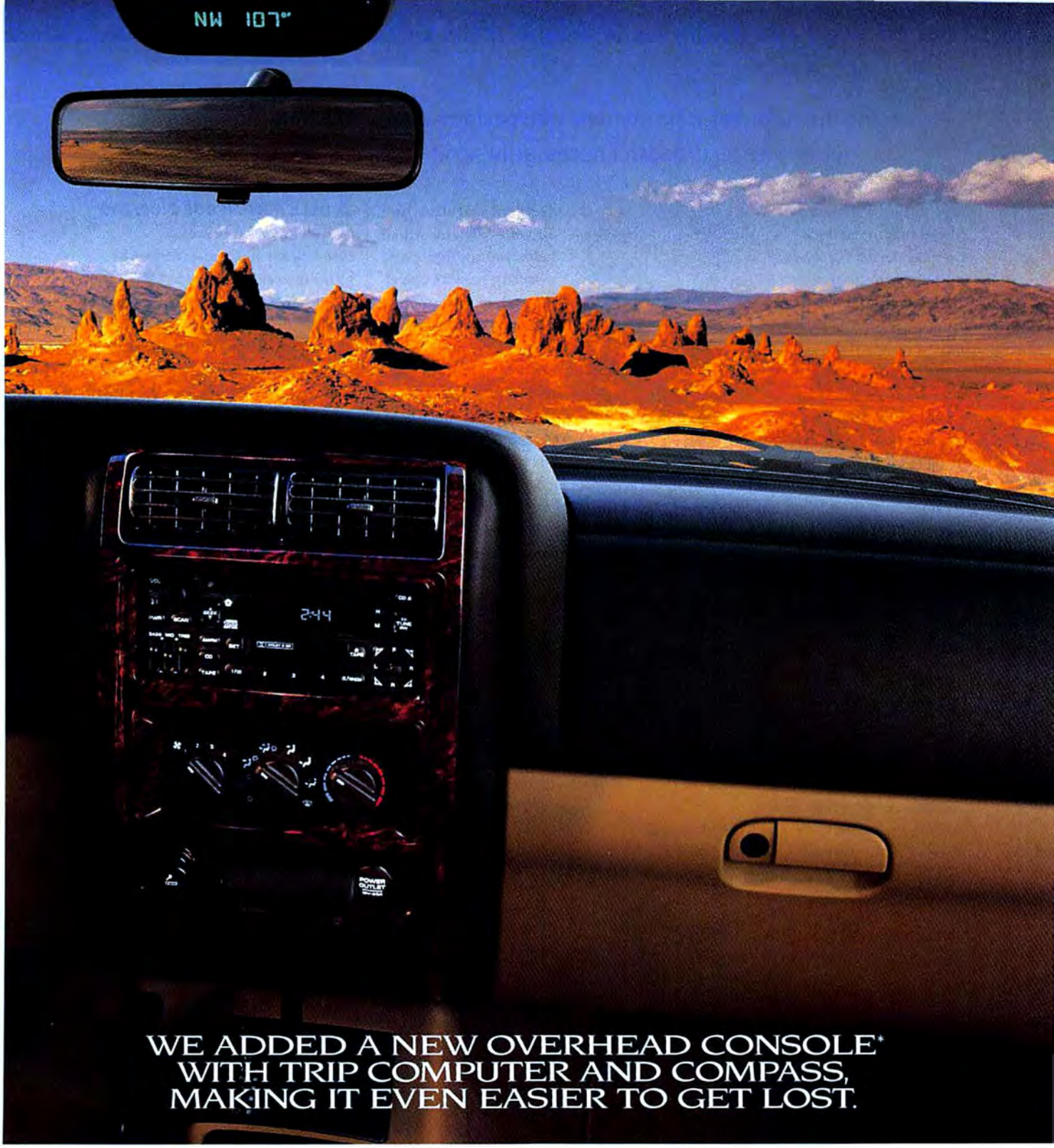
*Optional overhead console available on Country and Sport models only. Country model shown. **_Four Wheeler_ magazine. Always use seat belts.



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Among the **surprises** from our **new Web performance benchmark:** Speed on our file service tests **doesn't necessarily** signify speed as a Web server.

large but held with thumbscrews that make it easy to remove. Under the cover is a handy configuration chart and a system board layout. The system board is housed on the right half of the chassis, while the drives are on the left. Memory and CPU reside on a separate board; you can change the DIMMs without removing the board. You can also add a second Pentium Pro, but you can't pop it into a ZIF slot—you have to upgrade the processor board.

HP NetServer LD Pro

HP bundles its excellent server management features: NetServer Assistant, which helps you configure and install the network operating system; Information Assistant, which gives you all the information you need to maintain your NetServer; and Diagnostic Assistant, a troubleshooting aid. An optional card lets you manage or reboot the server via modem. The company provides round-the-clock phone support (toll-free during business hours) and a three-year warranty for next-business-day on-site service.

3 DELL POWEREDGE 2100/200

PRO: Speedy overall, clean design

CON: Slow Web service under Windows NT

PRICED ATTRACTIVELY at $4563, Dell's PowerEdge 2100/200 is a very capable workgroup server that made quick work of our performance tests. Overall, the PowerEdge ran second only to the ProLiant 800, and its sole performance disappointment was a fifth-place finish as an NT Web server.

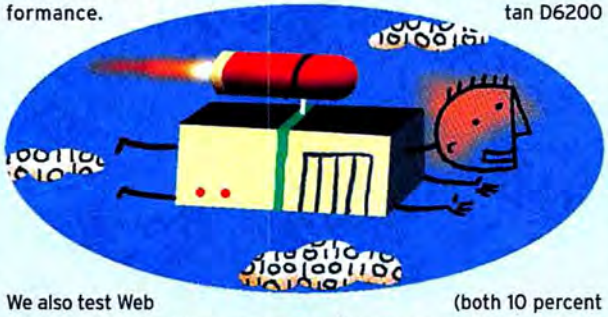
The PowerEdge comes in a small minitower configuration and boasts a Pentium Pro-200 processor, three 2.1GB Seagate Barracuda hard drives, an integrated Adaptec Ultra-Wide SCSI controller, and an Intel EtherExpress Pro network ▶

What Makes a Speedy Web Server?

THERE ARE DAYS when you might logically assume that every network server on the planet is turning into a Web server. That's not actually happening, but this role has become so common that *PC World* has made Web service a part of our performance benchmark suite.

TESTING WITH POPULAR WEB APPLICATIONS

AS WITH our other tests, we use real applications in this one. PC WorldBench 2.0 for Servers uses Netscape's SuiteSpot Server 2.0 under Windows NT Server 4.0, Novell WebServer 2.51 under Novell IntranetWare 4.1x, and the Netscape Navigator Gold 2.02 browser to measure the time it takes to process pages originally culled from the World Wide Web. Our test files include an assortment of pages with various mixes of text and graphics. We avoid multimedia and Java elements, because these put so much emphasis on the client that we wouldn't be able to keep the tests focused on server performance.



We also test Web searching under Windows NT Server with OpenText's LiveLink Search. Unfortunately, when our tests were finalized no search engine was available for NetWare.

SOME SURPRISES

HOW DID our Top 5 workgroup servers fare with the Web?

The Compaq ProLiant 800 nailed the top spot again (no surprise). But the Micron Vetix EL 1000, a sluggard on other tests, came in second overall, only 8 percent behind the ProLiant. Next came the HP NetServer LD Pro and the AST Manhattan D6200 (both 10 percent behind). The Dell PowerEdge, which did so well on all the other tests, came in fifth, at 13 percent behind the ProLiant.

There were two surprises: First, Web test results fall into a relatively small range—much smaller than in the other tests. (In file service, for example, the Compaq is more than twice as fast as the Micron.)

Second, a good speed score on the file service test doesn't necessarily signify fast Web server performance.

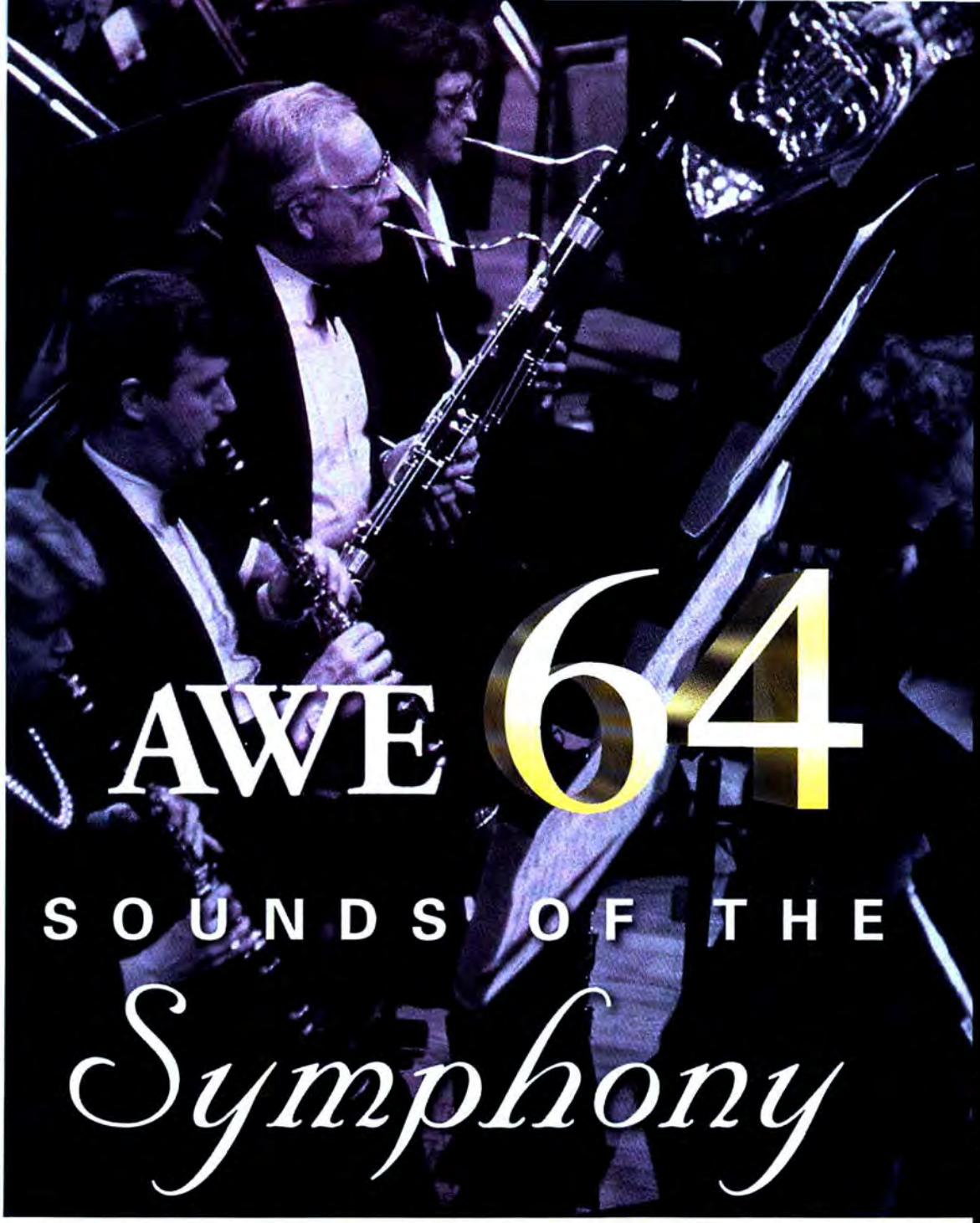
SERVING SMALLER FILES

WHY this difference? The most likely reason is that the file service test measures the time it takes to load the Windows programs as well as the data files from the file server. These program files are huge—an order of magnitude larger than even the big graphics files that often litter Web pages. Therefore, our file service test places more demands on the disk subsystem than does the Web server test. The 64MB of main memory helps us serve many of the Web pages out of cache, and our use of good network adapters means we aren't bottlenecked there.

The bottom line for now: Don't pay a huge price for a Web server. The performance differences don't justify the extra cost.

-W. L. R-G.

PHOTOGRAPHY: DPI/KEN SMITH DIGITAL PHOTOGRAPHY; ILLUSTRATION: JAMES YANG



AWE 64

SOUNDS OF THE

Symphony

1. Maestro Tapping Baton.
2. Piano Keys Dancing.
3. Entrance Of An Oboe.
4. Crashing Cymbals.
5. Violin Vibrato.
6. "Bravo, Bravo!"
7. Deep, Rythmic Grooves of a Cello.
8. Clarinet Scaling Octaves.
9. Audience Shuffling In.
10. Appreciative Applause.
11. Chord Progressions On Grand Piano.
12. Soft Strokes Of Harp Strings.
13. Chiming Triangle.
14. "Shhhhhhhhh..."
15. A Cymbal Brushing Lightly.
16. Cascading Clarinet.
17. Flute Solo.
18. Crescendo.
19. Playful Flirtation Of A Piccolo.
20. Boom Of A Tuba.
21. Pager Beeping.
22. Loud Clapping.
23. Low Tones Of A Stand-Up Bass.
24. Violin And Viola En Duet.
25. Piano Sonata.
26. Wailing Saxophone.
27. Smooth Slide Of A Trombone.
28. Exclamation Of A Trumpet.
29. Rolling Thunder Of A Timpani.
30. Arpeggio On The Violin.
31. The Reed Section.
32. Pages Of Sheet Music Turning.
33. Piano Playing Minuet In G.
34. Drum Keeping Tempo.
35. Violin Staccato.
36. Tambourine Jingle.
37. Clicking Castanets.
38. Relentless Beating of Drums.
39. Regal Sound Of A French Horn.
40. Snare Drum Rattling.
41. Xylophone Resonating.
42. The Low Pitch Of A Bassoon.
43. Cello Staccato.
44. Pulsating Viola.
45. Viol D'Orchestre.
46. Flute Ensemble.
47. Fluttering Of A Flute.
48. Regimental Sound Of A Bugle.
49. Plucking Of A Violin.
50. "Encore! Encore!".
51. Orchestra Tuning Up.
52. Silence Between Passages.
53. Harmonic Wind From A Flute.
54. Oboe Solo.
55. Soft Snoring.
56. Decrescendo.
57. Beethoven's 5th.
58. Throats Clearing.
59. Chopsticks.
60. Sounds Of Intermission.
61. Brass Solo.
62. Rattling Of Maracas.
63. "Wake Up, Honey, It's Over."
64. The Final Movement.

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Circle 54 on reader service card

adapter. Under the cover are three EISA and three PCI slots, all empty except for the PCI slot that holds the network adapter. The interior has a clean design free of cable clutter, which makes the parts easy to access. The three internal bays can hold either half- or full-height drives and are mounted with a handy removable bracket; the only drawback is that you must take off the server's front bezel to remove the bracket. Internal storage tops out at 27GB, which you get only by replacing the existing drives with 9GB models. (By the time you read this, Dell will have shipped an external chassis that provides up to 72GB of hot-swappable storage.) Maximum system memory is 256MB.

On the software side, Dell provides Intel's LANDesk Server Manager 2.5, a widely adopted server management package, plus a set of drivers and ▶

What Do Server Buyers Want?

You can run your business or your Web site with PC servers, but users want better tech support, cheaper storage, and—oh yes—higher performance.

CARE TO BET your business on today's PC servers? Until a year ago, San Francisco-based Ethos Corporation—whose personal-finance Web site, InvestorsEdge, gets over 1.5 million hits a day—did it the hard way. The firm ran the business with a collection of desktop PCs, one acting as a Web server and others hosting different databases. This setup was a nightmare to administer, says Ethos president Patrick Connolly.

BETTER SERVICE

NOW THE eight-person company comfortably operates on dedicated servers, including a four-processor Pentium-133 HP NetServer running Windows NT 4.0 that acts as both database and Web server. "We no longer administer a bunch of desktops and databases. Running just one gigantic server is great from both administration and performance standpoints," says Connolly.

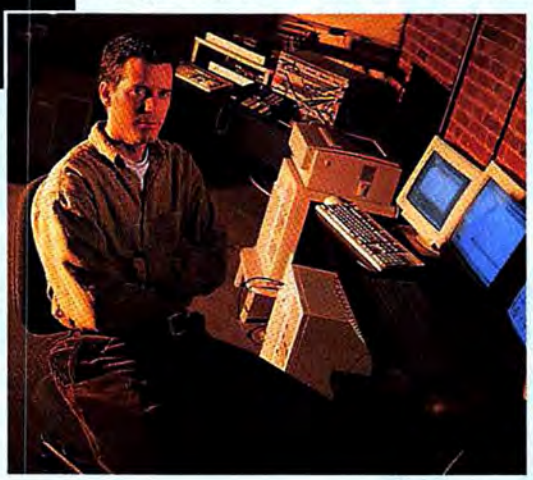
Intel-based servers can now pack up to eight Pentium Pro-200 processors, several gigabytes of memory, and more than a terabyte of storage. They support profitable endeavors ranging from exotic Web sites like InvestorsEdge to more mundane claims-processing applications. But many users still ask for better technical support, more cost-effective storage systems, and servers tailored for Web service.

"Running just one gigantic server is great from both administration and performance standpoints."

Patrick Connolly of Ethos, home of the InvestorsEdge Web site.

Customers say that most vendors are slowly enhancing their tech support, but some still complain about a lack of responsiveness, especially in the first few hours after a system fails. "I would like to see Compaq improve its support—not just telephone support, but keeping technical information more current on their Web site," says Brian Jaffe, director of network and client services for Bantam Doubleday Dell Publishing in New York.

Large and small companies alike are moving happily to high-reliability Redundant Array of Inexpensive Disks storage technology as they scale down critical applications that were once housed on minicomputers and mainframes. Some servers priced as low as $5000 now let you hot-swap defective drives, so you can replace them without bringing down the server.



CHEAP, YES—BUT CHEAP ENOUGH?

FACED WITH ever-growing mountains of data, however, most organizations want to see the cost of RAID technology come down even faster.

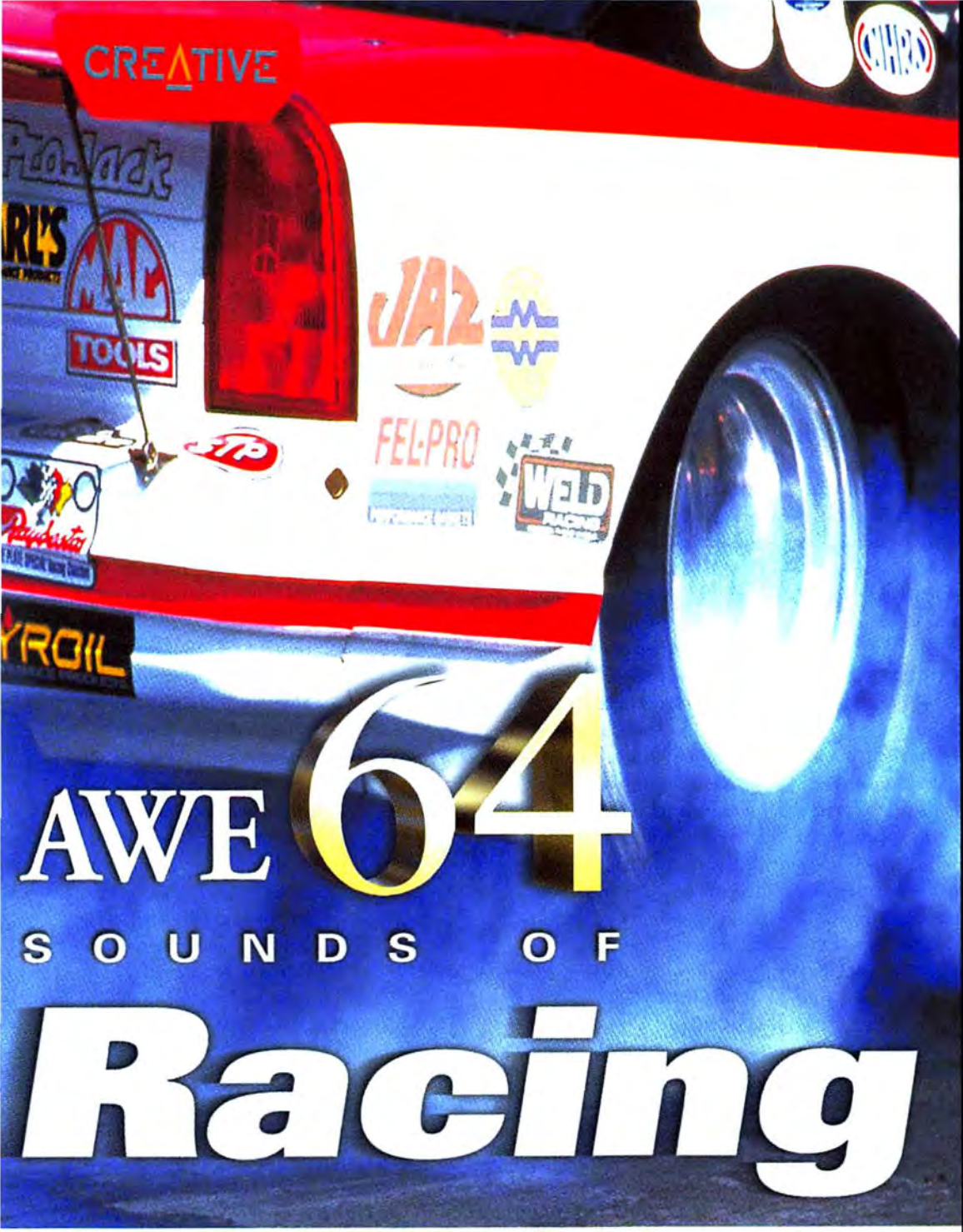
Many larger organizations are starting to create "disk farms," putting many drives together in separate boxes or rack-mounted enclosures outside the server itself. "The external RAID systems you can get now are pretty robust, and you can easily swap around the controllers and disks," explains Jaffe.

Server buyers are also looking for machines that are built from the ground up for Internet and intranet service.

"I would like to see HP come out with an integrated server geared for the Web with really fast processing, disk accessing, and Net support," remarks Ethos's Connolly. "When you handle as many transactions a day as we do, you don't want people waiting in a queue. That's bad for a growing business."

—Ed Scannell

PHOTOGRAPH: ERIC MILLETTE



1. Cars Taking Off.
2. Breaks Screeching.
3. Hubcaps Scraping.
4. Crowd Cheering.
5. "Place Your Bets!"
6. Engine Seizing.
7. Hearts Pounding.
8. Refueling.
9. Wheels Peeling.
10. Breaths Of Anticipation.
11. "That Was A Close Shave."
12. Cars Colliding.
13. Backfires.
14. Engines Revving.
15. The Roar Of A Crowd.
16. Fiery Explosions.
17. Skidding Into The Pit.
18. Engine Problems.
19. Shrieks Of Excitement.
20. Vrrrrroooooom.
21. "Low Fuel."
22. Jamming On The Brakes.
23. Gears Shifting.
24. Ambulance Siren.
25. Sighs Of Relief.
26. Engines Restarting.
27. Traction Of Bald Tires.
28. Crowd Going Wild.
29. "Last Lap!"
30. Starting Gun Firing.
31. Hubcaps Flying Across The Track.
32. Tires Blowing.
33. "Hurry! Fill 'Er Up!"
34. Engines Choking.
35. Tires Being Changed.
36. Nuts And Bolts Flying.
37. Grandstand Cheering.
38. Gears Grinding.
39. Slamming On The Breaks.
40. Turning Swiftly.
41. Pile-Ups.
42. Tires Rolling Off.
43. Skidding Uncontrollably.
44. Loud Screams.
45. Crowds Falling Silent.
46. Collision.
47. Thunderous Booms.
48. Deafening Cries.
49. Quick Turns.
50. Sudden Stops.
51. Reflex Braking.
52. "Gentlemen, Start Your Engines!"
53. Engines Sputtering.
54. Drop Of The Checkered Flag.
55. Head Gasket Exploding.
56. Hitting The Wall On Turn 3.
57. Chanting A Winner's Name.
58. Creaking Of The Chassis.
59. Radio Static.
60. Loosing Your Hood.
61. Accelerating Past The Finish Line.
62. Champagne Cork Popping.
63. Congratulatory Slaps.
64. Wizzing Past.

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Circle 59 on reader service card

With the Vetix line, **Micron is getting serious** about servers. The **EL 1000** offers a good set of standard hardware components but **lacks installation** and **management software.**

Dell PowerEdge

utility software for EISA configuration. The company also factory-installs your choice of network operating system and applications, as well as an adapter that lets you dial in and reboot or diagnose problems on your server. Dell offers toll-free round-the-clock phone support and one year of next-business-day on-site service.

4 AST MANHATTAN D6200

PRO: Inexpensive, expandable

CON: Slow file service, limited storage

THE AST MANHATTAN D6200 is a workgroup server with a small feature set and a very attractive price. For $4047 you get a Pentium Pro-200 processor, an integrated Fast Ethernet adapter based on Intel's EtherExpress Pro chip set, an integrated Ultra-Wide SCSI adapter, and three PCI and three ISA slots (five of which were free on the machine we tested). The Manhattan is reasonably expandable as well, with five internal and two externally accessible drive bays available. Unfortunately, it comes with only one 2GB hard drive; maximum internal storage is 24GB.

In this configuration the Manhattan isn't a fast file server. Adding one or two drives would certainly make it faster, and we would recommend doing so. Its application performance is in the middle of the pack.

The Manhattan D6200 is a minitower unit. The inside is very clean—only the drive cables get in your way, and there's a nice cable collector to help resolve that problem. Removing three screws lets you slide off a side panel and reveal the entire interior, including a complete configuration label at the bottom. The internal drives are mounted at the rear of the computer to make the most of the space inside. Remove three more screws, and the drive cage slides out; adding and removing drives is then a snap (although you'll need your screwdriver again).

AST Manhattan D6200

AST provides Intel's LANDesk Server Manager, and you can buy an optional card to manage your server through a dial-up connection. The Manhattan's printed documentation is adequate. The utilities CD-ROM is bootable and contains the software necessary to create floppy disks for the driver plus documentation in Adobe Acrobat format. The company provides toll-free phone support around the clock, plus next-business-day on-site service for three years.

Overall, the Manhattan D6200 is a capable server that will do quite well if you purchase a more powerful storage configuration.

5 MICRON VETIX EL 1000

PRO: Expandable storage

CON: Slow, few free slots as tested, lacks management tools

WITH THE VETIX LINE, Micron is getting serious about workgroup servers. True to form, its entry into the market is well priced at $4824 and outfitted with a long list of some of the best bundled options available.

Our test unit of this oversize tower came with two 2.1GB hard drives. Micron installed one network operating system on each drive for us; had they used a dual-boot configuration, the two drives could have been set up as a single striped volume to improve performance. Micron also chose to install a narrow 16-bit Seagate drive on the Ultra-Wide SCSI adapter, cutting the potential data transfer speed in half. These two configuration choices impaired the EL 1000's overall performance. It came in last in all tests except—curiously—Web service, where it ran second only to the ProLiant.

The EL 1000's five free externally accessible drive bays and three empty internal bays provide very good storage options. This makes the lack of card expandability a bit of a surprise. Only one shared PCI/ISA slot and one ISA slot were available, partly because Micron uses adapter cards for video and SCSI. Memory tops out at 256MB; most rivals go to 512MB.

Micron Vetix EL

Maintenance on the EL 1000 is fairly straightforward, although the cover, which is held on by six screws, is hard to remove and tricky to replace. But once the cover is off, you can easily get at all the drive bays and processor and memory sockets.

The first-class peripherals include a 3Com 3C905 Fast Ethernet adapter and an Adaptec AHA-2940 Ultra-Wide SCSI adapter. Micron doesn't provide any software tools for installation or server management. It does offer toll-free, round-the-clock phone support and a three-year warranty on parts, but for on-site support you must buy an additional service plan, administered by Digital Equipment.

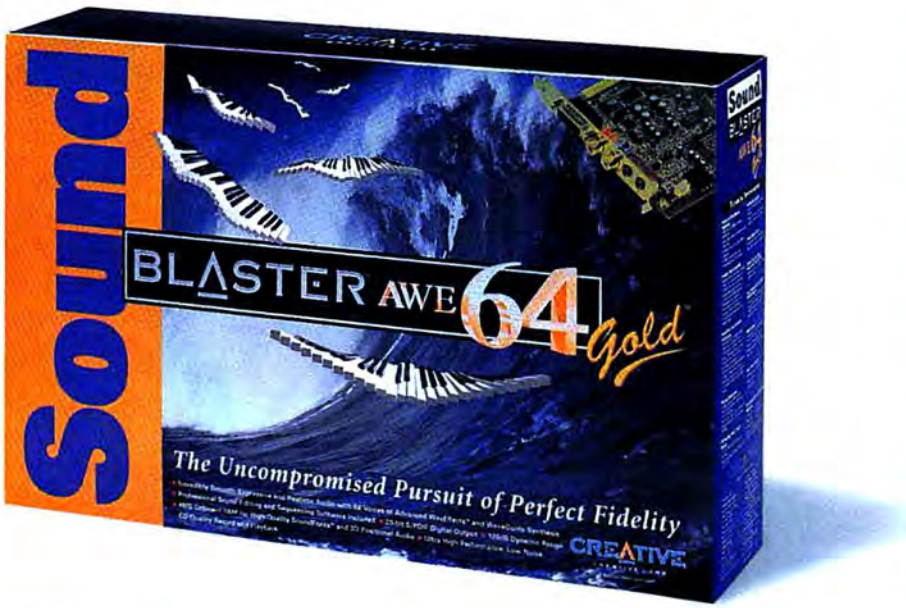
Simple performance enhancements, a few more slots, and some server management software would make the Vetix EL 1000 an excellent entry-level server.

online *For more server reviews, see www.pcworld.com/networking/servers. Eric Bender is a* PC World *executive editor. William L. Rinko-Gay directs the Network World–PC World Network Test Center. Ed Scannell is editor at large at* InfoWorld. ■

PHOTOGRAPH: DPI/KEN SMITH DIGITAL PHOTOGRAPHY

AWE 64

Reasons To Upgrade Your Multimedia PC



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2. Advanced WavEffects Synthesis.
3. Pure gold plating to inspire the envy of your friends.
4. Hands-free microphone included.
5. 20-bit SPDIF output.
6. Full duplex support.
7. The perfect audio upgrade for any Pentium PC.
8. The thunk of your old sound card hitting the trash.
9. 90dB signal-noise ratio (analog).
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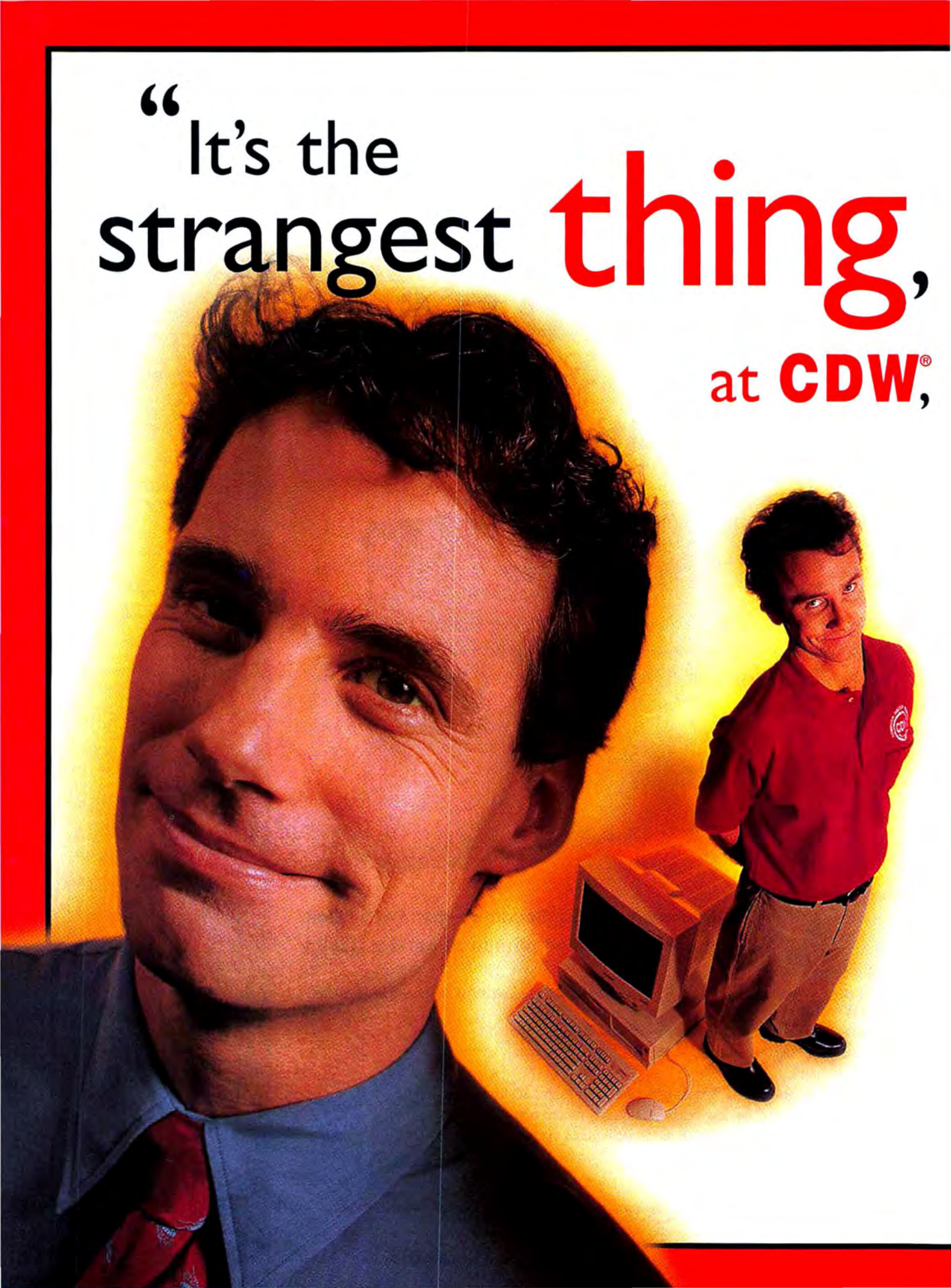
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NEWS
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The EMPIRE STRIKES BACK

Microsoft's latest browser suite battles Netscape for control of your desktop, changing the way you look at the Web—and your PC.

Is the Force with them?

WHEN YOU SPEAK of the great modern rivalries—Bill and Newt, Nancy and Tonya, Darth and Luke—you must add one more pair to the list: Microsoft and Netscape. With the latest versions of their respective browsers, these high-tech titans are waging a fierce battle to capture the hearts and modems of PC users.

Last month we looked at a prerelease version of Netscape Communicator (see "Netscape: The Great Communicator?" May). This time around, we got our hands on an early version of Internet Explorer 4.0. Microsoft released its first public beta version in April, and plans to ship the final version for Windows 95 and NT this summer. Windows 3.1 holdouts will get their version 90 days later, Microsoft says.

Like Communicator, Internet Explorer has grown from a simple browser into a full Internet suite. Besides a beefier browser, you'll find an enhanced e-mail and news program, a lightweight HTML authoring tool, conference and collaboration features, and push and pull technologies that bring updated Web content to your desktop. Each suite also pushes the HTML language to new heights—you'll soon see Web pages that look less like text documents and more like interactive multimedia applications. ▶

BY SCOTT SPANBAUER

ILLUSTRATIONS: JOHN BLECK

But IE 4.0 promises a change that Netscape Communicator may be unable to match: It lets you integrate the browser directly into the operating system, so you can use IE 4.0 instead of Windows 95's Explorer to manage your folders and files.

The tactic makes a lot of sense: A Web browser's hyperlinks, bookmarks, and Forward and Back buttons are better than anything in Win 95's Explorer. With IE 4.0 as your primary interface, you'll be able to jump from a folder on your hard disk to the network file server to a page on the Web, all by just clicking your mouse.

A copy of IE 4.0 will be part of every copy of Memphis, the Windows 95 successor due late this year or in early 1998 (see "Are You Ready for Windows 97?" for details). Another key difference: Unlike the $59 Netscape Communicator, IE 4.0 is available as a free download.

Though IE 4.0 was still far from being finished at press time, we got a good look at its enhanced browser, push and pull capabilities, e-mail and news programs, and collaboration tools. Here's what we found.

THANKS, I'M JUST BROWSING

YOUR BROWSER MAY have become smarter after all these years, but its main function is still downloading and displaying Web pages. Microsoft claims IE 4.0 will offer faster page downloads than version 3.0, though that wasn't apparent in the early copy we used. The prerelease version used about 40MB of hard drive space; Microsoft says the shipping version will soak up less space.

Unlike Netscape Communicator, Explorer 4.0 lets you use the browser to manage your PC's files and folders.

For your browsing pleasure, IE 4.0 adds several small, smart enhancements. For example, start typing a previously used URL into an address field and IE completes the URL for you. Right-clicking the Back or Forward buttons pops up a list of recently visited sites—a neat trick you'll also find in Netscape's new browser. As with Communicator's Bookmarks, editing Explorer's Favorites list is a drag-and-drop affair (see "A Better Way to Browse").

IE 4.0 also makes better use of scarce screen real estate. As in version 3.0, you get customizable, overlapping toolbars with buttons that link you to suggested sites, but IE 4.0 lets you manipulate these toolbars with a right-click instead of a dialog box. Placing links on the toolbar to your favorite sites is easy: Just drag a link from the current page and drop it on one of the current link bar buttons.

IE 4.0 also takes some of the pain

Communicator Versus Internet Explorer 4.0: Call It a Tie

NETSCAPE AND MICROSOFT seem locked in a game of "anything you can do, I can do better." Feature sets in their beta versions apparently change by the minute as each tries to improve upon the other's handiwork. So it's no surprise that, at this early stage at least, Communicator and Internet Explorer 4.0 are more alike than different. (Note: International Data Group, the parent company of *PC World*, has a minority interest in Netscape Communications.)

Like Internet Explorer, Netscape's browser has evolved into an Internet suite that does everything but clean your oven. The $59 Netscape Communicator includes an updated browser; an e-mail and newsgroup reader; a low-end HTML authoring tool; push and pull capabilities; plus text chat, a shared whiteboard, and Internet telephony. The $79 Communicator Pro adds group scheduling, administrative tools, and IBM 3270 terminal emulation. Here's how the suites compare.

Browsing the Web

IE 4.0 AND COMMUNICATOR both streamline browsing with customizable toolbars and navigation buttons that display a list of previously visited sites when you right-click them. And both let you view Web pages with multimedia, tables and frames, Java programs, and more. However, Communicator still doesn't directly support ActiveX controls, Microsoft's replacement for plug-ins.

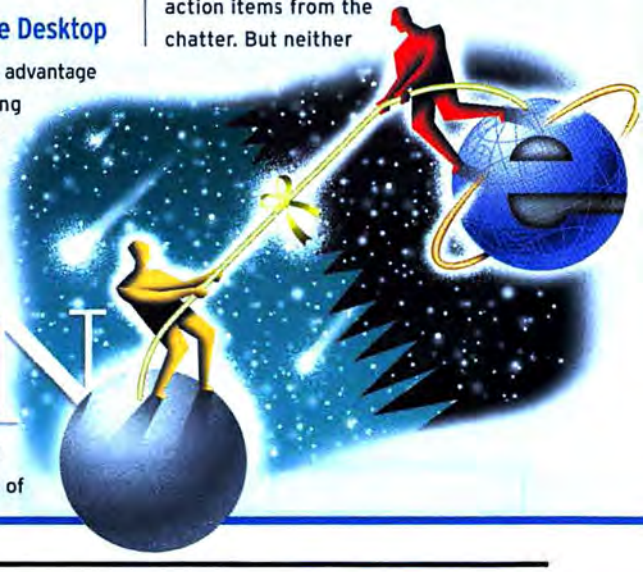
So far, Communicator lacks an equivalent to IE 4.0's Smart Favorites, which alerts you to changes in your favorite Web pages. But like IE 4.0, it will offer a Subscription feature that automatically pulls down updated Web pages for offline reading.

The Browser Meets the Desktop

IE 4.0 SEEMS TO HAVE a big advantage with its integrated browsing option, which enhances Windows 95's Explorer with browserlike navigation. But while a nifty interface innovation, it's not the greatest usability advance of the nineties. Netscape plans its own desktop shell as part of its Netcaster technology (formerly known as Constellation). Netcaster will be included in the next beta of Communicator, due out this month. Netcaster's Webtop shell won't integrate as deeply with Windows 95 as IE 4.0 does. But it should provide push capabilities similar to Internet Explorer's Channels and NetShow modules—and unlike IE 4.0, it will offer them to users of Windows 3.1 as well as Win 95.

E-Mail and News

IE 4.0 AND COMMUNICATOR both now support sophisticated filtering of incoming mail—a godsend for those of us who receive tons of e-mail each day and need to sort the action items from the chatter. But neither



out of Web searching. Go to the multiple search engine page on Microsoft's site, and the browser creates a side-by-side window display, with the search-engine page in the left pane and search results in the right pane. You can quickly preview your search results without having to jump back and forth to the search page. Now *that's* smart.

LOCAL BROWSER MAKES GOOD

IF BILL GATES has his way, eventually you'll be able to browse everything from your TV set to your toaster. With IE 4.0, however, you'll have to settle for browsing the Internet, your own hard disk, and your local area network. This option works only with Windows 95 or NT; Windows 3.1 users are out of luck.

Some breathless previewers have heralded IE 4.0's "integrated browser" option as the greatest thing since the Web itself. But really, browsing your hard disk Web-style is not a huge deal. They're the same old files and directories—they're just a little easier to access.

For example, type **c:\my documents** into IE 4.0's handy address window, and instead of a Web page you'll see Win 95's familiar files and folders. You can then open files and activate Shortcuts with a single click, or flip through your folders using Back and Forward buttons. And no matter what folder you're currently viewing, you can open a Web site simply by typing its URL into the address window. Nice stuff, but hardly revolutionary (see "Exploring Your Hard Drive").

There are a few more reasons to give integrated browsing a try. IE 4.0 lets you customize the Windows Taskbar. You can use one bar or multiple bars, each of which can contain the browser address field, plus links to your favorite sites or favorite desktop folders.

And here's an unexpected pleasure—the Taskbar's Properties sheet now offers a wizard that strips your Start menus of broken links, as well as the readme file and help file Shortcuts that clog it. Afterward, you can rearrange Start menu items by dragging and dropping them to new locations.

You say you like the standard Windows 95 Explorer interface just fine? No problem: Just say no to the option when you install IE 4.0. You can also easily uninstall the option later via the Control Panel.

What's Hot/What's Not

Microsoft Internet Explorer 4.0	Netscape Communicator
Basic suite: IE 4.0 browser; Outlook Express e-mail and news program; FrontPad HTML authoring; NetMeeting text chat, video and audio conferencing.	**Basic suite:** Navigator browser; Messenger e-mail and news program; Composer Web authoring; Conference text and audio chat; Collabra workgroup and discussion tool.
Extras: Integrated browsing option lets you browse your hard disk using IE 4.0; Channels and NetShow promise to deliver multimedia content to your desktop.	**Extras:** Netcaster will bring news and Web pages to your desktop; $79 Communicator Pro adds Calendar group scheduling, IS tools, and IBM 3270 terminal emulation.
WHAT'S HOT	
Nice price: It's free.	**Savvy navigation:** Like IE 4.0, Navigator now has customizable toolbars, plus other small but clever browser enhancements.
Smart Favorites: Alerts you of changes to favorite bookmarked Web sites.	**Better plug-ins:** Automatically retrieves helper apps and installs them.
Surf now, read later: Subscriptions feature downloads and caches Web sites at pre-assigned time for offline reading.	**On-site help:** Help pops up in a window on the page where you're working, instead of bringing you to a different page.
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LUKEWARM	
Browsing your hard disk: Faster access to files, folders, and Shortcuts, but it's not the design breakthrough of the decade.	**Managing your bookmarks:** Easy to add URLs; not always easy to drag and drop folders where you store bookmarks.
NOT SO HOT	
Taking NetMeetings: Text chat is handy, but videoconferencing features are too tricky–and bandwidth hungry–for most people.	**Calling a Conference:** Useful text chat utility, but product has no video capability.
Hyper Active Desktop: Displaying all or parts of Web pages as desktop background is hard to use in early version.	**You gotta pay to play:** $59 to $79, depending on the package. Not every company can afford to give away software.

A LITTLE HELP FOR YOUR FRIENDS

MOST OF US would rather read Web pages than compose them. But even if you have never yearned to learn HTML, Internet Explorer 4.0 offers some compelling reasons to at least pick up the basics. Explorer's integrated browser option lets you turn your PC's folders into HTML pages, so you can customize them for public consumption. (There is also a folder customization wizard if you want to avoid HTML altogether.)

Each folder can contain a default Web page that displays in place of the usual array of file and folder icons. If the folder resides on a departmental server, you could have its page display a message from you about the history of a project, or any other information a Web page can display—even links to other work sitting on the company intranet.

You'll be able to customize each folder's default page using the bundled FrontPad HTML authoring tool. And even if you don't use folders this way, FrontPad is a boon. This light version of Microsoft's ▶

suite works with leading proprietary e-mail systems (such as Notes, cc:Mail, or commercial online services' mail boxes). If you want a universal in-box, you still have to use Microsoft's Windows Messaging (aka Exchange), which is plodding at best.

With Internet Explorer 4.0 or Communicator, you can read e-mail and newsgroups from one place on screen. Communicator's newsreader offers a few niceties that Internet Explorer's still lacks, notably the ability to watch threads (automatically download new messages in topics you select) or ignore them. But Microsoft lets you maintain multiple news server accounts–a feature Netscape and every newsreader developer should copy.

Bottom Line

HOW ABOUT PRICE? You can't get any cheaper than Internet Explorer 4.0–it's free, which makes it about $60 to $80 less expensive than rival Communicator.

Aside from price, the big two are very close in the major areas. But this game's not over yet–expect both sides to add a few more tricks before the suites see shrink wrap. Here's hoping neither company stops borrowing the other's great ideas.

FrontPage offers a Home Page Wizard for design neophytes, and lets savvy Websters pepper their pages with scrolling marquees, sound and video clips, mail-to links, and ActiveX controls.

THE USUAL SUSPECTS

IF YOU USE THE NET to do research, you end up visiting the same sites repeatedly in search of updates and new links. Then you have to wait while the data downloads. Wouldn't it be nice if you were automatically notified when favorite pages changed? Now you can be. One of Internet Explorer 4.0's best new features, Smart Favorites, periodically checks your favorite pages for changes. It can notify you of changes in one of two ways. An icon for the Web site can appear on the Windows Taskbar, marked with a red gleam. Or, IE 4.0 can mail you a copy of the page via its integrated e-mail and news program.

But why not let IE 4.0 do the surfing for you? When you add a Web site to your Favorites list and click the Subscribe check box, IE 4.0 will scan the site's pages for updates at a time and frequency you select, then download them for later reading. You can tell it to check as often as every 15 minutes, and dig as many as five levels deep in a page for new data.

Let's say that you tote a laptop to an office with a high-speed Internet connection. IE 4.0's Subscriptions can gather the latest news while you're in a meeting, so you can read it later while you're in bed watching Letterman. Not to be outdone, Netscape announced at press time that Communicator will come with its own offline browser, which will let you subscribe to your favorite Web sites and update the data as often as you wish.

DON'T PUSH ME

SMART FAVORITES and Subscriptions are pull technologies—the client (your browser) pulls data from the Internet. But the latest Net rage is push technology, where remote systems transmit data to your PC, much like TV stations send transmissions to your television via cable or satellite.

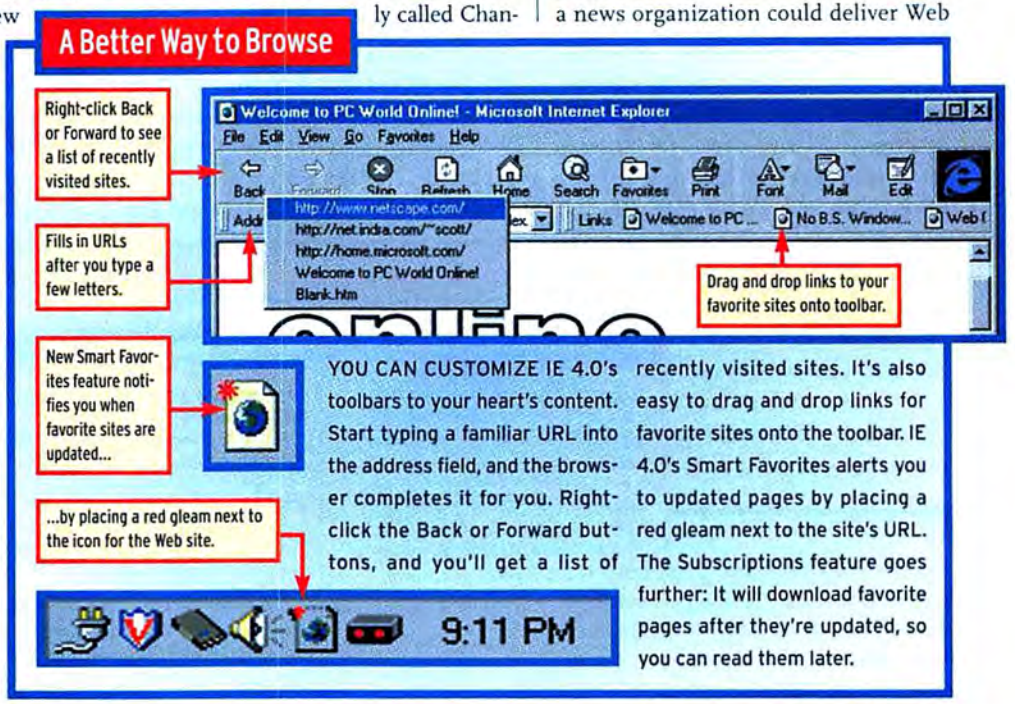
PointCast has pioneered the concept of server-push, with an advertiser-supported service delivering news, stock prices, and weather updates to your PC. Microsoft and Netscape plan to build push support into their suites—Microsoft has even signed on PointCast as a content provider. But Microsoft's push technology, currently called Channels, wasn't in our early version of IE 4.0.

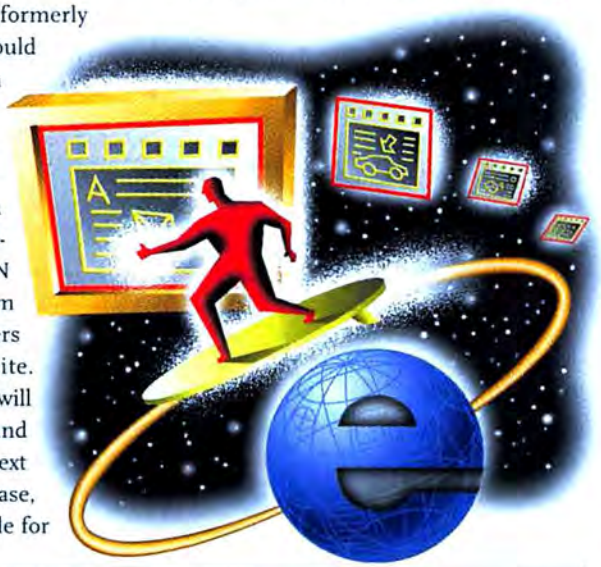
As we went to press, Microsoft submitted a design for server-push content, the Channel Definition Format, to the World Wide Web Consortium (W3C). This specification would allow almost anyone with a Web site to create and distribute Channels content using HTML.

Netscape's Netcaster (formerly called Constellation) should provide similar push capabilities, including its own version of Channels. Users will be able to access content from a variety of sources, including ABC News and CNN Web sites, and choose from a list of channel providers on Netscape's Web site. Netscape says Netcaster will be part of its $59 suite and will be included in the next Communicator beta release, which should be available for downloading by the time you read this.

Microsoft is working on a second, higher quality mechanism for delivering multimedia presentations over the Internet. Microsoft's NetShow client, which will be included in both IE 4.0 and the next version of Windows 95, will receive broadcasts of high-resolution video, audio, graphics, and animation. So, for example, a news organization could deliver Web reports that look more like TV than like electronic newspapers. But when will this content come pouring into your office? Maybe late this year, maybe later.

NetShow will also play a role in future television products. In April, Microsoft announced its intent to purchase WebTV Networks of Palo Alto, California. The ▶





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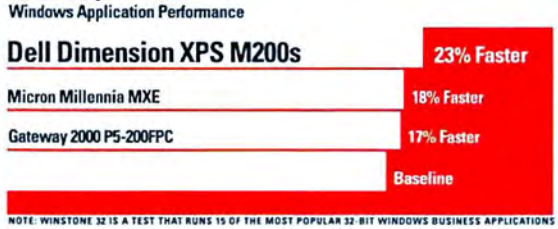

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company will operate as a subsidiary of Microsoft and develop products designed to let you surf the Net via your TV.

PARDON ME, BUT YOUR WALLPAPER IS BLINKING

AS IF ALL OF IE 4.0'S new ways of browsing, pushing, and pulling data weren't enough, here's one more. Active Desktop lets you anchor Web pages or parts of them to your desktop background. In other words, you might display an up-to-the-minute stock ticker from one Web site, a weather report from another, and news headlines from a third, all on screen while you work. (This option won't be available to Windows 3.1 users.)

It's too early to tell how valuable this feature will be. The Active Desktop in our early version of IE 4.0 needs some work. Anchoring all or part of a page to your desktop is easy enough, but it's tough to click between elements on the desktop. And if you thought the animations that populate most Web sites were irritating before, wait until they blink at you all day.

An included Active Desktop screensaver cycles through your Favorites list while you're busy elsewhere. It's unlikely to make you more productive, but it might entertain your coworkers. Just be careful what you bookmark.

Active Desktop will likely shine after Microsoft adds small objects that will be genuinely helpful to have on your desktop. One tool on its way is a scrolling ticker that can notify you of updates to Smart Favorites and Subscriptions. Meanwhile, Netscape will offer the Webtop, which lets you replace the Windows 95 or 3.1 interface with the channel of your choice, launch apps, and get updated information instantly. Part of Netcaster, the Webtop was not ready for testing at press time.

HAVE YOUR MAIL CALL MY MAIL

THE WEB GETS ALL the glory, but byte for byte, e-mail, newsgroups, and other communications tools are more valuable.

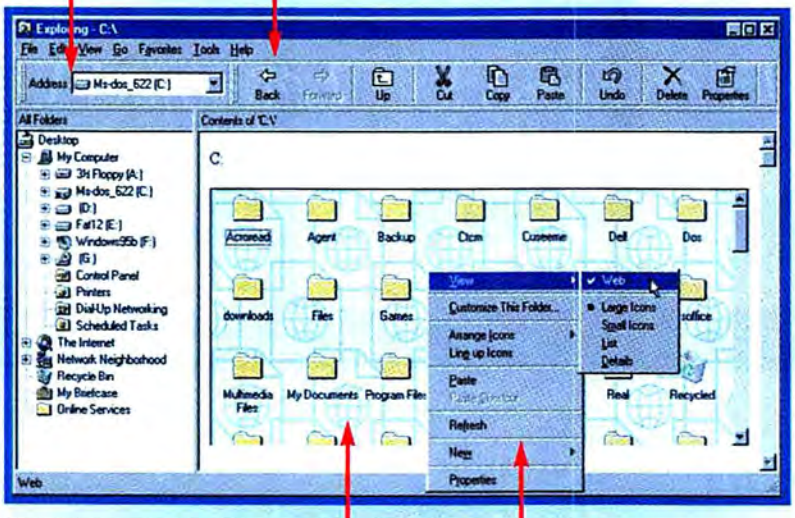
While Internet Explorer 3.0 debuted an adequate duet of programs—Internet Mail and Internet News—they offered fewer options and features than top third-party programs. In IE 4.0, Microsoft has combined e-mail and news programs in a single interface dubbed Outlook Express.

Like any top e-mail program, IE 4.0 lets you sort incoming e-mail into folders. A new three-pane view lets you preview messages without opening them: Scroll down the list in the in-box, select a message, and look in the pane below to start reading (see "E-Mail Bonding"). Since IE 4.0 complies with the Lightweight Directory Access Protocol, you can easily grab someone's e-mail address from an online directory such as four11.com.

But instead of making Outlook Express a fast, full-featured universal in-box, Microsoft limited it to the POP3 mail servers used by most Internet service providers. So you can get messages from one or more Internet e-mail accounts, but you can't get e-mail from commercial online services, or corporate cc:Mail or Notes messages. (Despite the similar name, Outlook Express should not be confused with Outlook, Office 97's combined heir to Exchange and Schedule+.)

Many of Outlook Express's best news-reading features are holdovers from IE 3.0—it downloads new messages for offline reading, joins and decodes binary attachments, and lets you control how quickly messages are purged from your system. Uniquely, you can set up multiple news server accounts that let you read newsgroups as well as the computing-oriented groups on Microsoft's own server. Netscape Communicator and other products limit you to one news server. ▶

Exploring Your Hard Drive



IE 4.0'S integrated browsing lets you use the browser interface to peruse your PC's hard disk or your local area network as well as cruise the Web. While not exactly revolutionary, this design change does let you open files and folders and activate Shortcuts with a single click, or flip through folders using the Forward and Back buttons. To open any Web site, type a URL into IE 4.0's address window.

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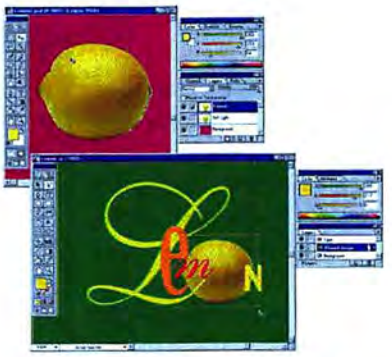

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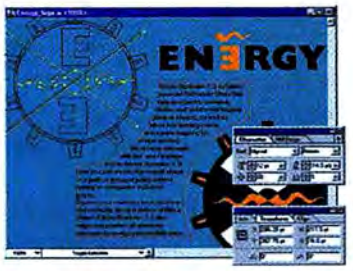

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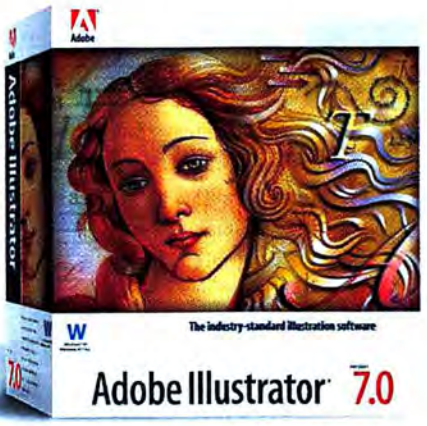

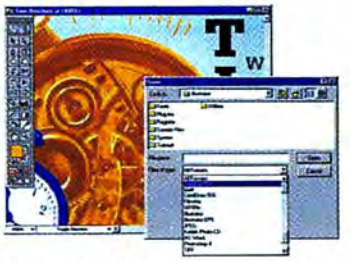

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Circle 32 on reader service card

Unless you're married to a particular mail or news program, Outlook Express (or Communicator's equally competent Messenger) will do the job. If you just can't live without Eudora or another mail program, don't worry—you can still make it the default program in either browser.

WORKING IN YOUR PJ'S

LIKE NETSCAPE, Microsoft wants to let you connect with colleagues working anywhere in the world. And its solution, called NetMeeting, may eventually take the place of conference calls and expensive dedicated videoconferencing. But not any time soon.

NetMeeting provides many of the important pieces of long-distance collaboration, including standards-based video and audio conferencing (using the H.323 protocol), text chatting, whiteboard, and binary file transfer. Someday, you'll be able to speed-dial your client in Malaysia and have an amicable, and free, video chat. ▶

Are You Ready for Windows 97?

BRACE YOURSELF: There's a new version of Windows on the way. Late this year or early in 1998, Microsoft will release its successor to Win 95, code-named Memphis. What does this mean to you? To find out, we went to Redmond for an early look at the new operating system, then tested an alpha version Microsoft released to developers in April.

For many, Memphis's most visible change will be a fully integrated version of Internet Explorer 4.0. You'll be able to choose between the usual Windows interface or IE 4.0. Take away IE 4.0, and Memphis should turn out to be mostly plumbing and fixtures. Some of these features—such as MMX support and the more efficient FAT32 filing system—are available in the OEM Service Release versions of Windows 95, installed on most PCs shipped this year. Other elements can be downloaded from Microsoft's Web site. So why upgrade?

NEW SETTINGS Wizards will make it easier to control the look of your desktop.

The biggest reason: new hardware. A Pentium MMX or Pentium II system with a 5GB hard disk, DVD drive, an IEEE 1394 interface, and ACPI (Advanced Configuration and Power Interface) power management will benefit from the improvements found in Memphis. The new Windows also will support the Accelerated Graphics Port, a connector that lets high-end 3-D video boards use a PC's cheaper main memory for 3-D acceleration. Although Windows 95 will run on new PCs, it won't fully support all the newest technology.

Old PCs, New Tricks

STILL MUDDLING through with an older PC? Memphis will offer plenty of small but tempting innovations: easier ways to configure your PC, better troubleshooting tools, and a possibly faster route to the Net.

Memphis is chock-full of small improvements to dialog boxes, menus, and wizards. In my testing, a new wizard for defragmenting the hard disk worked very well, giving unprecedented control over how and when Memphis optimizes files for faster performance. I also liked the ability to change my display's refresh rate and color depth on the fly.

Other upcoming features look equally compelling. Internet System Updates will download and install Windows bug fixes automatically using an ActiveX control. A new file checker should reduce problems caused by bickering drivers and other conflicts. Meanwhile, an improved Dr. Watson utility helps tech support troubleshoot your problems over the phone.

On the Internet front, Microsoft says Memphis will let you join multiple modem or ISDN connections into a single, higher-speed connection—an appealing bandwidth boost. And it will support the Point-to-Point Tunneling Protocol, which lets you use the Internet to set up a wide area network.

Finally, Memphis will introduce Microsoft's unified driver model, which will eventually allow hardware vendors to ship products with one device driver that works under both Memphis and NT 5.0, due out in 1998.

Between now and when it ships, Memphis will probably gain other flashy new features. But what most people really want is a Windows that's fast, bug-free, and easy to configure. Build that, Microsoft, and the world will beat a virtual pathway to your door.

The New Windows: You May Already Own It

IF YOUR PC CAME WITH WIN 95's OEM Service Release 2, you already own big pieces of the new Windows—and can download parts of the rest for free.

Memphis Features	Windows 95 OSR2[1]	Windows 95
Internet Explorer 4.0	Free download [2]	Free download [2]
NetMeeting 2.0 (text chat and videoconferencing)	Free download [2]	Free download [2]
FrontPad HTML authoring program	Free download [2]	Free download [2]
Personal Web server	Free download [2]	Free download [2]
Dial-up server	●	Free download [3]
Point-to-Point Tunneling Protocol	○	○
Automatic Internet system updates	○	○
Dr. Watson utility	○	○
FAT32	●	○
FAT32 in-place converter	○	○
SUPPORTS		
DriveSpace 3	●	○
New ACPI power management	○	○
Universal Serial Bus	●[4]	○
IEEE 1394	○	○
PC Card 32	●	○
Intel Pentium MMX processor	●	○
DVD drive	○[5]	○[5]
Multiple displays	○	○
Accelerated Graphics Port	○	○
Unified driver model	○	○

● Yes ○ No

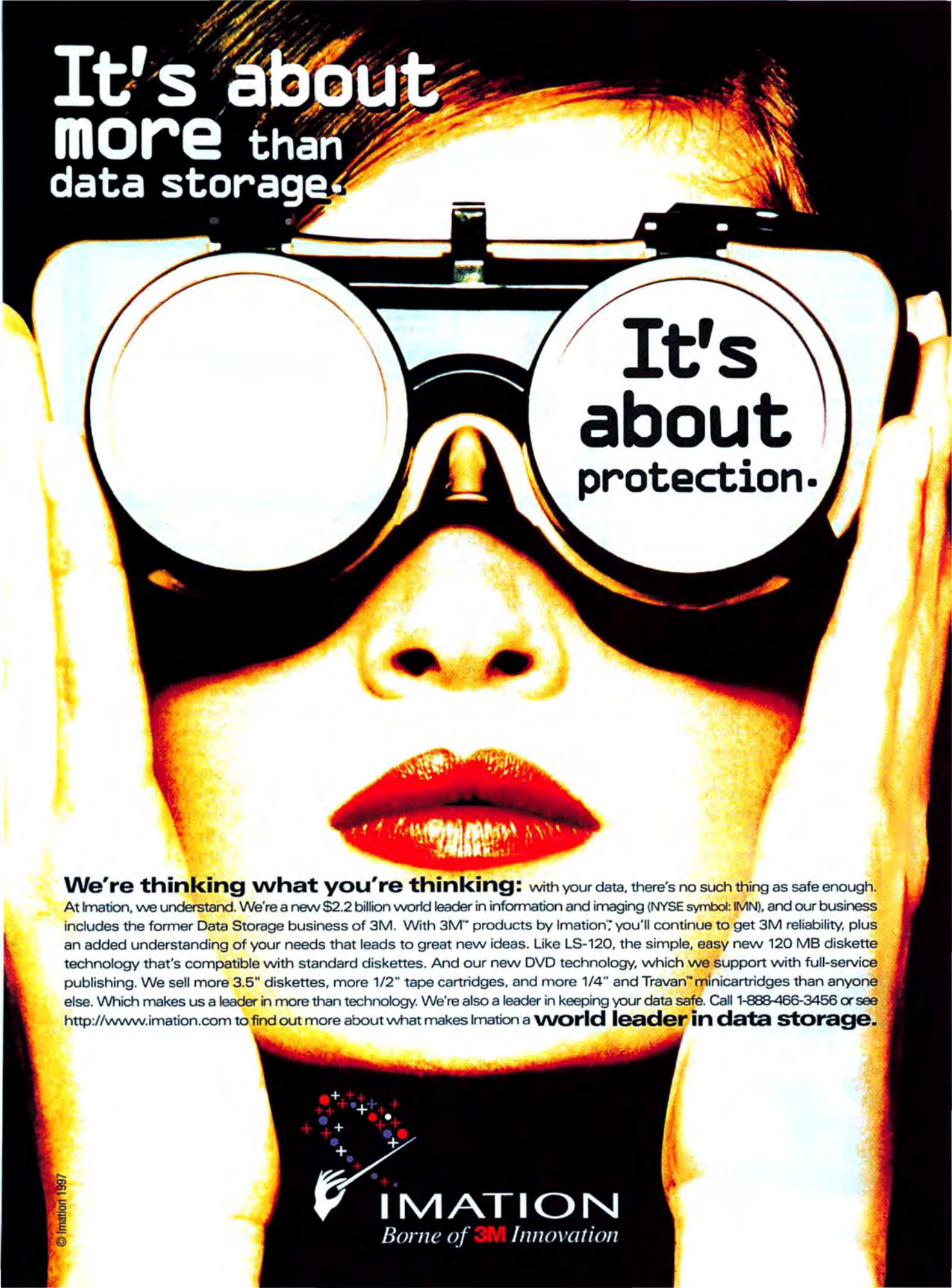
[1] To find out if you own OSR2, right-click My Computer and select Properties. The General page contains your version number; 4.00.950 B means you have OSR2 or 2.1.

[2] www.microsoft.com/msdownload/ieplatform/iewin95.htm

[3] www.microsoft.com/windows/common/aa2725.htm

[4] Limited support in OSR 2.1.

[5] Drivers likely to be provided by DVD drive makers.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But the bandwidth simply isn't available yet. Even on today's fastest Internet connections and hardware, trying to carry on a simple conversation among several people is comedic. And NetMeeting will need a better way for users to locate and join conferences. (A NetMeeting product manager hinted to us that this feature was in the works.) To use NetMeeting today you must know another user's e-mail IP address. Microsoft does provide a list of all the people currently using NetMeeting, but scrolling through this list to find your party isn't efficient. While Netscape does not currently offer any videoconferencing products, Microsoft's NetMeeting does not beat established third-party products, notably White Pine's Enhanced CU-SeeMe (see "Internet Phones Take On Ma Bell," this issue).

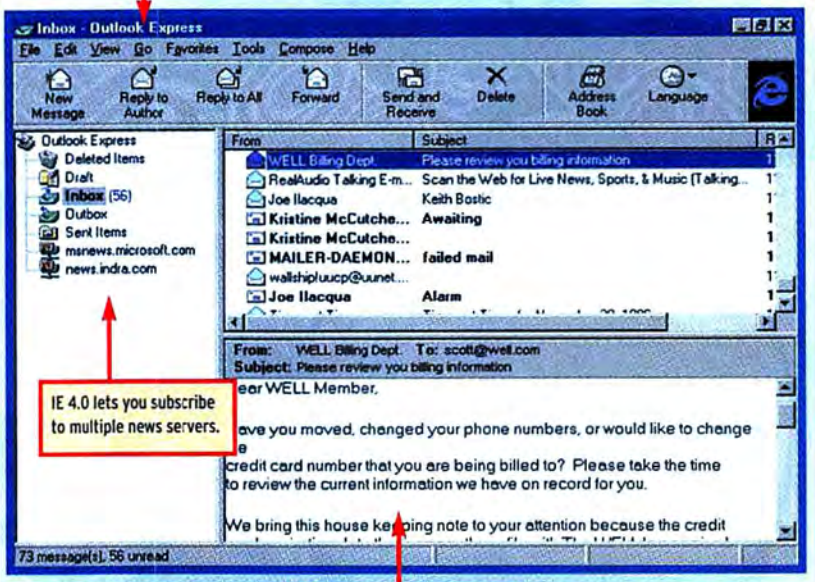
A FALSE SENSE OF SECURITY?

INTERNET EXPLORER 4.0 may well turn out to be faster, smarter, and easier to use than version 3.0, but will it be more secure? That's a question even Microsoft can't answer at this point.

Over the past year, researchers at several universities have uncovered holes in Internet Explorer 3.0's security features. They found that some Web pages can contain links that could upload programs to your PC and execute them, bypassing IE entirely. These rogue programs could theoretically copy your sensitive files or even delete the contents of your hard disk. (For more information on the flaw, see *Bugs and Fixes* in this issue.) In fact, Microsoft is so concerned about plugging these holes that it delayed the release of the IE 4.0 Platform Preview version several times this spring so it could build in the necessary fixes.

E-Mail Bonding

The new name for Internet e-mail and news program.



IE 4.0 lets you subscribe to multiple news servers.

This three-panel view lets you preview a selected message without opening it.

LOOKING FOR a single source for Internet newsgroups and e-mail? Take a ride on IE 4.0's Outlook Express. Internet Explorer 3.0 veterans will recognize this combined newsreader and e-mail program (formerly called Internet Mail and News), but they won't notice radical improvements. Outlook Express's new three-pane view lets you preview the contents of e-mail messages without opening them. And you can subscribe to multiple news servers, a feature Netscape Communicator and other third-party products don't offer. On the downside, Outlook Express can't act as a universal in-box for your corporate, ISP, and online service mail.

Both Microsoft and Netscape have vowed to help users prevent the creation of *cookies*—text files that Web sites create on your system to track your browsing habits. But details on exactly how IE 4.0 will do this were unclear at press time.

Microsoft is working with the Internet Engineering Task Force standards group on industrywide specifications for cookies, but those discussions are incomplete. Microsoft could not tell us what new security steps it would implement, or when it would implement them.

THE RACE TO THE FINISH

UNTIL A FINAL version of Internet Explorer 4.0 appears—this summer, according to Microsoft—definitive comparisons between it and Netscape Communicator are premature. Many features could vanish between now and the products' ship dates, and killer new tools may be waiting in the wings.

The news for Web addicts is good, though: Both Microsoft's and Netscape's tools are getting better. Both companies are taking different approaches as they try to integrate Web browsing with your desktop software and operating system. Each suite will continue to excel in small ways that the other doesn't. Right now, Microsoft's IE 4.0 offers worthwhile features—like Smart Favorites and an integrated browsing option—that Netscape Communicator doesn't.

But stay tuned, because the competition is far from over. For consumers, that may be the best news of all.

online *For QuickCam demonstrations of Internet Explorer 4.0's new features, see PC World Online (www.pcworld.com/jun97/ie4). Contributing Editor Scott Spanbauer is author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240).* ■

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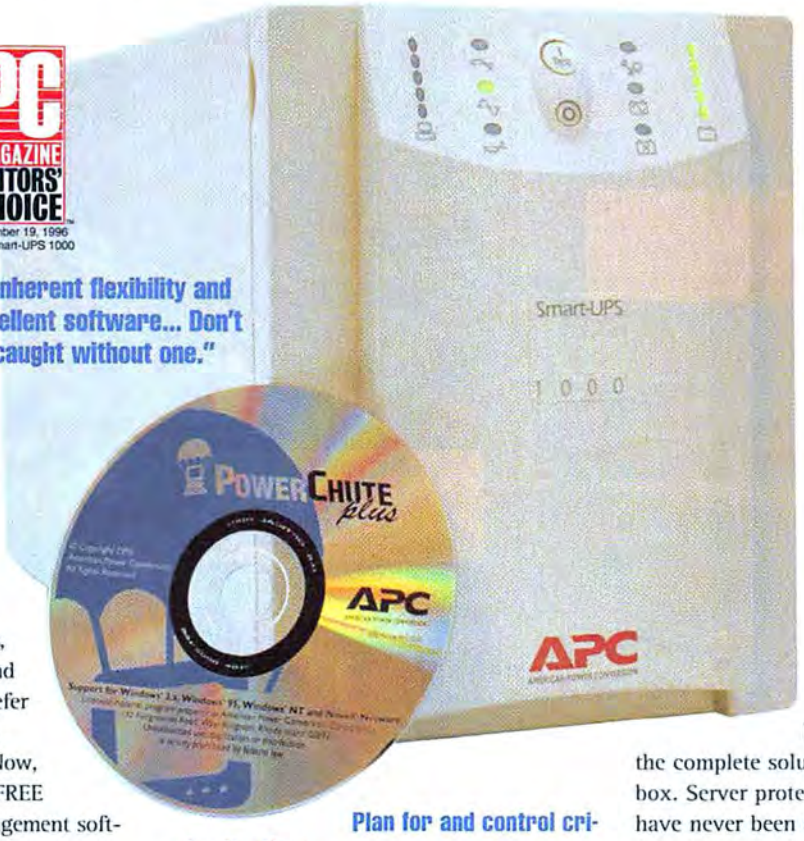

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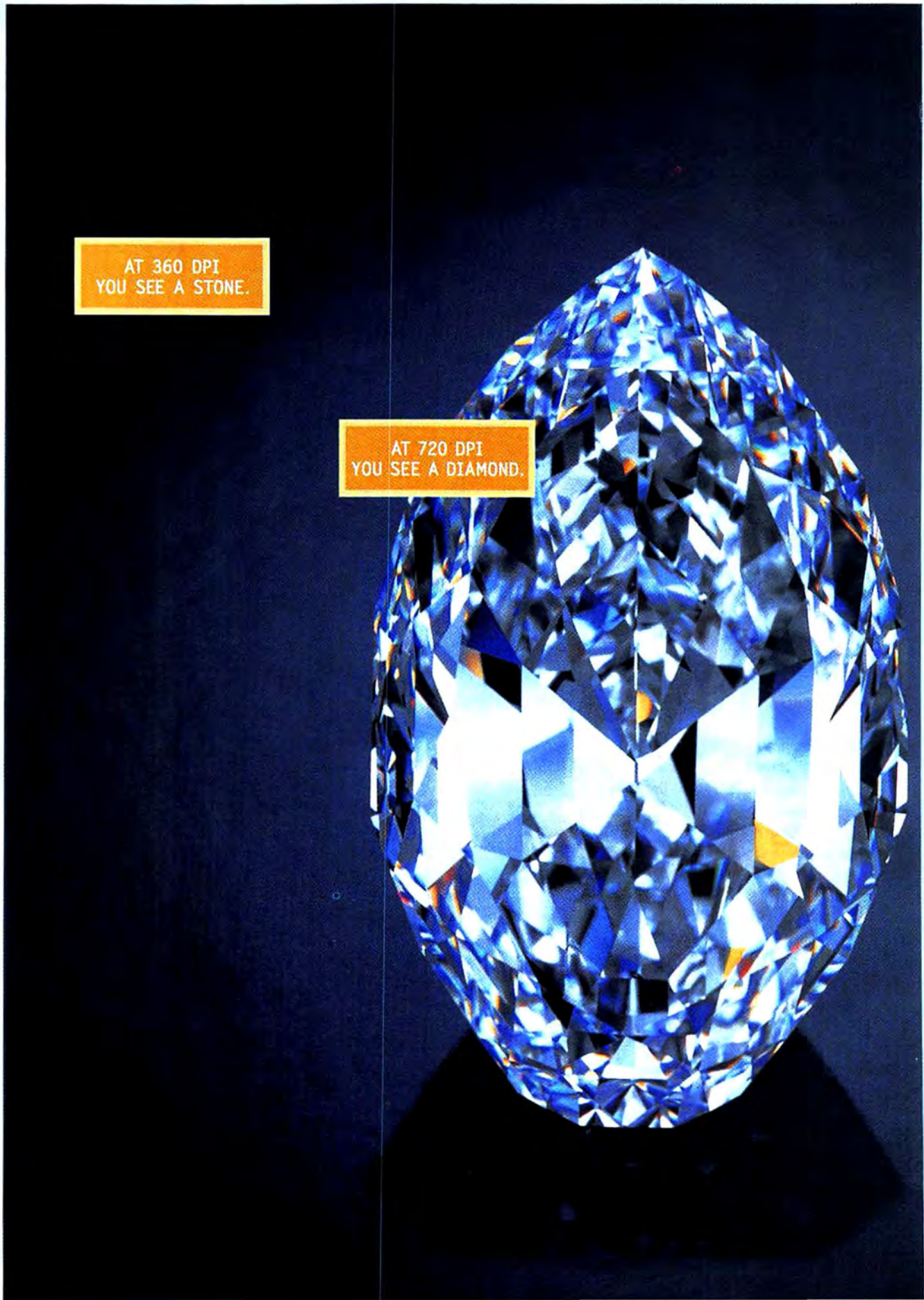

The National Software Testing Laboratory Inc. (NSTL) found the EPSON Stylus Color 600 outperforms and speeds of the HP DeskJet 694C by 31%, and the Canon BJC-4200 by 39%. The EPSON Stylus Color 800 outperforms and speeds of the HP DeskJet 870Cxi by 25%. Print speeds tested with Windows 95 and Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Adobe PageMaker and Adobe Photoshop. NSTL report available by calling 1 800 GO EPSON. Prices may vary. EPSON and EPSON Stylus are registered trademarks of Seiko Epson Corp. Micro Piezo is a trademark of Epson America Inc. © 1997 Epson America, Inc.

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Circle 228 on reader service card

WHEN Bad PCs HAPPEN TO Good People

BY BRAD GRIMES

Just bought a new PC? Get ready to call tech support. Over half of 13,500 readers surveyed experienced problems with their systems. Here's how to **avoid getting stuck with a lemon.**

LAST DECEMBER after months of research, Howard Rosen ordered a Micron computer—a Pentium-133 with a big hard drive and all the multimedia trimmings. The system arrived two weeks later than Micron had estimated, and it didn't work. "It was Friday the 13th when I decided to order from Micron," he says. "I should have known then."

Rosen, an accountant from Westchester County, New York, immediately called Micron's technical support staff. He recited the error messages he'd received and was told that his PC had faulty memory chips. Micron promised new chips and an on-site technician. Guess what? The RAM showed up, but the technician did not. Rosen picked up the phone again. This time, with Micron's help, Rosen installed his new memory and booted up. Still no luck.

Next diagnosis? A bad motherboard.

Howard Rosen

Formerly an unhappy Micron owner, now a happy Gateway owner.

PHOTOGRAPH BY PETER GREGOIRE

Once again, the new part arrived promptly, but the promised technician never showed. Then he started to hear voices. "My wife was saying 'Get rid of it, get rid of it,'" Rosen recalls.

It was time to move fast. Rosen hurriedly called Micron's customer service, hoping to extend his 30-day money-back guarantee so he could return the computer. After some back-and-forth between departments, Rosen's request was granted.

"I told Micron to get that machine out of my house, and I wanted to be credited for every penny that I'd spent." Micron obliged but informed Rosen he'd have to pay return shipping charges. (Micron eventually took responsibility for those costs, too.) Rosen now owns a Gateway 2000 PC and is happy with it—so far.

AVOIDING THE HEADACHES

HEY, THESE THINGS HAPPEN. In fact, of the 13,510 *PC World* readers who responded to our fax-back questionnaire about PC reliability and service, more than half (56 percent) said they'd had a problem with their system at one time or another. In other words, error messages, faulty motherboards, and creative guesses from tech support staff are a fact of life if you own a computer. You can spend top dollar on the best computer from a company that has a good reputation for reliability, but you still can't be sure that the system will remain problem-free. What you can do is arm yourself with information: Make sure that you know all your rights—and know where costs kick in (and where they don't)—before you fork over any money.

> Computer users may be getting **solutions** more quickly, but they've still got **lots of problems.**

Welcome to our guide to PC reliability and service. Here you'll find out what thousands of PC users have to say about their recent experiences with computers and service departments, and you'll get the gruesome details on warranties, extended warranties, support, fees, and return policies. When is a warranty just a bunch of words? When are on-site service and extended warranties worth it? When is a cutting-edge component a liability rather than a benefit?

LOOK WHO'S TALKING

THE BEST WAY to start when you're shopping for a computer is to ask friends and colleagues about the systems they own. *PC World* does this on an ongoing basis. Our monthly fax-back questionnaire asks readers to report on the reliability of their PC and the service provided by its manufacturer. We ask about any problems readers have had and the support they've received.

For this report, we tabulated responses received between August 1, 1996, and January 25, 1997. Twelve PC companies selling computers under their brand name elicited 100 or more responses each, of which at least 50 pertained to service, making those companies eligible for our current overall ranking (see the "Winners and Losers" chart at left). We've also included Apple in our reliability assessment, although we didn't get enough responses reporting on Apple's service to include the company in our service and overall ranking.

So what's new since we last reported our survey results ("PC Reliability and Service: Good-Bye to Good Support?" December 1996)? Not much—and that's the bad news. Customer satisfaction rates are still mediocre, even though service shows inklings of improvement. But reliability scores have a lot of catching up to do.

According to our survey, customers currently spend an average of 10.5 minutes on hold waiting to get through to technical support (compared with 11.5 minutes six months ago), and it takes them nearly

Winners AND Losers

IN THIS REPORT, Dell is the only company voted tops in both reliability and service categories—earning a Best rating overall. Since our last report, Digital and NEC dropped significantly in the reliability category. Gateway 2000 climbs to the top tier in service—with improvements also by IBM and Quantex—while NEC slips down to Worst in service.

OVERALL	RELIABILITY	SERVICE
BEST	**BEST**	**BEST**
Dell	Apple 116 Dell 1899 Hewlett-Packard 473	Dell 383 Gateway 2000 724 Micron 207
GOOD	**GOOD**	**GOOD**
Gateway 2000 Hewlett-Packard IBM Micron	Compaq 1068 IBM 673 Micron 875	Hewlett-Packard 113 IBM 175 Quantex 112
FAIR	**FAIR**	**FAIR**
Compaq Digital Quantex	Gateway 2000 2288	Compaq 272 Digital 50
POOR	**POOR**	**POOR**
AST Research	AST 314 Digital 154 Quantex 445	Acer 144 AST 106
WORST	**WORST**	**WORST**
Acer NEC Packard Bell	Acer 423 NEC 224 Packard Bell 1190	NEC 77 Packard Bell 469

Source: PC World Reliability and Service survey, based on questionnaires returned between August 1, 1996 and January 25, 1997.
Numbers indicate total responses that resulted in each company's ratings. Companies are listed alphabetically within categories. See "A Word About the Numbers" for methodology.

Judy Wilson

Success Mortgage, Kent, Washington

"When we told Dell **the problem**, they diagnosed it **right away**," recalls Wilson. "The on-site technician was in and out within **45 minutes**."

26 hours to reach a support person who can actually help them (compared with over 30 hours last time). When all is said and done, readers report that it takes just over seven days on average to resolve their problems—down more than one full day from last December.

Computer users may be getting solutions more quickly, but they still have lots of problems. The percentage of machines that don't work properly out the box has actually decreased. But five companies received lower marks for overall reliability since last time. The reason: Computers that initially worked fine are failing in their early life—often in the first six months. So, the length of the warranty, the company's return policies, and the quality and cost of technical support become even more important. (See "Warranties, Warranties, and Extended Warranties" and the chart "What Does Your Warranty Cover?")

IT'S LONELY AT THE TOP

STANDING ALONE in the top tier for overall reliability and service is Dell. And the folks at Success Mortgage in Kent, Washington, certainly give Dell a thumbs-up when it comes to service. Success vice president Judy Wilson says that when the Dell PC in her office went on the blink, she got through to Dell's technical support staff in no time. "When we told them the problem, they diagnosed it right away."

It turned out the system's power supply was defective. Dell arranged to dispatch an on-site technician, who showed up two days later with the needed replacement parts and fixed the problem pronto. "He was in and out of here within 45 minutes," recalls Wilson.

But it's lonely at the top of the chart. In December Dell shared that coveted seat with Micron, but this month Micron has slipped a notch, leaving Dell all by itself.

Micron's drop is due to an increase in the number of people reporting nonfatal problems with their systems. According to Raymond Jones, Micron's editorial review manager, the company made sweeping changes in quality control procedures last fall. It redesigned its manufacturing process and trained over 1200 employees in quality assurance practices. Hopefully these changes will mean fewer problem reports in the future.

Despite the rise in reported problems, though, most Micron owners who responded to this survey are happy (Rosen is a notable exception). Eighty-four percent said they would buy another Micron based on the service they received (compared to 82 percent last time).

GATEWAY'S SUCCESS STORY

IN THE REALM of customer service, the most improved PC company is Gateway 2000. Its service rating has jumped from Fair all the way to Best since December. Jay Miller, Gateway 2000's director of customer support, credits the ascent in part to the company's ability to forecast PC trends that might cause a sudden glut of phone calls—such as the rise of Pentium Pro systems and Windows NT—and to its hiring third-party support providers to handle the influx. "We've also brought more people on board," says Miller, "and we've revamped our whole training approach so we're giving more targeted, specific training to help the technicians."

Although IBM and Quantex have not achieved as dramatic an ascent as Gateway, their service improvements are notable nonetheless. Since our December report, both companies climbed up one notch in service from Fair to Good.

A DOWNWARD TREND?

MICRON IS NOT THE ONLY company whose overall rating slipped. Since December, five firms—Acer, Compaq, ▶

Keep 'Em Coming Back

Who is most likely to...

...get your business again?		...make you consider buying elsewhere?	
Company	**Percentage who would buy again**	**Company**	**Percentage who would buy again**
Dell	91	AST Research	55
Gateway 2000	88	Acer	50
Micron	84	Packard Bell	43

Average percentage of all companies: 70

Source: Based on percentage of respondents reporting problems who said they would buy again from the same company based on the service they received, as part of PC World's Reliability and Service survey, August 1, 1996, through January 25, 1997.

PHOTOGRAPH: RICH FRISHMAN; ICONS: JEFF BERLIN

Best AND Worst

Readers Rate Reliability and Service

WHICH COMPUTER COMPANY builds the most reliable machines? Which vendors are there when you need them for service and support? Our readers report back. This comprehensive listing in nine key reliability and service categories provides a detailed assessment of 12 top PC makers (12 manufacturers in the service category, 13 in reliability). Ratings are based on the responses of 13,510 respondents to *PC World*'s Reliability and Service survey between August 1, 1996, and January 25, 1997. Companies are listed according to their position in overall rankings. Listings within each rating tier (such as Best, Good, and so on) are alphabetical. Five stars are the best possible rating.

★★★★★ BEST									
Dell By itself at the top of the class, with fewer reliability problems.	★★★★★	★★★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★ GOOD									
Apple Track record continues with highly reliable machines.	★★★★	★★★★★	★★★★★	[1]	[1]	[1]	[1]	[1]	[1]
Gateway 2000 Dramatic improvements in service—problems resolved quickly.	★★	★★★★★	★★★★	★★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Hewlett-Packard Very reliable PCs, prompt service; some problems unresolved.	★★★★	★★★★★	★★★★	★★★★	★★★★★	★★★	★★★★	★★★★	★★★
IBM Some component failures, but getting better at fixing problems.	★★★	★★★★	★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★
Micron Takes a while to get help, but customers are still pretty satisfied overall.	★★★	★★★★★	★★★	★★	★★★	★★★★★	★★★★★	★★★★	★★★★★
★★★ FAIR									
Compaq Owners are not happy; takes a long time to reach proper help.	★★★	★★★★	★★★★	★★	★★★	★★★	★★★	★★	★★
Digital Serious problem with component failures; slow telephone response time.	★★★	★★★	★	★★	★★★	★★★	★★★	★★	★★★
Quantex Pretty high problem rate, but the company knows how to fix things.	★★	★★★★	★★★	★★★	★★★	★★★★★	★★★★	★★★	★★★★
★★ POOR									
AST Reliability and service have improved a bit, but that's not saying much.	★★★	★★★	★★	★	★★★	★★★	★★	★★	★
★ WORST									
Acer Plagued by component failures and extremely dissatisfied customers.	★★	★★	★	★★	★★★	★	★★	★	★
NEC Alarming reports of dead machines and tons of problems never resolved.	★	★	★★★	★★★★	★★★★	★	★★★★	★★	★★
Packard Bell This company is consistently at the bottom of the heap.	★	★★	★	★	★	★★	★	★	★

[1] Insufficient number of responses to rate service and support, but current data would rank Apple as Good overall.

ILLUSTRATION: KEVIN CURRY; ICONS: JEFF BERLIN

The Star System

STARS CORRESPOND to companies' relative rankings generated from raw scores in each category. Five stars are best.

PROBLEM RATE
Percentage of all respondents reporting one or more non-DOA (dead-on-arrival) problems. Five stars: 37 percent. Four stars: 41 to 42 percent. Three stars: 45 to 50 percent. Two stars: 54 to 55 percent. One star: 59 to 64 percent.

SYSTEM DOA RATE
Percentage of all respondents reporting one or more of the following components dead on arrival: hard drive, motherboard, CPU, or power supply. Five stars: 1.5 to 1.9 percent. Four stars: 2.2 to 2.7 percent. Three stars: 3.5 to 3.9 percent. Two stars: 4.5 to 4.7 percent. One star: 5.4 percent.

COMPONENT DOA RATE
Percentage of all respondents reporting one or more non-system-level components dead on arrival. Five stars: 0.9 percent. Four stars: 5.1 to 6.7 percent. Three stars: 7.1 to 7.7 percent. Two stars: 9.6 percent. One star: 10.2 to 11 percent.

TIME TO TALK
How long respondents with problems said it took to reach a support staffer who could help. Five stars: 14 hours. Four stars: 18 to 20 hours. Three stars: 24 hours. Two stars: 28 to 32 hours. One star: 41 to 45 hours.

TIME TO RESOLVE
How long respondents said it took the company to repair the problems they reported. Five stars: 4.8 to 5.1 days. Four stars: 6.5 to 7 days. Three stars: 7.6 to 8.9 days. One star: 10.8 days.

UNRESOLVED PROBLEMS
Percentage of all respondents reporting that their problems were never resolved. Five stars: 2.9 to 5.4 percent. Four stars: 7.3 percent. Three stars: 7.9 to 8.3 percent. Two stars: 9.5 percent. One star: 11.4 to 20 percent.

BUY AGAIN BASED ON SERVICE AND SUPPORT
Percentage of respondents with problems who would buy from the company again, based on service. Five stars: 91 to 84 percent. Four stars: 78 to 70 percent. Three stars: 64 to 62 percent. Two stars: 55 to 50 percent. One star: 43 percent.

LOW SATISFACTION
Percentage of respondents reporting lower-than-average satisfaction with service and support. Five stars: 13 to 14 percent. Four stars: 19 to 21 percent. Three stars: 27 percent. Two stars: 32 to 36 percent. One star: 44 to 47 percent.

HIGH SATISFACTION
Percentage of respondents reporting higher-than-average satisfaction. Five stars: 64 to 62 percent. Four stars: 51 percent. Three stars: 47 to 46 percent. Two stars: 40 to 35 percent. One star: 30 to 22 percent.

Digital, Micron, and NEC—have seen their combined overall score for reliability and service drop. Only AST, Gateway 2000, and IBM have improved overall.

All companies with declining overall scores owe the fall to a drop in their reliability score. But Acer, Digital, and NEC service scores also dropped; all three attribute their lower grades to large shipments of home PCs. (Digital bowed out of the home PC market last year but still supports existing systems.) Novice users, these companies say, are less technically savvy and more likely to clog lines with calls about what they think are faulty components. When in doubt, support staff often prescribe a new part.

But Rob Olstad, Acer director of product marketing (consumer division), says nothing is wrong with many of the components that customers return. "A lot of new sound and video boards that are coming back actually have no problems—upwards of 80 percent." So some of the lower reliability scores may be due to inaccurate troubleshooting by tech support rather than sloppy manufacturing. For example, technical support might suggest swapping several components through trial and error, before locating the one part that's actually causing the problem.

This predicament is not Acer's alone; we're hearing more stories about shot-in-the-dark diagnoses that call for replacement parts. Remember accountant Howard Rosen's story: He lost several days—and eventually his patience—when Micron told him he needed new memory and then a new motherboard, only to find out that neither component helped fix the problem that his computer came with.

> Among all the companies with **dropping scores,** NEC's free fall is the most **alarming.**

DROPPING THE BALL

AMONG ALL the companies with dropping scores, NEC's free fall is the most alarming. Since our March 1996 report, it has gone from Good to Worst overall. Leslie Fiering, a vice president at the Gartner Group in Stamford, Connecticut, points to NEC's merger last summer with Packard Bell as one reason for the company's woes—Packard Bell consistently rates at or near the bottom of the pack for both reliability and service in *PC World* reports. "The merger created a lot of confusion and uncertainty," says Fiering. "The folks at NEC may have taken their eye off the ball." Fiering believes things have gotten better, but she feels that it will take a while before customers start to notice the difference.

NEC's new vice president of customer service and support, Ron Rando, agrees. He says the merger scattered parts of NEC's management staff and caused the service department to drop the ball in many cases. "Dropping the ball" is also how respondents would characterize the situation: Reports of unsolved problems with NEC machines have nearly doubled in the last six months.

EASING UP ON FEES?

COMPAQ TOO HAS slipped somewhat in the overall ranking. Since our report last December, it dropped from Best to ▶

Questions and Answers

Who is most likely to...

...be most knowledgeable?		...be least knowledgeable?	
Company	Knowledge rating percentage	Company	Knowledge rating percentage
Dell	69	Compaq	44
Micron	65	Packard Bell	44
Gateway 2000	64	Acer	41

Average percentage of all companies: 56

Source: Based on respondents' reports of satisfaction with knowledge level of companies' support staff, as part of PC World's Reliability and Service survey, August 1, 1996, through January 25, 1997.

Good in reliability, and it is still holding on to a Fair rating for service.

When pressed to explain why the company's reliability score is down, Brij Kathuria, Compaq's director of corporate manufacturing quality, identifies the rollout of the new summer PC line as a possible cause. "Revamping the entire PC family meant retraining our manufacturing personnel while still getting new products out the door," says Kathuria. "Assemblers always have problems, and it is likely that this happened while they were learning about the new product line."

Kathuria says the company has moved quickly to ensure the quality of future systems. He reports that Compaq is even beefing up its customer audit testing procedure (in which people test products under real-world conditions).

Compaq's service score began a nosedive around the time the company started

A Guide to Basic Support

PC MAKERS still rely on guarantees, warranties, and good old-fashioned phone support to instill confidence and keep customers coming back for more. But just as you carefully sift through your choice of PC companies to find the ones with the best reputations, you should also learn as much as you can ahead of time about the companies' basic support policies.

The differences among support policies can be subtle, and the minutiae of rules and exclusions even subtler. Following are some guidelines for what to expect. In addition, the chart at right ("What Does Your Warranty Cover?") gives you the nitty-gritty on the policies of the major players.

RETURN POLICIES. Don't settle for anything less than a 30-day money-back guarantee. Many retailers and nearly all PC makers that sell their systems directly to customers offer such a guarantee, but ask before you buy. Keep in mind that if you buy directly from the computer company, the 30-day period starts from the time the company processes the invoice, *not* from the time you open the box. If systems sold through retail stores or resellers are not backed by a manufacturer's money-back guarantee, make sure you have the full lowdown on the outlet's policy.

SHIPPING CHARGES. If you buy your system directly from a company like Micron or Gateway 2000, you might incur a cost if you opt to return it. Not only will you have to pay for return shipping and insurance, which could cost $100 or more, you won't be refunded the original shipping charges. You could be out several hundred dollars and have no computer to show for it. So be sure you know what you're getting into before you return the computer.

RESTOCKING FEES. If you buy your PC at a retail store or from a reseller, you don't have to worry about shipping charges and insurance. But you may have to pay a hefty restocking fee—10 to 20 percent—if you decide to return it. (Quantex is the only mail-order company in our survey that charges a restocking fee—20 percent.) Some

ILLUSTRATION: KEVIN CURRY

WHAT DOES YOUR WARRANTY COVER?

COMPANY (MODEL)	30-day money-back guarantee	Vendor pays round-trip shipping for returns	Vendor pays round-trip shipping for replacement parts	Warranty for parts/labor (years)
AST (Advantage)	●[1]	○	○	1/1
AST (Bravo MS)	●[1]	○[1]	○	3/3
Acer (AcerPower)	●[1]	○	○	3/3
Acer (Aspire)	●[1]	○	○	1/1
Compaq (Deskpro)	●[1]	●	●	3/1
Compaq (Presario)	●[1]	●	●	1/1
Dell	●	●	●	3/1
Digital	○	○	○	3/1
Gateway 2000	●	○	○	3/3
Hewlett-Packard (Vectra)	●[1]	○	[5]	3/3
Hewlett-Packard (Pavilion)	●[1]	●	●	1/1
IBM (Aptiva)	●[1]	○[1]	●	1/1
IBM (PC Series)	●[1]	○[1]	●	3/3
Micron	●	○	○	3 [6]/1
NEC (PowerMate)	●[1]	○	●	3/3
NEC (Ready)	●[1]	●	[4]	1/1
Packard Bell	●[1]	○[1]	○	1/1
Quantex	●	○	○	3/1

● Yes ○ No [1] Depends on reseller. [2] Not applicable; home system. [3] Price covers two years only. [4] Manufacturer negotiates priority support contracts case by case.

charging $35 for any support call not involving a problem with the hardware (see our December 1996 story for details). Compaq is still smarting from the backlash. John Paget, director of field service and operations, says that Compaq is becoming more flexible about its fee policies.

"It's pretty clear that consumers haven't been very receptive to paying for technical support," Paget says. "Right now...less than 10 percent of our callers are charged a fee. We've relaxed our position, and we will be far less concerned about charging for support than we've been in the past."

But that doesn't mean the practice is dead. In fact, other PC companies are considering adopting fee-based support, especially for consumer systems.

Acer is one of them. Ralph Herbst, Acer's vice president of customer service, believes that all PC manufacturers will eventually follow Compaq's lead. "Consumers tend to think the support policy covers how-to questions," he says. "It's as if you bought a car but didn't know how to drive, and you expected the dealer to teach you because he sold you the car."

But if we take Compaq as a model for what can happen when consumer are afraid to call for fear of being charged a fee, implementing such a model at Acer could have disastrous results. The company's service score is already in a slump, dropping from Fair to Poor since last December. (Prior to that, Acer's service was rated Poor in both our March 1996 and June 1995 reports, and Worst in our very first report in June 1994).

superstores, including CompUSA, won't charge a restocking fee as long as all the parts and original packaging are returned.

REPLACEMENT PARTS. A crucial piece of fine print in a manufacturer's warranty spells out the company's right to replace defective components with used parts. These parts usually come from systems that were returned to the company during the money-back guarantee period. Replacement parts are generally covered until the original system warranty runs out or for 90 days, whichever period is longer. You are required to return the original defective part to the company and may have to pay for shipping, although some companies will pick up this cost. And if a technician says you need a replacement part, don't act until you get a second opinion, or post a message online.

ON-SITE SERVICE. Unless you're handy with tools and have lots of spare time, it's a good idea to get a year's worth of on-site coverage—even if you have to spend an extra $50 or $100 to do so.

Duration of on-site service	Cost for three years on-site service	Toll-free weekday support	Support (hours)	Free weekend support (Sat., Sun.)	Free priority support for businesses	Duration of free support hardware/software	Comments
1 year	$192	●	24	●	[2]	lifetime/lifetime	Customer pays shipping for system return one way.
1 year	$108	●	24	●	●	lifetime/lifetime	AST Bravo LC Series offers one-year parts-and-labor warranty.
1 year	$198	●	24	●	●	1 year/1 year	Customer pays shipping for system and parts returns one way.
90 days	$169 [3]	●	24	●	[2]	1 year/1 year	Customer pays shipping for system and parts returns one way.
1 year	$109	●	24	●	○ [4]	lifetime/lifetime	No charge for how-to questions.
90 days	$249	●	24	●	[2]	lifetime/1 year	How-to questions cost $35 per problem or $2 per minute at 900 number.
1 year	$99	●	24	●	○ [4]	lifetime/30 days	Next-business-day on-site service if request filed by 5 p.m. customer's time.
1 year	$212	●	11.5	○	○ [4]	3 years/90 days	90 days free phone support for setup and configuration.
1 year	$99	●	24	●	○ [4]	lifetime/lifetime	Gold Premium service ($99) offers 3 years on site, priority toll-free number.
1 year	$160	○	11	○	●	1 year/90 days	Customer pays for toll call to technical support; support itself is free.
1 year	$199	○	24	●	[2]	1 year/90 days	Customer pays for toll call to technical support; support itself is free.
1 year	$186	●	24	●	[2]	1 year/1 year	30 days free phone support for setup, configuration, and OS software.
1 year	$400	●	24	●	●	3 years/3 years	30 days free phone support for setup, configuration, and OS software.
1 year	$99	●	24	●	●	lifetime/30 days	On-site service agreement is between customer and a third-party provider.
1 year	$99	●	24	●	○ [4]	3 years/90 days	After 90 days, software-related questions cost $30 per incident.
1 year	$199	●	24	●	[2]	1 year/90 days	After 90 days, software-related questions cost $30 per incident.
90 days	$221	●	24	●	○ [4]	90 days/○	Customers pay to ship PCs to *and* from service provider.
1 year	$230	●	24	●	○	lifetime/lifetime	The only mail-order vendor here that charges a restocking fee.

[5] Offers on-site or carry-in service instead of shipping replacement parts directly to customers.
[6] CPU and RAM covered for five years.

HOUSE CALLS

HAVING TO PAY to get questions answered certainly upsets customers. But nothing makes them feel more supported than having a technician knock on the door, ready to replace a bad component. On-site service is an industry in itself, with big companies like IBM, Kodak, and Xerox contracting with PC makers to provide their customers with on-site technicians.

What do on-site technicians do? For one thing, they do *not* diagnose problems—they only swap parts. So don't get too excited: You still have to get through to the manufacturer's technical support staff and then get them to diagnose your computer's ailment and authorize on-site service.

It's not up to you whether you receive on-site service either. Only after the support staff diagnoses your problem and explores less drastic remedies will a technician be dispatched. Some companies seem more willing than others to send someone out into the field. Of the companies in this report, customers of Digital (42 percent), HP (37 percent), and NEC (47 percent) report the highest rates of on-site service; customers of Gateway 2000 (11 percent) and Quantex (12 percent) reported the lowest rates.

The duration of your on-site service contract depends primarily on whether you bought a business or home PC. Business systems and most PCs sold by large mail- ▶

When Parts Fail, Get the Checkbook

Our readers told us which parts failed most often—and which manufacturers had the highest and lowest incidence of failure. Most of these problems occurred under warranty. But if a part fails and you're caught without warranty coverage, the costs mount up fast.

Component	Cost to repair or replace [1]	Overall failure rate [2,3]	Highest failure rates [3]	Lowest failure rates [3]
Hard disk	$200 to $900	4.73%	NEC	Apple, Dell
Add-in boards (video and sound)	$100 to $400	4.46%	Packard Bell	Apple, Dell
Modem/fax board	$100 to $400	4.04%	Packard Bell	Hewlett-Packard, Apple
CD-ROM drive	$150 to $300	3.45%	Acer	Apple, IBM

[1] Estimated average cost to repair or replace components (including parts and labor), according to Warrantech Consumer Products Services (WCPS), a subsidiary of Warrantech Corp.

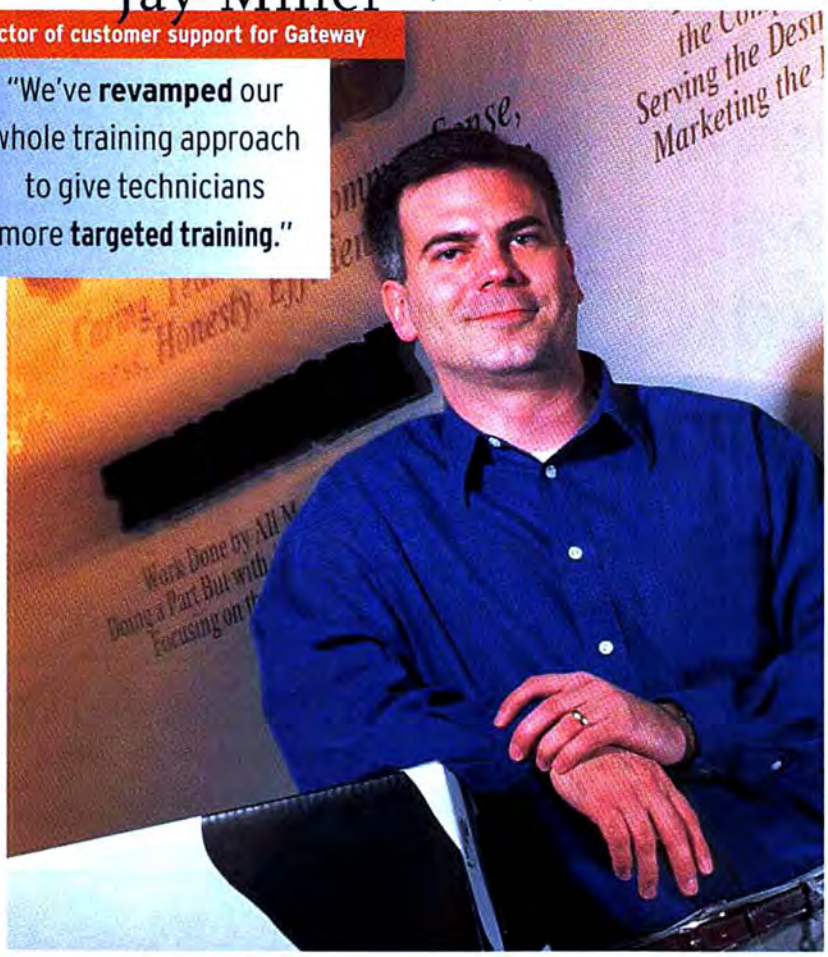
[2] Percent of all systems in this report in which component failed.

[3] Based on respondents' reports of component failures and problems in PC World's Reliability and Service Survey, from August 1, 1996, through January 22, 1997.

Jay Miller

Director of customer support for Gateway

"We've **revamped** our whole training approach to give technicians more **targeted training.**"



PHOTOGRAPH: BILL GILLETTE

Buying Smart

KEEP THESE POINTERS in mind before you slap down that credit card for a new PC.

- **Beware the cutting edge.** You may be eager to get your hands on the latest and greatest technologies, but you don't want to get caught with half-baked hardware. Consider being the second or third kid on your block with the newest toy.
- **Know your PC's anatomy, part 1—multisourcing:** *Multisourcing* means using components (such as CD-ROM drives) from several manufacturers in a single line of PCs, depending on what's in stock. Ask the salesperson about the origin of components in the PC you're considering.
- **Know your PC's anatomy, part 2—stripped-down parts.** To save money, PC makers often use special versions of sound boards or video cards that lack some features of the retail product. These "lighter" versions may not stand up to more complex high-end demands.
- **Call for service before you buy.** Make test calls to a company's tech support and customer service line to get a feel for what response times are really like.
- **Go online.** Browse groups that discuss the companies you're interested in. You'll see whose customers are having problems—and whose are not.

When strength is
matched by comfort,

and the end of the road
is just the beginning,

what is your destination
on a dark
and stormy night?

Anywhere.

Navigator from Lincoln

Discover life beyond
Cyberspace.
You can wait with the rest
of the world until July,
or you can see it now at
www.lincolnvehicles.com

Introducing Navigator from Lincoln. What a luxury [ ] **should be.**

Circle 132 on reader service card

order companies come with one year of on-site service. Home PCs sold retail typically come with only 90 days of on-site service.

WHEN A BARGAIN ISN'T

Ultimately, knowing that the maker of your computer will be there when needed—even if it does charge a fee for the support—is as least as important as getting the best price on your new system. "Having a lemon was no big deal," says Rosen of his ill-fated Micron PC. "It's just that no one gave me the help I needed when things went wrong."

Since not all PC failures will happen while the money-back guarantee is in effect, ensuring that your warranty will still be there if your computer fails can save you trouble and money. So when you're shopping for a PC, demand the service coverage and guarantees that you need. Ask a lot of questions, evaluate your choices carefully, and check the company's claims *and* reputation.

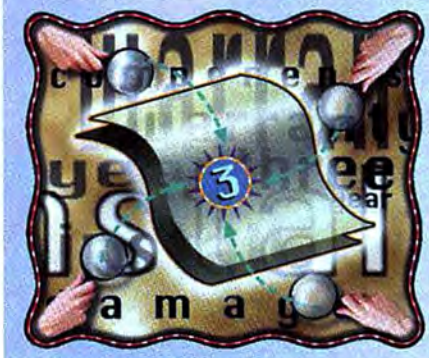
And if the company you buy from fails to stand behind its claims, exercise your money-back guarantee. Let's face it, your computer—like your car—will need service sooner or later. You'll be better off if that service is part of the package you bought, not an afterthought.

The more time you take to school yourself—from picking a reliable company to understanding support policies to getting just what you want in your PC—the more prepared you'll be to handle the hitches.

And maybe you shouldn't buy a PC on a Friday the 13th.

Brad Grimes is a PC World *senior associate editor. Vice president for research Cheryl Brink also contributed to this article.* ■

Warranties, Warranties, AND Extended Warranties



WARRANTIES COST the PC maker money, and the cost is passed along to you. They don't get top billing in ads and spec sheets like more glamorous features do, but you should know what warranty is bundled with the system you're considering.

In general, the warranty of your choice is available if you're willing to pay, but a good rule of thumb is to think three years. With business machines, three-year warranties are standard. Mail-order systems from Dell, Gateway 2000, and Micron may involve more hassles and shipping charges when it comes to getting repairs done, but they also come with three-year warranties. Do these warranties cover both parts *and* labor for three years? In many cases, no.

EXTEND THAT WARRANTY. If you're buying a home PC from your local superstore, it will probably come with a piddling one-year warranty. Your best bet is to buy an extended warranty, because you'd be surprised how many things can go wrong.

Read the fine print carefully *before* buying. Go over the warranty thoroughly with a salesperson, and find out exactly which components are covered and for how long. For example, if a component doesn't come standard in the system that's advertised, it probably isn't covered under the same warranty—even if the company sold you the part and installed it. And, remember, if you buy and install a part on your own, you may void the warranty on your entire system.

Chances are, something in your PC will go bad someday. The question is when—and whether the failure will be covered under your standard warranty. When you consider the cost of fixing your PC's most basic components, you may agree that the price of an extended warranty is money well spent.

WORTH THE MONEY? If you're a business buyer and your company doesn't have staff to make repairs, purchasing an extended on-site service agreement makes sense. For home PCs, an extended warranty is virtually a must. Some retail PCs have warranties that cover parts for one year and on-site service for 90 days. Prices vary, but you can usually extend the parts *and* on-site coverage on a home PC to three years for less than $250.

PC makers themselves will sell you the extra coverage, or you can go though a third-party retailer like CompUSA for about the same amount. But if you buy from a superstore, ask exactly what's covered and when. Steve Corbin, a budget analyst with the U.S. Navy in Washington, D.C., bought an extended warranty from CompUSA to go with his new NEC Ready 9510. When the internal modem died and he couldn't get through to NEC's technical support, he tried CompUSA. "They told me I'd have to go through NEC," Corbin says. "The extended warranty only kicks in *after* the NEC warranty kicks out."

A Word About the Numbers

THE RELIABILITY AND SERVICE SURVEY is a monthly fax-back questionnaire bound into every issue of *PC World*. The rankings presented in this report were generated from the results of 13,510 questionnaires received between August 1, 1996, and January 25, 1997. Because the survey is not a random sampling, its results are not statistically projectable either to the larger base of *PC World* readers or to PC owners in general.

SCORES AND RANKINGS. To determine the reliability rating for each company, we used three categories: percentage of respondents reporting a non-DOA (dead on arrival) problem, 50 percent weighting; percentage reporting a system-level DOA (PCs that had a faulty motherboard, CPU, hard drive, or power supply out of the box), 30 percent; and percentage reporting one or more other components DOA, 20 percent.

To determine the service rankings, only respondents reporting on their service experience were counted. We used six categories: average time respondents waited to talk to a person who could help them, 10 percent weighting; average time it took to resolve the problem, 20 percent; percentage reporting that their problem was never resolved, 30 percent; percentage who would buy the same brand again based on service, 20 percent; percentage reporting low satisfaction with service, 10 percent; and percentage reporting high satisfaction with service, 10 percent.

In each of the three reliability and six service categories, we ranked each company on a scale of 1 to 5 to determine its star rating. We determined a company's overall ranking based on the sum of its reliability and service scores, as well as on the number of stars awarded in individual categories.

ILLUSTRATION: KEVIN CURRY

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Internet Phones TAKE ON Ma Bell

Sick of paying **long-distance charges?** We review **nine Internet phones** that let you call anyone in the world for **virtually nothing.** **The catch:** You get what you pay for.

ILLUSTRATIONS BY JOSÉ CRUZ

BY STEVE BASS

What? WHAT? Sorry, can't hear you. Turn up your mike, will ya? No, no, not that much. Your mouse? Closer to the house? What? Over. Okay, sure, right, I'll be quiet. You have a what? Oh, yeah, right, your mouth. Of course. The mike's too close to your... What? WHAT?

I've been working with Internet phones a lot lately, and this is how a lot of my conversations have gone. At its best, live audio over the Internet sounds like a cheap cellular phone. At its worst, it sounds like a cheap cellular phone, low on batteries, at the bottom of a well. But if you're willing to put up with poor audio quality, you can talk to people all over the world—without spending a dime.

Internet phones aren't real phones—they're programs that let you talk with other people using the Internet. But if you've got a Windows PC, a sound card, speakers, a microphone, a modem, and

an ISP that charges a flat monthly rate, you can turn the Internet into a no-charge long-distance carrier. The appeal is irresistible. You could call your cousin in London on Ma Bell's time for $1.31 a minute, or you could do it on the Net for free.

But while the concept sounds wonderful, the calls themselves often don't. And there are other gotchas. The other person must be online when you are and use the same Net phone software (see "From Net Phone to Real Phone" for a variation on the technology that sidesteps this problem—for a price). And you'll have to install the software, configure it, and do a fair amount of troubleshooting just to get the sound up to an acceptable quality.

Is it worth the hassle? Hey, I had a grand time. I could call my sister in McKinleyville for free, ask strangers in Egypt about the weather, and actually get *PC World* to *pay* me for it. For you? Well, that depends. But if you regularly spend a lot of money calling one or two distant computer cronies, and you're willing to put up with the drawbacks, a Net phone could save you a bundle.

MEETING THE PROGRAMS

THERE'S A RAFT of Internet phone programs out there, with more arriving every day. In an effort to preserve my sanity, I picked nine that came either from a major manufacturer or from one that's been making this kind of software for long enough to qualify as established. I looked at FreeTel's Personal Edition V 1.01, IBM's Internet Connection Phone 2.0, Internet Phone with Video 4.5 from VocalTec, Netscape CoolTalk 3.0 (bundled with Netscape Navigator 3.0), WebPhone Full 3.0 by NetSpeak, and at beta copies of Intel's Internet Video Phone 1.0, Microsoft's NetMeeting 2.0 (to be bundled with Internet Explorer 4.0), Netscape Conference (part of Netscape Communicator 4.0), and Voxware's TeleVox 2.5.

VOXWARE'S TELEVOX wins the Best Buy by virtue of its easy interface and comparatively excellent sound.

These programs do more than let you talk for free. Most let you type in a chat window. With some of them, you can also share documents on screen, transfer files, and conduct conference calls with three or more people. Even better, if you have a camera, four of the packages allow your partner to look at you while listening (for a discussion of these programs' video capabilities, see "Internet Videoconferencing: Still a Little Mickey Mouse").

These are not expensive programs. Three are freebies, three are bundled with

INTERNET PHONES SCORECARD FEATURES AND

VENDORS	List price	Sound quality	Ease of installation	Ease of use	H.323 compliant	File transfer	White-boarding	Chat
FreeTel Personal Edition V 1.01 800/838-0490 www.freetel.com	$39.95	good	good	fair	○	●	○	●
IBM Internet Connection Phone 2.0 800/426-7235 www.ics.raleigh.ibm.com/ics/icphone.htm	free	poor	good	good	○	○	○	○
Intel Internet Video Phone 1.0 [1] 800/538-3373 www.intel.com	free	excellent	good	excellent	●	○	○	○
Microsoft NetMeeting 2.0 [1] 800/426-9400 www.microsoft.com/netmeeting	free [2]	fair	good	fair	●	●	●	●
Netscape Conference [1] 415/937-2555 www.netscape.com	$59 [4]	fair [5]	good	good	●	●	●	●
Netscape CoolTalk 3.0 415/937-2555 www.netscape.com	$49 [6]	poor	good	fair	●	●	●	●
NetSpeak WebPhone Full 3.0 561/997-4001 www.netspeak.com	$49.95	good	good	fair	○	○	○	●
VocalTec Internet Phone With Video 4.5 201/768-9400 www.vocaltec.com	$49.95	good	excellent	excellent	○	●	●	●
Voxware TeleVox 2.5 [1] * 609/514-4100 www.voxware.com	$29.95	excellent [7]	excellent	excellent	●	●	○	●

*Best Buy ● Yes ○ No

online Find sample recordings on PC World Online (www.pcworld.com/jun97/netphone).

[1] Beta version reviewed.
[2] Bundled with Internet Explorer 4.0.
[3] Not yet available in reviewed beta version.
[4] Bundled with Netscape Communicator; price includes larger communications package.
[5] Rating based on informal testing; not available in time for structured tests.
[6] Bundled with Netscape Navigator 3.0; price includes larger communications package.
[7] Sound quality testing done on version 2.0 before version 2.5 was available.

leading browsers, and the others cost under $60. And you can download full or partial versions of all of them from the companies' Web sites or PC World Online.

To see if Net phones are worth even those low prices—and your time—the PC World Test Center and I spent a month playing with these programs, fiddling with the assortment of gizmos you need to make the software work, making calls through modems and much faster ISDN lines, and nursing some major headaches. I concentrated on casual testing, calling various *PC World* offices, friends and acquaintances, and total strangers all over the world using both a standard modem and ISDN. My testing tended to be pretty flexible, jumping to another ISP if the connection wasn't good, and calling during business hours and at times when the Internet was not in great demand. For example, I talked with someone in Denmark at the ridiculously early hour of 6 a.m. PST, while other overseas conversations took place after midnight.

Meanwhile, Susan Silvius led a PC World Test Center team through more controlled tests, recording the same scripted conversation with each program and again with plain old-fashioned telephones. The tests used 33.6-kbps modems at each end and always occurred at the same time of day to ensure a similar level of Internet traffic. (Even though the Lab's methodology was rigorous, testing over the live Internet isn't scientific; perfect replication simply isn't possible.) A panel listened to the calls, rating them on such criteria as echo, frequency range, static level, and lost syllables. Susan and her staff did extensive casual testing, as well. To hear how these programs sound, check out our sample recordings at www.pcworld.com/jun97/netphone.

What conclusion did we reach? The Test Center staff and I agreed that, audiowise, Best Buy TeleVox and Internet Video Phone belong high on the list and CoolTalk and IBM IC Phone at the bottom. TeleVox's echo suppression has a lot to do with its super sound, as does the low distortion of Intel's Internet Video Phone.

GETTING THE RIGHT GEAR

LISTEN, DON'T EVEN think about trying to use an Internet phone without the right hardware. With my Pentium-166 and a Creative Labs Sound Blaster AWE32 card, I thought I was in pretty good shape. But I still needed to swing by a computer supply store to pick up a few things.

Speakers were no problem, but I needed a microphone if conversations weren't going to be a trifle one-sided. I tried a number of mikes, ranging in price from $8 to $15, but all of them were incon- ▶

BEST BUY

TeleVox Is the Sound Choice

IT'S A TOUGH CALL, but Voxware's TeleVox gets my Best Buy stamp of approval—it consistently gave me the best sound. My words were rarely clipped, speech wasn't garbled, and there was little echo and minimal delay. When I set up teleconferences with my relatives, TeleVox proved the hands-down choice (up to five people can join in).

A close second is the VocalTec Internet Phone. It's fun to use, easy to connect with other users, and just plain friendly. If it had the ability to make a conference call, it would have earned a slam-dunk Best Buy. In fact, you may want to try Internet Phone first—just to get a feeling for what these programs are like.

Honorable mention goes to Intel's no-frills Internet Video Phone, which also has high-quality audio. And to collaborate on documents while chatting, try Microsoft's NetMeeting. The day before my quarterly taxes were due, I used NetMeeting to talk with my CPA while we both worked on an Excel spreadsheet. And I fell in love (with the program, *not* with the CPA). –S. B.

COMMENTS

	Document sharing	Conferencing	Video	Comments	Reader service number
	○	○	○	Relatively good, if inconsistent, voice quality; however, the directory list has quite a few obscenities.	601
	○	○	○	Lousy sound and complete lack of extra features prove that even with free programs, you sometimes get less than you pay for.	–
	○	○	●	Voice quality is as good as Web phones get, although the lack of extras (except video) makes this a limited program.	602
	●	●[3]	●	More like a general collaboration program with audio added as an afterthought; terrific document sharing but mediocre sound.	603
	○	○	○	Sound is a bit better than CoolTalk's (Conference's predecessor), but still nothing to write—or phone—home about.	604
	○	○	○	Some cool features, but truly abysmal sound with many lost words made conversation difficult.	605
	○	●	●	Advertising on the screen and a somewhat awkward interface give this otherwise unexceptional program black marks.	606
	○	○	●	The easiest to use of the lot with better sound than most, although program lacks conferencing, and directory has foul language.	607
	○	●	○	The best of the bunch, with great voice quality and good conferencing; it's even an easy program to use.	608
				All products:	901

HOW WE TEST Ratings of sound quality are based on the opinions of the author and the PC World Test Center staff, as well as of six PC World employees questioned after listening to unidentified phones. These opinions are based on listening under a wide variety of conditions. A poor rating means the sound was unacceptable; fair means the sound was comprehensible enough to maintain a conversation with some difficulty; good means the sound was suitable for a conversation, although we sometimes had to speak a little slower to be understood; excellent means the conversation was as comprehensible as with a conventional phone, but with much lower fidelity. Ratings for ease of installation and ease of use are based on the opinions of the author.

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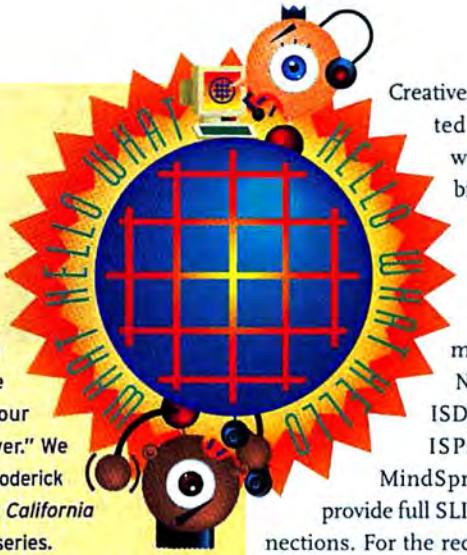
From Net Phone to Real Phone



ONE PROBLEM with Internet phones is that you can use them only to talk to other people who are similarly equipped. But there is a different kind of software: programs that connect your computer to a real phone, using the Internet to find a telephone exchange near the party you're calling to avoid long-distance rates.

While I was writing this article, I had to contact a couple of computerless friends vacationing in China. So I decided to use IDT's Net2Phone. (A similar product, NetiPhone, wasn't ready for me to test.)

I connected to the Internet, then used Net2Phone to type in the phone number plus a 10-digit PIN number. In a few seconds, I heard a phone ringing. Soon, my Pentium was talking to someone who was using 100-year-old telephone technology in a Beijing hotel.

Unfortunately, the English-speaking hotel clerk couldn't understand a word I said, and he immediately disconnected. I called back, but the echoing, buzzing, and yowling forced me to hang up. The third try was better, but I had to repeat myself, my friend kept yelling "WHAT?" and we both had to end our sentences with "over." We sounded a lot like Broderick Crawford in the old *California Highway Patrol* TV series.

I tried other calls: My editor in San Francisco asked if I was calling from the bottom of an aquarium (he didn't sound much better). But chatting with my *PC World* counterpart in Denmark was reasonably trouble-free.

IDT gives away the Net2Phone software, then charges you to use it. But the charges are astonishingly low: The call to China was only 97 cents a minute, compared to $2.63 for AT&T or Sprint's $2.39 (see "Charge by Phone"). Are the savings worth the low sound quality? That's a call *you'll* have to make. –S. B.

NET2PHONE LOOKS LIKE a phone and can call anyone in the world, but sound quality? That's where the similarity ends.

• Net2Phone, charges per call vary; IDT; 800/245-8000, www.net2phone.com, sales@net2phone.com

READER SERVICE NO. 729

• NetiPhone, charges per call vary; 415/596-1777, 415/596-1775 (fax); www.netiphone.com, helpdesk@netiphone.com

READER SERVICE NO. 730

Creative Labs' Web site netted me a new driver with full-duplex capabilities.

Luckily, I was well connected, with a U.S. Robotics 33.6-kpbs external modem, a Diamond NetCommander ISDN terminal, and two ISPs, EarthLink and MindSpring, both of which provide full SLIP/PPP Internet connections. For the record, I *did* try using these programs with Prodigy, America Online, and CompuServe, but the sound quality was dismal. (Special online-service versions of Internet calling programs may be available by the time you read this.)

THE JABRA PC HEADSET is handier than a microphone and doesn't cost much.

Speaking of dismal audio, I tried one conversation with someone who was using a 14.4-kbps modem, but I wouldn't recommend this experience. At best his voice sounded fuzzy, with the ends of most sentences dropping off into the great Internet void. This proves two things: At the very least, you need a good modem to talk over the Internet, and the person you want to talk to must be as well equipped as you are.

STARTING OUT

HERE'S THE BEST PART: For once, I could review a collection of programs without first having to call a bunch of software companies and beg for review copies. Since all the programs are shareware or freeware, I simply downloaded them from their respective companies' Web sites. Installing them was almost as easy. I managed to get each one up and running in less ▶

venient. To send good sound, I discovered I had to hold the mike near my mouth. My solution was to use a headset: less extraneous noise, more privacy, free hands, and better sound thanks to a closer microphone. Not any headset would do: I needed one designed for use with a sound card. I especially liked Jabra's $39.95 Jabra for PC, a simple device that fits comfortably in your ear (well, at least in *my* ear) and comes with an eight-foot cord. I must admit I was also attracted to the terrific—and terrifically expensive—$237.95 Supra Monaural Headset and Headset Switcher Adapter combination from Plantronics, which I could use for both Internet and conventional phone calls.

THE SUPRA MONAURAL HEADSET works with both Internet phones and the real thing.

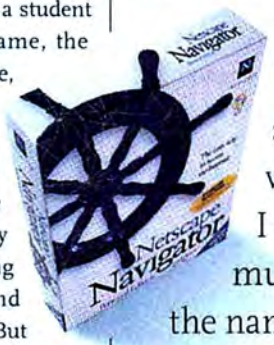
I also discovered that my Sound Blaster wasn't operating with a full deck of cards—or at least not at full-duplex—which all these phones need for optimal sound (a half-duplex card tends to cut off the other person's voice). As it turned out, I didn't need to buy a new card—a visit to

than 10 minutes. The easiest installation was VocalTec's Internet Phone, which examined my system and found the relevant drivers, then launched an audio test wizard that made sure my sound and microphone were set up correctly.

The first thing I wanted to do after installing these programs was—what else?—start talking. I dialed my ISP, launched VocalTec's Internet Phone, and watched as a list of callers currently online popped up on screen. I counted about 2000 people, but I wanted to find someone halfway around the world...Japan or Russia, maybe Lower Slobovia.

WITH FREETEL'S CHAT WINDOW, typing messages is a lot easier than shouting "What?!" into a microphone.

In a second I found Takashi, a student in Japan. I clicked on his name, the phone started ringing, and zowie, he answered. We were talking! Well, sort of—we actually spent most of our time shouting and repeating ourselves. He did not speak much English; my Japanese is limited to ordering sushi, counting to three, and shouting "Kampai!" But that didn't matter. I was talking overseas, and it wasn't costing me a dime. Even for a geek, this was some cool stuff.



The fact is, I had stumbled upon the fun part of using Web phones: the ease with which you can hook up and talk to complete strangers. You see, the makers of all of these programs have online directories listing the people who are currently online and presumably dying to talk to you. In fact, with FreeTel's Personal Edition, IBM's IC Phone, and VocalTec's Internet Phone, the people are grouped by shared interests (you tell them what you are interested in; the software does not read your mind).

NETSPEAK'S WEBPHONE looks like a cell phone—and includes some confusing buttons.

I sometimes had to look for the directory, but it was always there. To get to NetSpeak's WebPhone Full directory, for instance, I finally figured out I had to click a button marked *INF* (which stands for *information*). Intel's Internet Video Phone uses multiple Web sites for its directory listings, forcing me to hop all over the Web looking for people to talk to (some sites had only four participants). This arrangement wasn't all bad, though: It let me launch the program from my browser simply by going to one of these sites and clicking a name. Netscape's Conference (and the older CoolTalk) server listings were no bargain; I spent way too much time clicking names of people who just weren't online—the list once showed over 14,000 users. (For the record: International Data Group, the parent company of *PC World*, is a minority shareholder in Netscape Communications.)

Netscape's server listings were no bargain; I spent way too much time clicking the names of people who weren't online.

I also stumbled onto the dark side of all this socializing: Some people use foul and sexually suggestive language to describe themselves, much of which I found repellent. However, IBM, Intel, Netscape, and NetSpeak manage to keep their directories relatively clean, mostly because they don't allow users to add comments to the listings or adopt nicknames.

Luckily, each program gives you ways to avoid specific interest groups or participants, once you become at least mildly familiar with the way the package works. Even then, with VocalTec's Internet Phone you can't block out anything without first seeing it. There's absolutely no way I'd set up a conference with my mother or my sister's kids with the possibility that they'd bump into these things.

CALLING FRIENDS AND COWORKERS

TALKING TO STRANGERS may be fun (at least when the conversation's clean), but eventually I had to get down to business: calling the specific people I needed to talk to at the PC World Test Center.

Reaching a particular person isn't as easy as simply picking up a phone and dialing. Since you can't call someone who isn't online, we had to schedule times to talk, usually by using a regular phone. ▶

Charge by Phone

Internet phones aren't perfect, but they're far cheaper for long-distance calls.

SERVICE	Copenhagen	London	Beijing	San Francisco
AT&T	$1.23-$1.70	$.90-$1.31	$2.01-$2.63	$.15
MCI	$1.32-$1.45	$1.02-$1.08	$2-$2.59	$.12-$.30
Sprint	$1.23-$1.70	$.87-$1.31	$1.95-$2.39	$.15
Net2Phone [1]	$.25	$.18	$.97	$.10
Internet phone call	free	free	free	free

Cost per minute of phone calls made from Pasadena, California, based on direct-dial daytime business rates. Rates often vary during the business day. Prices do not include cost of hardware or monthly Internet access fees.

[1] See "From Net Phone to Real Phone" for discussion.

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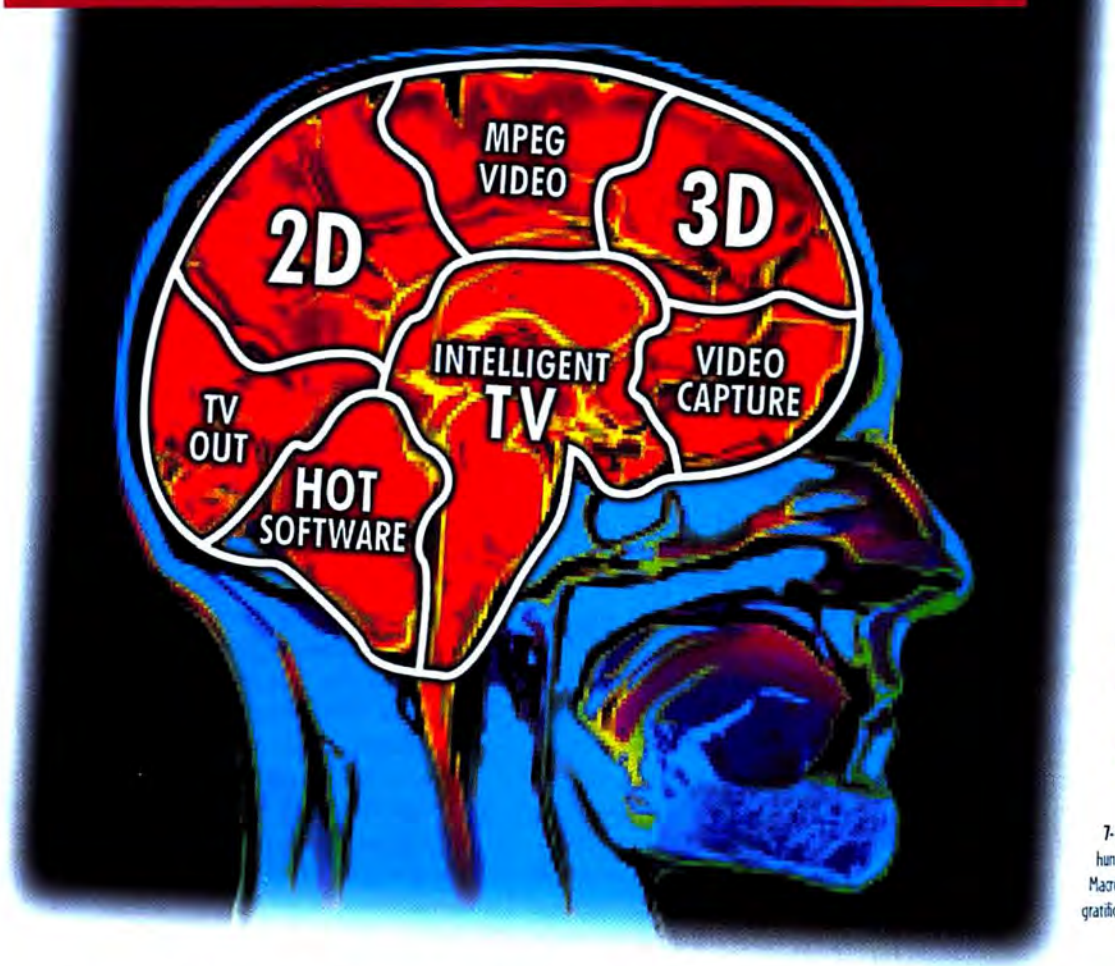

1- Intelligent TV Tuner lets you watch TV on your PC, and signals you whenever any of the "hot words" you specifiy are detected in a program's closed captioning.

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And both of us, of course, had to be using the same software. The relatively new H.323 standard is supposed to eliminate that requirement; theoretically it allows different brands of Internet phones to connect. The products from Intel, Microsoft, Netscape, and Voxware are all H.323 compliant, but for the life of me, I couldn't get them to talk to one another.

Direct dialing is usually easy. Most of the programs let you contact people via e-mail address or nickname, which you can save in an address book for reuse. But with FreeTel, if a person isn't listed in the company's directory or your address book, you must dial them using their IP address—a fate I wouldn't wish on a dog.

You see, everybody on the Net has an 11-digit number called an IP address. But with most ISPs you get a different IP address *every* time you log on. They're like phone numbers that keep changing, making an address book useless. You can find your current IP address in Windows 95 by selecting *Start•Run* and typing **winipcfg**. But to find out someone else's IP address, you need to—that's right—call them on a regular phone (funny how often you have to resort to that).

With **FreeTel,** if a person isn't in the directory or your **address book,** you must dial them using their IP address—a fate I wouldn't **wish on a dog.**

MAKING ADJUSTMENTS

WITH EACH of the programs, I would eventually find someone to talk to and eagerly click. Then I'd hear what sounded like a phone being dialed, and, if the person wasn't on another call, I'd be connected. And then the other person and I would start shouting "what?" as we tried to get the program, mikes, and speakers adjusted. The deal is, even if you both speak the same language, placing that first Internet call with a new program is a bear. There's always futzing and fine-tuning to do.

VOCALTEC'S INTERNET PHONE supplies tons of calling information; the animations even show you who's talking.

Although all the programs had some method for automatically adjusting speaker and microphone settings, I inevitably had to do some tweaking. As I turned my microphone settings up (then down) and speaker volume down (then up), and tried to share setting information with whoever I was trying to talk to, I found myself using the text chatting window—if the person at the other end couldn't hear what I said, at least they could read what I typed. And sometimes it was easier to talk on the real telephone while fine-tuning the Internet phone.

INTEL'S INTERNET VIDEO PHONE offers a no-frills telephone experience.

Eventually I figured out how to minimize the strain. Before trying a new program, I'd launch my sound card's mixer, the applet that lets you adjust the card's settings (VocalTec's Internet Phone makes that easy—it's a menu option). Before going online, I would slide the microphone and speaker settings down below halfway—Susan at the Test Center and I learned the need for this precaution the hard way after close encounters of the loud and unpleasant kind. When FreeTel Personal Edition blasted a sonic ringing through our headsets, we both ripped them off.

JUDGING SOUND QUALITY

OF COURSE, when I finally got connected to someone, I had to listen to them. And that wasn't always easy. If we placed all of the Internet conversations we had on a scale of 1 to 10, with a regular phone call getting a 10, the best Internet phone conversation would get about a 5.

A lot of factors affected the sound quality, including which Internet phone program we were using. On the whole, we found Intel Internet Video Phone and Voxware TeleVox easiest on the ears, and Netscape CoolTalk and IBM Internet Connection Phone the most aurally challenging.

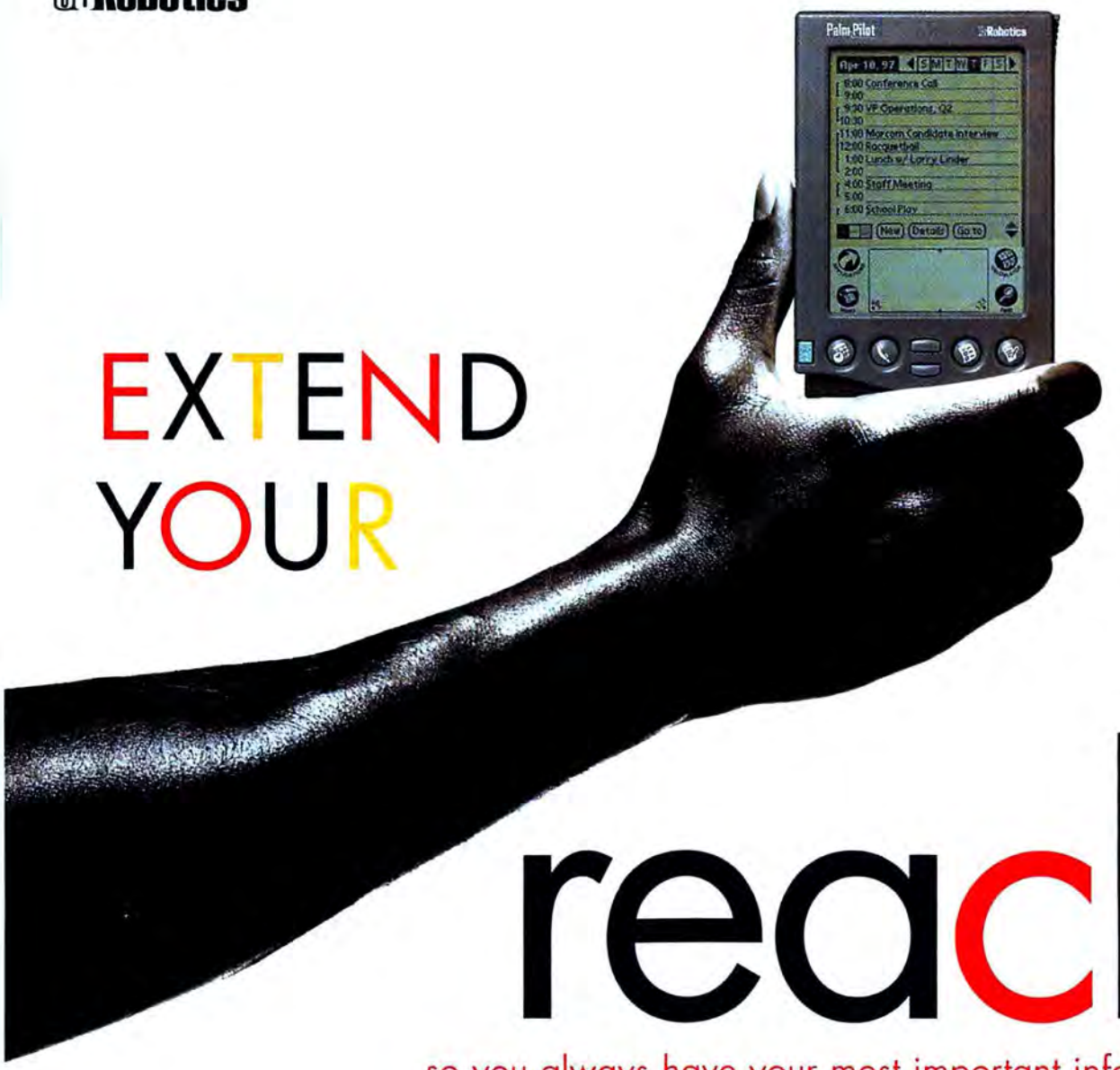
But sometimes even the best programs gave us lousy results, because there are so many variables beyond the software that affect the sound of an Internet call. There's the speed of your Internet connection, of course, but there's also the quality of your computer, sound card, speakers, and microphone. Variables completely beyond your control can also affect sound—for example, the number of people both on the Internet and on the phone's server, and quite possibly the alignment of the planets.

The first time I tried hooking up with Martin in Copenhagen, the connection was mediocre with every program. The problem? He was calling through *PC World Danmark's* local area network, and he had *tons* of trouble getting through the LAN firewall. Our next try was from his home office, with both of us using 28.8-kbps modems. This time the sound was—at least by Internet phone standards—excellent.

Through trial and error, I found a few tricks that could sometimes help. If the voice quality wasn't good, I would use the program's disconnect feature and call again. If that didn't help, I would log off the Internet entirely and redial. I experimented and found that EarthLink's Los Angeles phone lines were considerably better than the ones in nearby Pasadena. Two days later, however, the Pasadena lines were better. Go figure.

One factor we thought would make a difference, but didn't, was the distance between callers. On one day, from California, I talked to Boston, Denmark, Japan, and Hong Kong, heard about the weather in all of them, and one connection proved as good (or as bad) as another. ▶

U.S. Robotics



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EXAMINING EXTRAS

TALKING ISN'T ALWAYS the main attraction with these programs. Most of them have other features for collaborating over the Internet. It's sometimes nice to be able to communicate without having to scream, "Speak into the mike!"

For example, all the programs except IBM IC Phone and Intel's Internet Video Phone support chat, letting both parties type sentences to each other in real time as well as speak them. This feature is invaluable when you're trying to tell someone why the audio isn't working.

If you're chatting with someone (either vocally or with text) and want to send them a file, well, with most of the programs you just send it, without having to muck around with e-mail.

Ever try *whiteboarding*? No, you don't have to live in Malibu. You collaborate ▶

INTERNET VIDEOCONFERENCING

Still a Little Mickey Mouse

REMEMBER THAT FAKE videophone that impressed you so much at Disneyland's House of the Future when you were a kid? You just couldn't wait to have one in your own home. Well, unless your home has the budget of a medium-size corporation, you're going to have to keep waiting.

Videoconferencing is here, but for the most part, it ain't cheap. It involves buying special add-on boards, leasing high-priced phone lines, and generally dipping into the corporate budget. It may be worthwhile for a huge company, but you can't run a T1 line just to connect with your grandkids.

Internet videoconferencing, which is basically Internet phones with pictures added, is the low-cost alternative. So why isn't everyone watching and talking? Because the image and sound quality are the pits.

To find out more about this technology, Steve Bass and I tested the video capabilities of four Internet phones: Intel's Internet Video Phone 1.0, Microsoft's NetMeeting 2.0, NetSpeak's WebPhone Full 3.0, and VocalTec's Internet Phone with Video 4.5. We also looked at White Pine Software's Enhanced CU-SeeMe, a program designed for videoconferencing. We used fast, 128-kpbs ISDN connections for the best bandwidth found in home environments. We went for the most commonly available low-cost digital cameras—Connectix's $99 QuickCam and $169 Color QuickCam.

THE COLOR QUICKCAM camera stares down at you from atop your monitor.

Steve and I already knew the programs from testing their audio capabilities, and we were pleasantly surprised that there was nothing special or inherently difficult about using them with video. In fact, Internet Phone and NetMeeting bring up video automatically if they detect a camera.

ENHANCED CU-SEEME and other video phone programs give you a jerky, low-contrast version of the person you're talking to.

STILL-LIFE VIDEO

YOU MAY BE AWARE that standard video goes at 30 frames per second, film at 24 frames per second, and computer multimedia often at 10 or 15 frames per second. Internet video? Think not of frames per second but of seconds per frame. In no case did we see a rate faster than 1 frame per second. Some programs, such as VocalTec Internet Phone, took longer than 4 seconds to display a single frame, looking more like a slide show than video. And this was with ISDN! We didn't test video with conventional modems—I shudder to think of the quality we'd get with them.

VocalTec's Internet Phone produced the best results overall, with consistently clear audio and comparatively decent, if slow, pictures. Microsoft's NetMeeting (still in beta at press time) came in a close second for those occasions when we could get the video to work. Intel's Internet Video Phone initially produced a Vaseline-on-the-lens effect, which cleared up when we replaced the black-and-white camera that was in use at one end with a color unit. NetSpeak's WebPhone gave us poor video and actually locked up our test system on several occasions, but it was the only product besides Internet Phone to give us acceptable audio quality.

PARTY LINE

NONE OF the four Web phones allows you to conference between more than two people. For that, you'll need White Pine Software's Enhanced CU-SeeMe. But if you want to have a private conference, you'll also need a dedicated UNIX PC. Enhanced CU-SeeMe's images and sound are both about on a par with those of the other programs.

The Enhanced CU-SeeMe package lists for $99. Plain old CU-SeeMe, which lacks color support and other features, remains available at no cost from its original developer, Cornell University.

Still thinking that you'd like to videoconference over the Internet? Just ask yourself this question: Do you want to spend $100 to $200 to see still photos of your loved ones? —Susan Silvius

CU-SeeMe free; Cornell University, cu-seeme.cornell.edu

Enhanced CU-SeeMe for Windows $99 list; White Pine Software; 603/886-9050, 603/886-9051 (fax); www.wpine.com, info@wpine.com

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QuickCam $99, Color QuickCam $169 list; Connectix; 800/950-5880, 415/571-5100, 415/571-5195 (fax); connectix.com, sales@connectix.com

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with someone by putting a bit-mapped image of a file up on both computers so the two of you can mark it together. I used it recently to show my cousin some photos I took at his grandson's bar mitzvah. While we were talking on VocalTec's Internet Phone, I scanned the photos and pasted them directly onto the whiteboard. The icing on the cake was using the Internet Phone's file transfer tool to instantly send him the photo files. Oh, yeah, it also comes in handy for business uses, like discussing a new ad campaign. CoolTalk, Conference, NetMeeting, and VocalTec's Internet Phone all support whiteboarding.

I used the **VocalTec** phone's whiteboarding feature to show my cousin **photos** I took at his grandson's **bar mitzvah.**

Microsoft's NetMeeting does better than whiteboarding, however—it lets you collaborate on the actual live file rather than a picture of it, and in the file's native application. I first tried it with a guy from Ohio who loaded Bass Trophy, a fishing game that is not, as far as I know, named after me. Then I opened Word for Windows, called Copenhagen, and let Martin try a hand at editing this article. He was even able to cut and paste part of it into a shared clipboard. (Sorry, Martin, but I did not use any of your edits.) Even if you're not interested in Net phones, collaboration makes NetMeeting worthwhile.

Voxware's TeleVox and NetSpeak's WebPhone allow you to talk to several people at once, which is a wonderful experience if you all agree on something to talk about. TeleVox has the best conferencing capabilities, letting me easily bring up to five people together. In fact, I had a reasonably clear three-way conversation from southern California with my *PC World* lab partner Jeff in San Francisco, and someone I'd never met before in Hong Kong. (The weather in Hong Kong, by the way, was great.) The beta version of Microsoft's NetMeeting I looked at didn't have true conferencing, but it's promised for the final version.

FIGURING THE BOTTOM LINE

WILL INTERNET PHONES replace Ma Bell? Under pristine conditions—even with a conventional modem—I was able to have a decent conversation. But how often can I depend on pristine conditions? On the other hand, if you're running up big phone bills talking with the same person, and you both already have multimedia PCs and Internet connections, Internet phones can save you big bucks.

I wouldn't use an Internet phone to call my mother across town. But if she ever moves to China, I'll make sure she has a good ISP.

Headsets for Internet Phones

- Jabra for PC $39.95 street; Jabra; 800/327-2230, 619/622-0764, 619/622-0353, www.jabra.com/, info@jabra.com (e-mail)

READER SERVICE NO. 733

- Supra Monaural Headset $88, Headset Switcher Adapter $149.95 list; Plantronics; 800/544-4660, 408/425-8654 (fax); www.plantronics.com

READER SERVICE NO. 734

Find files from this article and sample recordings at www.pcworld.com/jun97/netphone. Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information. PC World Test Center manager Susan Silvius and performance analysts Elliot Kirschling and Jeffrey Kuta, PC World Online staff editor Glenn McDonald, and PC World Danmark *editor Martin Joergensen all contributed to this story.* ■

Ma Bell Fights Back

IT'S EASY TO UNDERSTAND why the telephone companies are worried about Internet phones. Suddenly, the service they're selling is being given away.

In an effort to stop this potentially ruinous charity, a coalition of small to midsize phone companies petitioned the Federal Communications Commission last year to regulate Internet phones until a regulatory policy can be established. The group, called America's Carriers Telecommunication Association, claims that providers of such software are de facto telecommunications carriers and, as such, should be subject to FCC regulation.

Unfortunately for ACTA, the FCC has been pretty consistent about Internet regulation: It doesn't want any part of it. "Our goal is to promote competition and deregulation, to support new technology," says Kevin Werbach, FCC council for new technology policy. "[FCC chair] Reed Hundt has stated several times that we should we not be in the position of applying old monopolistic rules to Internet telephony."

The FCC has not yet made any formal statement regarding regulation of Internet telephony, Werbach says. But pressure to act soon is coming from the opposite corner of the ring.

The Voice on the Net Coalition, a group of Internet phone advocates that includes Microsoft and VocalTec, is finalizing a petition asking the FCC to make up its mind. According to Bruce Jacobs, attorney and VON Coalition counsel, the Coalition is concerned that governmental inaction is stunting the growth of the Internet phone market.

However, Wen Liao, a senior analyst with the research firm Jupiter Communications, says the federal government is not likely to interfere with Internet telephony.

"The FCC is trying to keep a hands-off approach," Liao says. "They want to let the market determine what the best solution is."

—Glenn McDonald

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SELECT FEATURES

512KB pipeline burst cache, flash BIOS
16V EIDE variable speed CD-ROM drive
3.5" floppy drive
100MB Iomega Zip drive

32 voice wavetable stereo sound and speakers
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Tool-free minitower or desktop
Microsoft™ Intellimouse, 104-key keyboard

Microsoft Windows® 95 and MS® Plus! CD
Microsoft Office 97 SBE CDs
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(comprised of MMX technology-based software)
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SELECT FEATURES

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PCI 32-bit Ultra SCSI Fast-20 controller
12X SCSI CD-ROM drive, 3.5" floppy drive
100MB Iomega Zip drive

32 voice wavetable stereo sound and speakers
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Tool-free minitower or desktop
Microsoft Intellimouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD

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Multimedia Xcitement Pak:
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3.5" floppy drive
16-bit stereo sound and speakers

PCI 64-bit 3D video, MPEG, 2MB EDO RAM
Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard

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$2,899
Bus. lease $99/mo.

SELECT FEATURES

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16X EIDE CD-ROM drive

3.5" floppy drive
100MB Iomega Zip Drive
16-bit stereo sound and speakers
PCI 64-bit 3D video, MPEG, 4MB EDO RAM

Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD
Microsoft Office 97 SBE CDs
5-year/3-year limited Micron Power warranty

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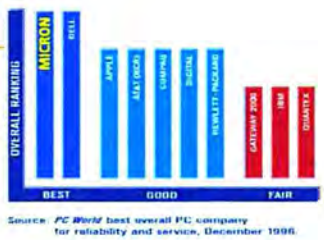

Source: *PC World* best overall PC company for reliability and service, December 1996.

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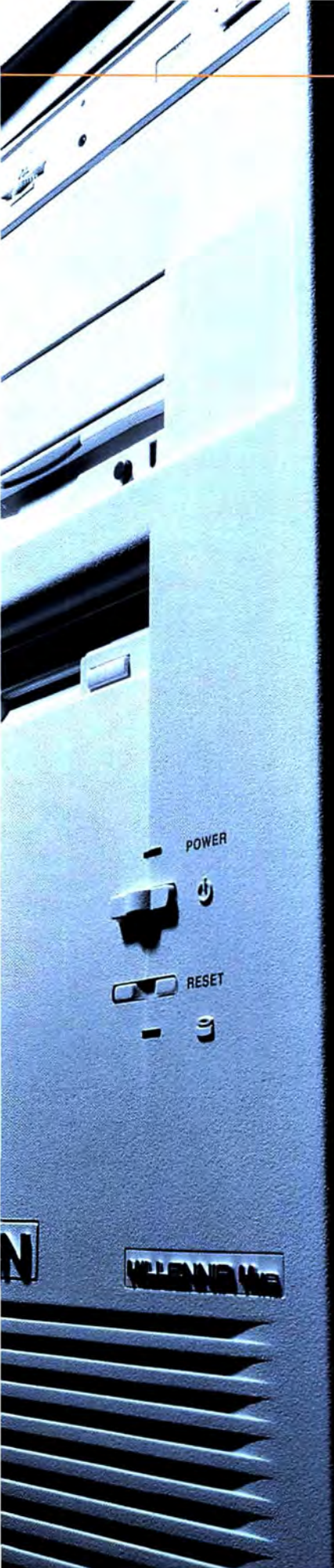

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Advent AV270 2x25 watt stereo speakers in P200 only
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Microsoft Phone telephony software
Internet ready: SPRYNET Internet trial membership, Microsoft Internet Explorer
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Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
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Microsoft Works CD
SystemSoft SystemWizard application for automated problem resolution
Quicken Financial Pak: Quicken Deluxe, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer
Family Pak: ABC by Dr. Seuss, Thinkin' Things Collection 1, Earthworm Jim and Mechwarrior 2
Microsoft Home Bundle
5-year/3-year limited Micron Power warranty

OPTIONS

MULTIMEDIA OPTIONS

32 voice wavetable stereo sound card	$59[1]
32 voice wavetable stereo sound card with 2MB RAM	$99[1]
Advent AV270 Powered Partners stereo speakers	$79
Advent AV370 Powered Partners stereo speakers with subwoofer	$199
Microsoft SideWinder 3D Pro joystick	$59
Microsoft SideWinder gamepad	$39

STORAGE/MEDIA OPTIONS

Adaptec 2940U Ultra SCSI Fast-20 controller (upgrade from system with standard Ultra SCSI Fast-20 controller)	$100[2]
Plextor 12PleX 12X 1.8MB/sec SCSI internal CD-ROM drive (upgrade from system with standard 12X EIDE CD-ROM drive)	$200[2]
Iomega Jaz SCSI drive with 1GB removable cartridge	$399[2]
Iomega ZIP IDE drive with 100MB removable cartridge	$99
Iomega 6-pack of 100MB Zip cartridges	$99
Iomega Ditto 2000 (1/2GB) Travan tape backup drive with tape	$149
Iomega Ditto 3200 (1.6/3.2GB) Travan tape backup drive with tape	$199
Sony 4/8GB SCSI DDS-2 tape backup drive with tape	$999[2]

[1] Upgrade from systems with standard 16-bit stereo sound card
[2] Requires SCSI host adapter
[3] Modem includes trial memberships to CompuServe and America Online
[4] Modem includes trial memberships to CompuServe and America Online, requires sound card
[5] Upgrade from systems with standard Micron 17" 17FGx color monitor

COMMUNICATION OPTIONS

33.6bd V.34 internal data/fax modem	$139[1]
33.6bd V.34 internal telephony data/fax modem with speakerphone and voice mail	$159[4]

NETWORKING OPTIONS

3Com 3C509 network adapter	$99
3Com 3C905 Fast EtherLink PCI 10/100 network adapter	$159

HP PRINTERS

HP DeskJet 692c printer	$329
HP LaserJet 5L-FS printer	$419
HP LaserJet 6P printer	$799

Price includes cable. Additional DeskJet/LaserJet models available. Please call for details.

SOFTWARE OPTIONS

EdVenture Pak: Sheila Rae the Brave, Putt-Putt Saves the Zoo, Reader Rabbit's Reading Development Library 1, Freddi Fish and the Case of the Missing Kelp Seeds, and the Thinkin' Things Collection 2 (available only on desktop and notebook systems with Windows 95)	$69
Quicken Financial Pak: Quicken Deluxe, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer (available only on desktop and notebook systems with Windows 95)	$69

[1] Upgrade from systems with standard 64-bit 2MB video card
[2] 1st year on-site service is available in the United States and in limited areas in Canada from third-party service provider per customer's agreement with provider.
[3] 2nd year and 2nd & 3rd year offerings are available in the United States only

Options and accessories available with system purchase only.

DISPLAY/VIDEO OPTIONS

17" Hitachi SuperScan 1711 (15.9" display) .26dp color monitor	$150[5]
21" Hitachi SuperScan CM801 (20" display) .26dp color monitor	$650[5]
Number Nine Imagine 128 series II video card, 4MB VRAM	$299[1]
Number Nine Imagine 128 series II video card, 8MB VRAM	$549[1]

SERVICE OPTIONS

Optional 1st year on-site service[2] coverage included	
Extended 2nd year on-site service[3] coverage for desktop systems (with system purchase)	$79
Extended 2nd year on-site service[3] coverage for desktop systems (after system shipment)	$99
Extended 2nd & 3rd year on-site service[3] coverage for desktop systems (with system purchase)	$99
Extended 2nd & 3rd year on-site service[3] coverage for desktop systems (after system shipment)	$139

DIGITAL CAMERAS

Kodak Digital Science DC20 camera	$199
Kodak DC25 digital camera	$499
Kodak Digital Science DC50 zoom camera	$699

OTHER OPTIONS

APC Per7T surge suppressor	$39
APC Pro7T surge suppressor	$59
Microsoft Natural Keyboard[4] (upgrade from standard keyboard)	$49

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- 30-day money back policy
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PC World DECEMBER 1996

PC Computing EDITORS' CHOICE FEBRUARY 1997 MICRON MILLENNIA MXe P200

good, cheap color

OUR BEST BUYS: The Brother HL-720 (top), the HP LaserJet 5L Xtra (middle), and the Epson Stylus Color 600 (bottom).

With high-quality color printers as low as $299, you can't afford *not* to own one. We compared 11 color and 11 monochrome printers to find the best for business and home.

BY HARRY McCRACKEN

Don't look now, but personal printers are undergoing the same revolution that hit television 30 years ago—color is in, and black-and-white is fast becoming passé. Sales figures tell the story: According to Lyra Research of Newtonville, Massachusetts, more than six out of seven personal printers sold today are color, not monochrome.

This month's roundup focuses on color printing—and refreshes the Top 10 Printers chart with some new tests. (For a summary, see "This ▶

PHOTOGRAPHS BY STAN MUSILEK

Month's Top 10 in Brief"; for the complete Top 10 chart, see page 235.) We tested a total of 11 color and 11 monochrome printer models that range in price from $179 to $800.

WHAT MAKES COLOR COOL?

WHY THE BIG MOVE to color printing? Mostly because it's easier and cheaper than ever to create color documents on a PC. You can grab an image off the Web, create one using a digital camera or scanner, or take advantage of the automated graphics tools in applications such as the Microsoft Office suite.

The emergence of near–photo quality is also pushing color to the forefront. Both Canon and Hewlett-Packard offer models that use special inks and papers to print better photographs. The new Epson models that debut this month all print good photos, too.

It seems we can't move without stubbing our toe on yet another new model. By the time you read this, HP will have announced the DeskJet 672C, a $199 color ink jet that will replace the DeskJet 400. We'll test the new model in an upcoming issue.

But we're not ready to play taps for monochrome printers just yet. A laser is still the smartest way to print fast, good-looking monochrome output for business letters and other important correspondence. The Brother HL-720 and the HP LaserJet 5L Xtra earn Best Buys in our book (see "Monochrome Matters").

EPSON WINS COLOR BEST BUY

OUR BEST BUY COLOR PRINTER, the new $299 Epson Stylus Color 600, produces excellent color quality for a wide variety of images, including photos, and it's also one of the faster ink jets we've tested. Epson's $449 Stylus Color 800, also new on the chart at fourth place, is even faster.

The new second- and third-ranked color printers, HP's DeskJet 694C and Canon's BJC-4200 Photo, both $299, are essentially the same as the DeskJet 693C and BJC-4200 that were on the chart previously, but they come with better software and additional supplies. One more color printer that's new, the $229 Epson Stylus Color 400, is similar to our Best Buy, but if you can afford the extra $70 the Stylus Color 600 is a better value overall.

Introductions of new personal lasers are few and far between these days. No brand-new monochrome models were available for this review, and the Best Buy Brother and HP lasers have been on the chart for months. Notably absent is the Panasonic KX-P6100, a longtime Best Buy that just missed this month's chart—a victim of progress. When we first reviewed the model nearly two years ago, 300-dpi lasers were a good value. Now 600-dpi lasers offer better print quality and features for competitive prices.

Many of the changes you'll see in the rankings this month are a direct result of new tests and weightings we've implemented for speed, print quality, and ease of use.

We updated our CorelDraw tests to the new version 7.0, which prints faster than version 6.0; this resulted in better graphics printing times for many models we tested. The typical *PC World* reader now prints more graphics, as well as HTML pages from the Web, so we added more photos and a Web page to our tests.

As personal printers perform more tasks, they become potentially more complex to use. Starting this month, we're weighting our hands-on experiences with the printers more heavily, so we can give due credit to all aspects of their design—from control panels to documentation to online help, as well as ease of changing

Best Buy Personal Printers

EPSON'S NEW $299 STYLUS COLOR 600 ink jet debuts as our color printer Best Buy. Brother's HL-720 and Hewlett-Packard's LaserJet 5L Xtra tie for Best Buy among the monochrome printers we tested.

The Epson Stylus Color 600 is hard to beat for color graphics. However, its black text falls short of laserlike sharpness.

The chairman's historical
Gutenberg have caused m

The HP LaserJet 5L Xtra prints crisper text and smoother gray-scale images than any other laser we tested.

The chairman's historic
of Gutenberg have caus

The Brother HL-720's print quality is better than average for the price, but it lags behind that of the LaserJet 5L Xtra.

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of Gutenberg have caus

COLOR PRINTERS FEATURES COMPARISON

	MODEL	Street price (2/7/97)	Printer type	Maximum monochrome resolution (dpi)	Maximum color resolution (dpi)	Windows 95–certified Plug and Play	Largest size
		FEATURES					
1	Epson Stylus Color 600*	$299	ink jet	1440 by 720	1440 by 720	●	banner
2	HP DeskJet 694C	$299	ink jet	600 by 600	600 by 300	●	banner
3	Canon BJC-4200 Photo	$299	ink jet	720 by 360	720 by 360	●	legal
4	Epson Stylus Color 800	$449	ink jet	1440 by 720	1440 by 720	●	banner
5	HP DeskJet 820Cse	$399	ink jet	600 by 600	600 by 300	●	legal

* Best Buy Also see Top 10 chart, page 235. ● Yes ○ No

[1] Excludes costs of BC-20 black printhead ($28) and BC-21 color printhead ($48), which last 900 and 4000 pages, respectively.

ink or toner cartridges. Many of the models come with software for creating stationery, signs, and greeting cards. Some color printers can handle unusual media such as banners and T-shirt transfers, while the monochrome printers offer watermarks, booklet creation, and double-sided printing. Many newer models now come with more on-screen help and less paper-based documentation.

PHOTOS PUT PRINTERS TO THE TEST

THE COLOR MODELS WE TESTED varied widely in print quality, and price isn't always a good indicator of what to expect. One of the least expensive printers we tested, Epson's $229 Stylus Color 400, produced outstanding color pages—better than the output we got from printers costing twice as much.

Most of the models we tested easily handled typical color graphics such as clip art, bar charts, and multicolored text. The subtle colors and high level of detail in photographic images proved the greatest challenge: The only printers here that did a really pleasing job on photos using their regular inks were Epson's Stylus Color models and Canon's BJC-620. Canon's BJC-4200 Photo and BJC-240 and HP's DeskJet 694C all require a special photo-ink cartridge to produce photo-quality images. A few that don't use the optional photo cartridges, such as the DeskJet 870Cse, just can't print realistic-looking photos.

Shutterbugs who just want to print snapshots should buy a printer designed for that purpose—and it seems that we see a new one every week. In "Photo Printers Proliferate" on PC World Online, we review special photo printers from Alps, Panasonic, and Fargo (www.pcworld.com/jun97/printers).

If you're buying one color printer to handle all your output needs, its monochrome quality matters as much as its color output. Ads for color ink jets often boast of laser-quality monochrome text, but in reality even HP's sharp-printing DeskJet 820Cse and 870Cse can't quite produce the crisp edges and rich blacks of true laser output. Epson's Stylus Color models and Canon's BJC-620 achieve laser quality, but only on specially coated stock that you probably wouldn't want to use for business correspondence. Coated stock is more expensive than plain paper, it feels a little funny, and it's whiter on the coated side than on the other.

THE HIDDEN COSTS OF COLOR

OVER TIME, YOU'LL ALMOST certainly shell out more cash for paper and ink than you spent for an ink jet printer in the first place, especially if you use a lot of color. Ink cartridges vary widely in price and capacity, but for most printers a page of plain text costs between 2 and 4 cents—roughly the same as for a monochrome laser page. Printing in color costs much more: An average page of graphics costs between 8 and 16 cents.

Color printer costs escalate when you start buying special paper. Simple ink jet paper may cost just 2 cents a sheet, not much more than plain laser paper. But for printing a business presentation or family photo, fancier paper can cost up to $2 a sheet. Additional media for banners, cards, T-shirts, and the like will also cost you.

The higher resolutions that produce better-looking prints can also slow the process—sometimes a lot. For example, at its ▶

It Oughta Be in Pictures

INK JETS AREN'T THE ONLY WAY to print snapshots. For reviews of photo printers, see "Photo Printers Proliferate" on PC World Online (www.pcworld.com/jun97/printers).

The Panasonic TruPhoto system (right) uses a special paper that releases colors when it's heated—no inks are involved—to print fairly realistic snapshots.

This Month's Top 10 in Brief

COLOR PRINTERS

1. Epson Stylus Color 600*
2. HP DeskJet 694C
3. Canon BJC-4200 Photo
4. Epson Stylus Color 800
5. HP DeskJet 820Cse

MONOCHROME PRINTERS

1. Brother HL-720*
2. HP LaserJet 5L Xtra*
3. NEC SuperScript 660plus
4. NEC SuperScript 860
5. Panasonic KX-P6500

FOR DETAILS, SEE THE TOP 10 PRINTERS CHART ON PAGE 235. *BEST BUY

PAPER			PRINT COSTS						SUPPORT			
Input capacity (sheets)	Standard envelope capacity	Manual feed slot	Estimated cost per plain-text page	List price of black cartridge	Estimated cartridge life (pages)	Estimated cost per color page	List price of color cartridge	Estimated cartridge life (pages)	Warranty (years)	Toll-free phone support	Weekday support (hours)	Weekend support
100	10	○	$.05	$24.95	472	$.126	$29.95	360	2	●	12	●
100	20	●	$.04	$32.95	650	$.11	$34.95	313	1	○	16	●
100	15	○	$.04	$7.40[1]	200	$.10	$21[1]	200	1	●	18	●
100	10	○	$.027	$29.95	1000	$.091	$29.95	300	2	●	12	●
150	15	●	$.03	$32.95	850	$.08	$34.95	450	1	○	16	●

default setting of 360 dpi, the Stylus Color 800 printed a five-page Harvard Graphics presentation in about 8 minutes. Set at its top resolution of 1440 dpi, however, it took 1 hour and 10 minutes to print the same presentation—about nine times longer.

BARE-BONES, BEGONE

IN THE PAST, cheap ink jet printers have tended to be—well, cheap, with minimal features. But stripped-down models are a vanishing breed: Only the least expensive printer here, the Canon BJC-240, is a single-cartridge model, which forces you to open up the printer and change cartridges every time you switch from a monochrome to a color print job. Only the lowest-end models like the BJC-240 and the Lexmark 2030 Color Jetprinter come with no output tray.

FROM BANNERS TO BROCHURES

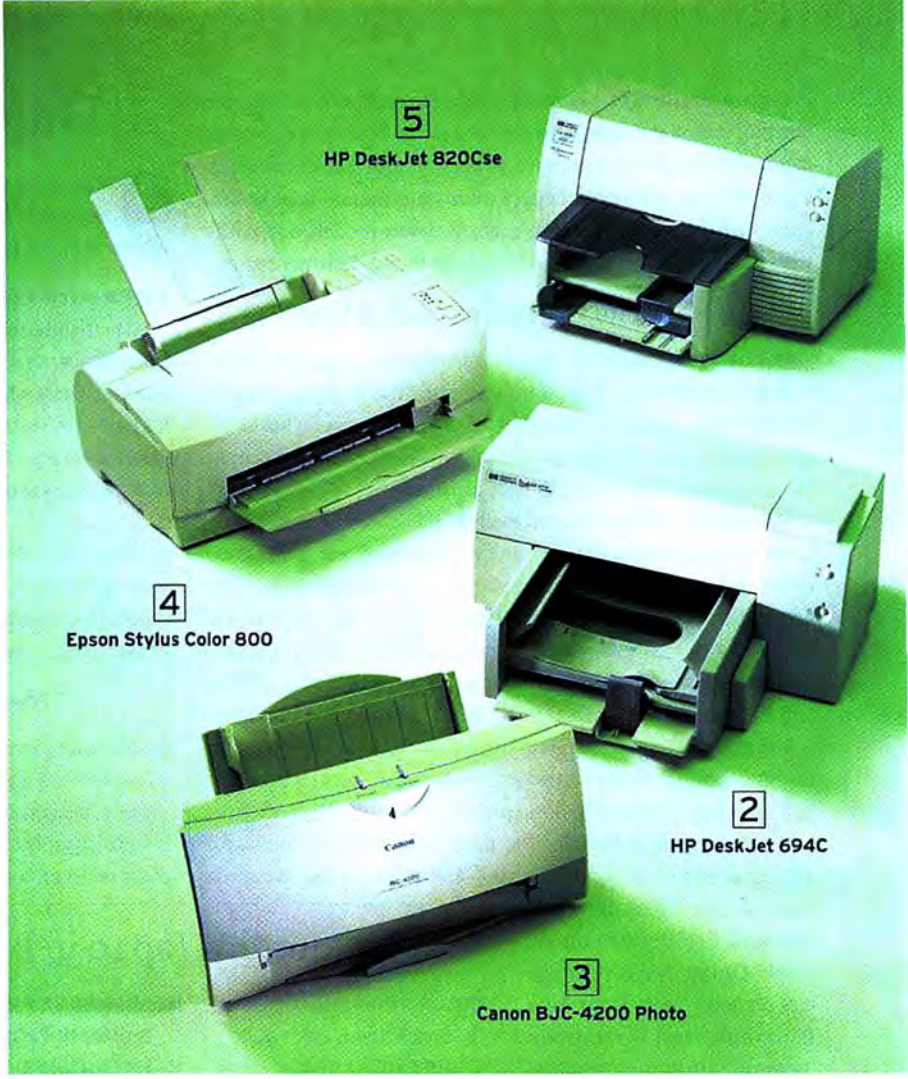
COLOR PRINTING STARTS with hardware, but it grows with software. Every ink jet we tested comes with printing software. Canon Creative 2, which is bundled with all of Canon's ink jets, is the best: You get two CD-ROM discs' worth of programs and clip art for making brochures, cards, stickers, storybooks, and much more—something for everyone, from preschoolers to small-office users.

Printed documentation is often reduced to a brief setup guide, and on-screen help is becoming more common—though it doesn't always fill the void. We liked the thorough on-screen manuals provided with the BJC-240 and BJC-4200 Photo, the Stylus Color 400 and 600, and most of the DeskJets. Lexmark's Jetprinters come with a CD-ROM video introduction that shows how to unpack the printer and set it up.

All the printer vendors whose products we tested offer some level of service and support, but the devil is in the details. Neither HP nor Lexmark offers a toll-free number for technical support, and each also reserves the right to charge you for support if your printer model has been discontinued. Epson's free phone support is good only for the duration of the warranty. Most color printers come with just a one-year warranty; Epson's Stylus Color 600 and 800 have two-year plans, and the company will replace faulty units within the first 90 days after purchase.

The Web has become an important resource for technical support. Most of the vendor sites we explored covered the basics well, providing downloadable drivers and troubleshooting information. But only Canon, Epson, and Lexmark let you e-mail questions to support staff through their Web sites.

Harry McCracken is a senior associate editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center. Associate Editor Melissa Riofrio, Test Center Coordinator Andrew Hawn, and freelance tester Derrick Sakai contributed to this article.*



COLOR PERSONAL PRINTERS

Epson Leads the Pack

1 EPSON STYLUS COLOR 600

PRICE: $299
TESTED PRINT SPEED: 2 ppm text, 0.6 ppm graphics
PRINT QUALITY: Adequate text, very good graphics
EASE OF USE: Good

Epson's new $299 Stylus Color 600—our new color personal printer Best Buy—is the successor to the Stylus Color 500, which reigned over the color chart for six months. Like the 500, the 600 is fast, produces excellent color pages, works with both PCs and Macs, and is reasonably priced. The fact that it's one of the few ink jets backed by a two-year warranty doesn't hurt, either.

At its default resolution of 360 dpi, the Stylus Color 600 printed both text and graphics-intensive documents fairly quickly compared to its peers. When we cranked up the resolution and used Epson's Photo Quality Paper, which costs about 12 cents a sheet, *voilà*—presentation slides with complex color transitions came close to perfection (albeit very slowly).

The Epson prints photos more realistically than any personal printer we've tested, and it doesn't require special photo inks as the Canon and HP models do. The printer's maximum ▶

"With the new 32-bit Windows version, it's making a strong bid for honors as the best all-around remote control program on the market."
PC World *March 1996*

"LapLink is the easiest program to use, and it's one of the fastest and steadiest."
Federal Computer Week *Feb. 6, 1996*

"After hours of testing, a clear usability winner emerged-LapLink was far and away our testers top choice for fuss-free remote access to files, programs, or a network, and for remote training and technical support."
PC/Computing *Sept. 1996*

"Its modular design shines in Microsoft's Windows 95's 32-bit multitasking enviorment. It is easy to use, and it also has features that make it easy for network administrators to manage."
LAN Times *Feb. 19, 1996*

"LapLink consistently outperformed pcAnywhere on our network. With LapLink, we felt as though the remote system was performing tasks locally, but when we switched to pcAnywhere we still felt as though we were using a modem."
PC Magazine *March 26, 1996*

"LapLink is a powerhouse for, and the granddaddy of, remote computing."
Home Office Computing *May 1996*

"...if you haven't upgraded your LapLink in a while, it's time to do it again. LapLink for Windows 95 is good."
BYTE *May 1996*

"LapLink is a superior remote access client for telecommuters, remote offices and even local clients"
PC Week *April 1996*

"When we matched it up against Symantec's pcAnywhere32 in our labs, we found that LapLink is the product we'd want with us on the road."
PC/Computing *May 1996*

"LapLink is still the tool of choice for laptop users. It may be the only remote access product you need."
LAN Magazine *June 1996*

"...LapLink's speed and intuitive design make it the best choice in the market."
Info World *Jan. 29, 1996*

If you think file transfer is all we do, you need to catch up on your reading.

Computer industry experts aren't in the habit of agreeing with each other. When they do, it's definitely worth noting.

It's also worth noting that LapLink® has already racked up more prestigious industry awards (twenty-three of 'em, at last count) than every other remote access software package. Combined.

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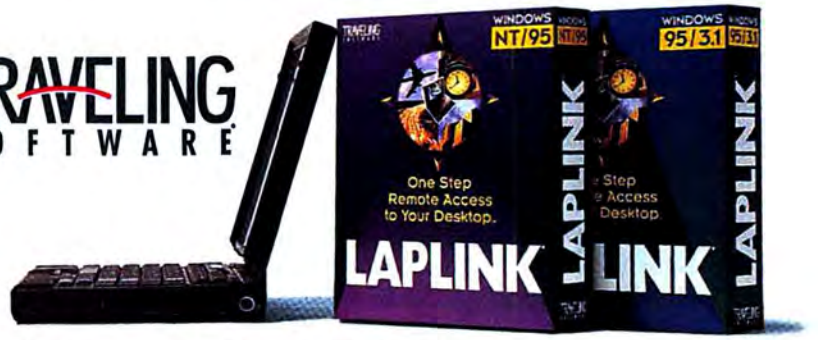

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Circle 243 on reader service card

resolution is 1440 by 720 dpi, but images printed at 720 by 720 looked nearly as good and printed much faster.

The Stylus Color 600's on-screen help and software settings are improvements over their predecessors. Now there's an interactive troubleshooting guide, the print settings are easier to navigate, and you can save custom settings. Epson's new CD-ROM–based installation is effortless: Just load the disc, click your mouse a couple of times, and you're ready to roll.

What's not to like? Well, the Stylus Color 600's black text looks fuzzy on plain paper. You have to remove the paper stack from the input tray to print an envelope because there's no manual feed slot. The manual instructs you to reconfigure the input tray to print transparencies; don't tell Epson, but we got good results without doing so. The printer comes with Sierra Print Artist (a graphics package) and the Adobe PhotoDeluxe image editor, but Canon's BJC-4200 Photo and HP's DeskJet 694C offer better software for business users.

If you're on a tight budget, consider Epson's lower-end Stylus Color 400. At $229, it costs $70 less. Its print quality is nearly as good as the 600's, but it's also slower, it lacks a Macintosh port, and its warranty is for only one year. *Epson America, 800/463-7766, www.epson.com*

2 HP DESKJET 694C

PRICE: $299
TESTED PRINT SPEED: 2.2 ppm text, 0.3 ppm graphics
PRINT QUALITY: Good text, adequate graphics
EASE OF USE: Very good

Is the DeskJet 694C a new printer? Yes and no. It uses the same hardware as the DeskJet 693C it replaces, but the 694C has been updated with a new software bundle that has broader appeal than the 101 Dalmatians package that came with the previous models. (In some stores you may see this printer sold as the DeskJet 692C, which is identical to the 694C but doesn't come with any bundled software.)

When it comes to printing plain text, the DeskJet 694C is a better choice than the Epson Stylus Color 600—it's a little faster, and characters are crisper and blacker. But the Epson is a better choice for color because its graphics speed is faster. For photographs, the DeskJet requires a photo-ink cartridge (one comes with the printer) and special paper that costs about 60 cents a sheet. The results are pretty snazzy but still not quite as realistic as those printed by the Stylus Color 600 with its regular inks on Epson's cheaper coated paper.

The design of the DeskJet 694C includes many thoughtful touches. A manual feed slot lets you print an envelope without removing the paper stack from the main input tray, and you can also feed continuous-form paper to create banners for birthdays and office parties. On-screen help is particularly easy to find and use—that's important, because all documentation other than a printed setup guide is on CD-ROM.

The DeskJet 694C's software CD-ROM strikes a nice balance between useful small-office tools and fun stuff for families. You get Corel Print House for producing everything from business cards to bookmarks, plus a photo-retouching package and a kid-oriented T-shirt designer. The disc also includes a multimedia ▶

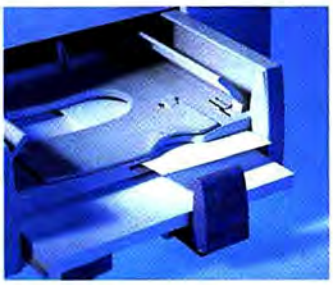
Features Good and Bad

WHAT MAKES A PRINTER EASY TO USE—or a real hassle? Individual opinions may differ, but after exhaustive hands-on testing of over 20 personal printers this month, here are some of the best and worst features we've seen.

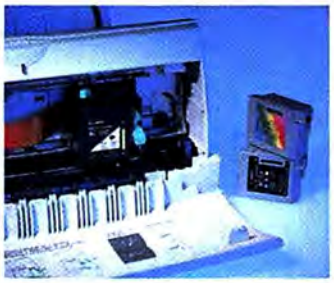
A Manual Without Labor

Can't remember how to load paper, replace a cartridge, or clean the ink nozzles? Epson's Stylus Color 600 has a virtual minimanual inside its cover for your reference.

Easy Envelopes



The conveniently placed manual feed slot on HP's DeskJet 694C lets you print an envelope quickly without having to remove the paper stack from the main input tray.



The Old Switcheroo

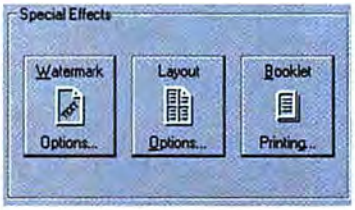
Canon's BJC-240 is one of the few remaining ink jet printers that can't hold both black and color ink cartridges at the same time—which means you'll have to swap cartridges.

Stripped-Down Design

Lexmark saved money by removing the control buttons and indicator lights from the 2030 Color Jetprinter. But how can you tell when the Jetprinter is turned on?

Features at Your Fingertips

The NEC SuperScript 860's many output options—including booklets, posters, and watermarks—have easy on-screen buttons to guide you.



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introduction to the printer, although some of its advice—"Greeting cards are great for staying in touch"—seems fluffy. *Hewlett-Packard, 800/752-0900, www.hp.com*

3 CANON BJC-4200 PHOTO

PRICE: $299
TESTED PRINT SPEED: 1.4 ppm text, 0.3 ppm graphics
PRINT QUALITY: Adequate text and graphics
EASE OF USE: Very good

A printer may be a piece of hardware, but the software it comes with can play a big role in determining its value. This is especially true of the $299 Canon BJC-4200 Photo—and it's an even better bargain right now: Through June 30, Canon is offering a $50 rebate. But Canon Creative 2, a two-CD software bundle that comes with all Canon ink jets, is what earns this printer its place on the color chart.

Canon Creative 2 is still the best printer software bundle we've seen.

Canon Creative 2 is a high-quality collection of programs for printing stationery, T-shirt transfers, pop-up greeting cards, quilting panels, and many other items. You also get WebRecord, a clever program that downloads Web pages and prints them in an easy-to-read format. But setting up all the software is a complex and tedious process, and Canon Creative 2 gets confused if you try putting it anyplace but the C: drive (say, if your hard disk is partitioned).

Unfortunately, the printer is showing its age. Overall it's the slowest on the chart, and its print quality is so-so: Monochrome text sometimes shows white flecks, and color pages lack vibrancy. The BJC-4200 Photo works best with the supplied photo-ink cartridge and high-resolution paper (10 sheets are included). Its photo prints are nearly as attractive as those from Epson's ink jets. On-screen help is good, too, although a feature for double-checking your settings sometimes made mistakes in our tests.

Canon also sells this printer as the $279 BJC-4200, and it too qualifies for the rebate. The hardware is the same, but you don't get the photo cartridge and coated paper that come free with the BJC-4200 Photo, and the Web software isn't included. *Canon Computer Systems, 800/848-4123, www.ccsi.canon.com*

4 EPSON STYLUS COLOR 800

PRICE: $449
TESTED PRINT SPEED: 3.7 ppm text, 0.7 ppm graphics
PRINT QUALITY: Adequate text, very good graphics
EASE OF USE: Adequate

Epson's $449 Stylus Color 800 offers the same great print quality as our Best Buy, the Stylus Color 600. The 800 is a better fit for an office, though, because it's fast and has options to add an ethernet connection and PostScript.

The Stylus Color 800 shares the 600's easy installation CD-ROM, well-designed software controls and on-screen help, and two-year warranty. But it doesn't come with the Print Artist and PhotoDeluxe software; Epson claims that the Stylus Color 800 will appeal mostly to serious artists who already have the software they need. *Epson America, 800/463-7766, www.epson.com*

5 HP DESKJET 820CSE

PRICE: $399
TESTED PRINT SPEED: 4 ppm text, 0.3 ppm graphics
PRINT QUALITY: Good text, adequate graphics
EASE OF USE: Very good

With HP's $399 DeskJet 820Cse, a small office needn't sacrifice monochrome print speed and quality to get color. Though it's very similar to the DeskJet 870Cse we also review here (see "Color Printer Snapshots"), the 820Cse is slightly slower and is a Windows-only printer. Still, it printed text faster overall than one of our monochrome lasers, the LaserJet 5L Xtra. And even its plain-paper output comes closer to sharp, black laser quality than that of any other color ink jet here. Its graphics speed is adequate, and pie charts, logos, and the like look crisp and professional.

The 820Cse's one big limitation is that it can't capture the subtleties of photos with its standard inks, and it can't use a photo-ink cartridge as the DeskJet 694C does. Compared to photo-ink output from the 694C, the 820Cse's images look grainy.

The 820Cse has a manual feed slot for quick envelope printing, and its excellent on-screen troubleshooting system can steer you around common problems. It also comes with an extensive printed manual and Microsoft Publisher 97, a desktop publishing application that costs around $70 if bought separately. Publisher is much more flexible than the software bundled with most printers; it can handle free-form newsletters, brochures, and even Web pages.

It's a minor point, but the 820Cse's Quick Start CD-ROM, which claims to be an "easy and fun route to printer set-up," does little more than tout the high quality of HP supplies and instruct you to follow the installation procedures in the printed manual. *Hewlett-Packard, 800/752-0900, www.hp.com*

For Photos, Inks Make a Difference

INK JETS CAN PRINT NICE PHOTOS, but photo printers such as the Fargo FotoFun still make better prints. See "Photo Printers Proliferate" on PC World Online (www.pcworld.com/jun97/printers).

Compared to the Canon BJC-4200's regular inks (left), its photo inks produce much smoother results (right).

The Epson Stylus Color 600 is one of the few ink jets that can print realistic-looking photos with its regular inks.

The Fargo FotoFun photo printer produces images that are barely distinguishable from true snapshots.

Color Printer Snapshots

We evaluated these color printers along with the others, but they didn't score high enough to reach the Top 10.

CANON BJC-240

Canon's bargain $179 BJC-240 includes the same terrific Canon Creative 2 software bundle that comes with the Canon's costlier ink jets. But like most dirt-cheap printers, the BJC-240 has a stripped-down feel: It can't hold black and color ink cartridges simultaneously, it lacks an output tray, and it's one of the slower ink jets we tested. An optional $45 photo kit includes a special ink cartridge and paper for printing snazzy photographs. (The $199 BJC-240 Photo variation comes with the kit.) With the standard inks, the BJC-240's print quality is mediocre—colors aren't very bright, and black text sometimes shows a few white flecks. *Canon Computer Systems, 800/848-4123, www.ccsi.canon.com*

CANON BJC-620

Canon's $399 color ink jet creates some of the best-looking pages we've seen, and it does justice to photos without needing a special ink cartridge. Like Canon's other ink jets, the BJC-620 comes with the versatile and entertaining Canon Creative 2 software bundle. Unfortunately, it's pricier and slower than the BJC-4200 Photo, which is number three on the color chart. Its on-screen help is also sparser than the other Canon printers', and printing an envelope is a real chore: You have to open up the unit and flip multiple switches. *Canon Computer Systems, 800/848-4123, www.ccsi.canon.com*

HP DESKJET 870CSE

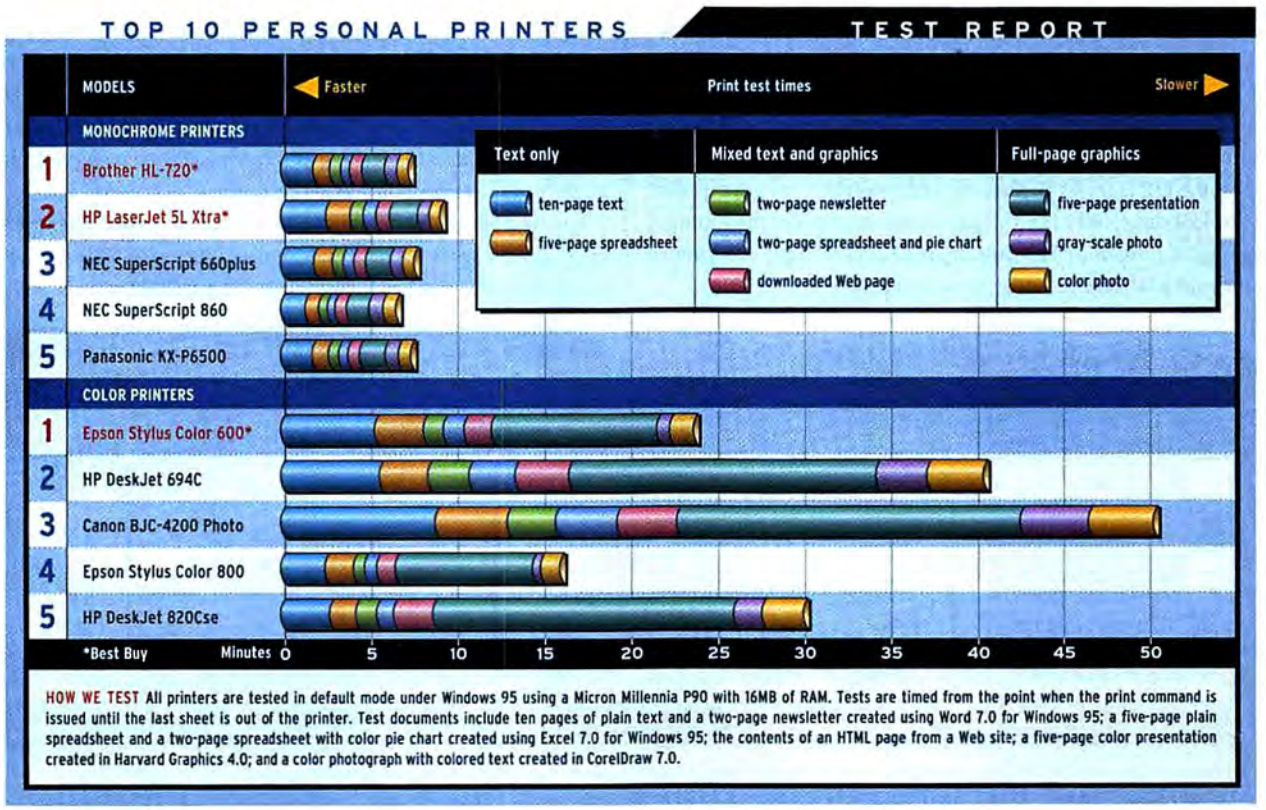
A higher-end version of Hewlett-Packard's DeskJet 820Cse, the $499 DeskJet 870Cse is the fastest color ink jet we tested—4.8 ppm for text and 0.5 ppm for graphics. Unlike the Windows-only DeskJet 820Cse, this printer works with Macintoshes as well as PCs. The DeskJet 870Cse's software bundle, however, is just a bland collection of templates for use with your applications. *Hewlett-Packard, 800/752-0900, www.hp.com*

LEXMARK 2030 COLOR JETPRINTER

This $199 ink jet is the cheapest printer we've seen that holds both color and black ink cartridges at once. That's something to consider if you're on a tight budget, but the 2030 Color Jetprinter's drawbacks keep it from making the chart: It lacks an output tray, and it's slow, especially with graphics. Print quality is acceptable, but black areas look a little watery and colors could be more vibrant. The Jetprinter's mostly on-screen documentation is fairly thorough, and the Lexmark Workshop CD-ROM is an engaging, home-oriented software bundle with a nifty comic-book designer. *Lexmark International, 800/358-5835, www.lexmark.com*

LEXMARK 2050 COLOR JETPRINTER

For $249, this upscale cousin to the 2030 Color Jetprinter offers similar print quality, the same Lexmark Workshop CD-ROM, and better paper-handling features. The mostly electronic documentation is fairly complete. We'll test a $299 variation of this product, the 2055 Color Jetprinter, in an upcoming issue; it comes with a generous business-oriented software bundle as well as Lexmark's new photo-ink cartridge. *Lexmark International, 800/358-5835, www.lexmark.com*



MONOCHROME PERSONAL PRINTERS

Monochrome Matters

If you absolutely, positively don't need to print in color, a good monochrome laser is still your best choice. Lasers offer better-looking text, faster speed, and more versatile handling of paper and envelopes. Laser prices are lower now, too: Most of the models on our chart cost around $400 or less.

Okidata is the only vendor we know of that still sells LED printers, which produce results similar to lasers'. The two Okidata printers we tested didn't make the chart, though.

We haven't found our dream printer yet—one with great color, razor-sharp text, blazing speed, and effortless paper handling. But you could get our color Best Buy and one of our monochrome Best Buys for less than $700 total. Not so long ago, you would have paid more than that for one decent monochrome laser.

1 BROTHER HL-720

PRICE: $350
TESTED PRINT SPEED: 5.5 ppm text, 2.6 ppm graphics
PRINT QUALITY: Good text and graphics
EASE OF USE: Good

With an attractive balance of price, speed, print quality, and features, the Brother HL-720 has the right stuff to be a Best Buy. Although it's not a Plug and Play model, it installed flawlessly. It's the fastest graphics printer on the chart, and it includes a roomy 200-sheet input tray that outstrips the HP LaserJet 5L Xtra's smallish 100-sheet tray. The manual feed slot is a cinch to use, and the printer's gently curving paper path helps avoid jams even with heavy stock. The HL-720's pleasant but meager software offering, Surf 'n' Print, can print Web pages and other documents as booklets.

But there's a downside. The HL-720 has a large, ungainly footprint compared to other lasers we've tested, especially after you've unfolded the fragile-feeling output tray. And the Brother can't beat the HP LaserJet 5L Xtra, our other Best Buy, on print quality: Text looks fine, but a limited gray-scale range makes the Brother's graphics look dull. The on-screen help is skimpy, too. *Brother International, 800/827-6843, www.brother.com*

2 HP LASERJET 5L XTRA

PRICE: $399
TESTED PRINT SPEED: 3.8 ppm text, 2.4 ppm graphics
PRINT QUALITY: Very good text and graphics
EASE OF USE: Very good

It's the slowest monochrome printer on the chart, but because the $399 LaserJet 5L Xtra excelled in our two toughest ratings—print quality and design—it shares Best Buy status with the Brother HL-720. Text always looked good in our tests, and even photographs were largely free of the banding and gritty quality that bedevils gray-scale graphics from other monochrome printers.

This LaserJet doesn't skimp on features. It has a second paper path for envelopes and thick media that you select with a flick of a switch. The on-screen controls are easy to use, on-screen help is thorough, and you get a CD-ROM of bundled software for printing labels, greeting cards, and even medical records.

We had a few minor complaints: The input tray's 100-sheet capacity is a bit low, and its fold-out paper guide has a tendency to flop down. We nearly overlooked HP's helpful explanation of the icons on the printer's exterior—not surprising, since it's hidden inside the case. *Hewlett-Packard, 800/752-0900, www.hp.com*

3 NEC SUPERSCRIPT 660PLUS

PRICE: $349
TESTED PRINT SPEED: 5.1 ppm text, 2.5 ppm graphics
PRINT QUALITY: Good text and graphics
EASE OF USE: Good

NEC's low-cost cousin to the SuperScript 860 is a good value, especially considering that it's one of the few personal printers that include a high-quality cable (which normally costs $10 to $25 extra) and a two-year warranty. It can't match the speed of the Brother nor the print quality of the HP, but this NEC is more versatile than either Best Buy: You can print watermark-style overlays (such as "CONFIDENTIAL") onto your pages, and squeeze multiple shrunken pages of a document onto one sheet of paper. It has a generous 150-sheet paper tray, and its on-screen prompts guide you through double-sided printing.

The 660plus lacks Gibraltar-like solidity, however. The input and output trays feel a bit flimsy, and sliding the two-piece toner cartridge into place is a challenge. The printer comes with

MONOCHROME PRINTERS FEATURES COMPARISON

	MODEL	FEATURES: Street price (2/7/97)	FEATURES: Printer type	FEATURES: Maximum monochrome resolution (dpi)	FEATURES: Windows 95-certified Plug and Play	PAPER: Largest size	PAPER: Input capacity (sheets)	PAPER: Standard envelope capacity	PAPER: Manual feed slot	Estimated cost per plain-text page
1	Brother HL-720*	$350	laser	600 by 600	○	legal	200	10	●	$.025
2	HP LaserJet 5L Xtra*	$399	laser	600 by 600	●	legal	100	10	●	$.034
3	NEC SuperScript 660plus	$349	laser	600 by 600	●	legal	150	5	●	$.025
4	NEC SuperScript 860	$449	laser	600 by 600	●	legal	200	5	●	$.019
5	Panasonic KX-P6500	$449	laser	2400 by 600	●	legal	100	10	○	$.029

* Best Buy Also see Top 10 chart, page 235. ● Yes ○ No

[1] Excludes costs of separate imaging drums. The Brother's costs $192.99 and lasts 20,000 pages; the Panasonic's costs $152 and lasts 15,000 pages.

easy-to-use software for printing stationery, but its samples and templates are plain, bordering on ugly. *NEC Technologies, 800/632-4636, www.nec.com*

4 NEC SUPERSCRIPT 860

PRICE: $449
TESTED PRINT SPEED: 7 ppm text, 2.4 ppm graphics
PRINT QUALITY: Adequate text and graphics
EASE OF USE: Very good

NEC's SuperScript 860 differs greatly from the SuperScript 660plus in both design and capabilities. The 860 delivers raw speed—it's by far the quickest 600-dpi personal laser we've tested on text documents. NEC also made the printer very easy to use. There's a comprehensive on-screen manual, and the software lets you create booklets, watermarks, and even posters (in the form of multiple pages that you tape together). It will be an even better deal by the time you read this: It cost $449 when we tested it, but at press time its price tag was due to tumble to $399.

We were surprised to see better overall print quality from the cheaper SuperScript 660plus than the SuperScript 860. Some of the 860's line art looked jagged, and grayscale images were blotchier. To avoid the 860's one significant paper-handling irritant—printed pages exit face-up, so they collate in reverse order—you can either change the setting in the printer driver or unfold an ungainly secondary output tray (which greatly increases the printer's footprint). *NEC Technologies, 800/632-4636, www.nec.com*

5 PANASONIC KX-P6500

PRICE: $449
TESTED PRINT SPEED: 5.6 ppm text, 2.3 ppm graphics
PRINT QUALITY: Very good text and graphics
EASE OF USE: Adequate

Not long ago, a $449 personal laser like the KX-P6500 would have been a real bargain, but prices have dropped so dramatically that it's now on the expensive side. Still, this 600-dpi laser's overall performance is faster than average, and its print quality is second only to that of the LaserJet 5L Xtra, especially for tricky tasks such as photos and italic text. If your desk is already too crowded, the KX-P6500's tower shape and sleek footprint are real pluses. It's also got versatile software controls for printing multiple pages on one sheet of paper, scaling images up and down in size, and assisting you with double-sided printing.

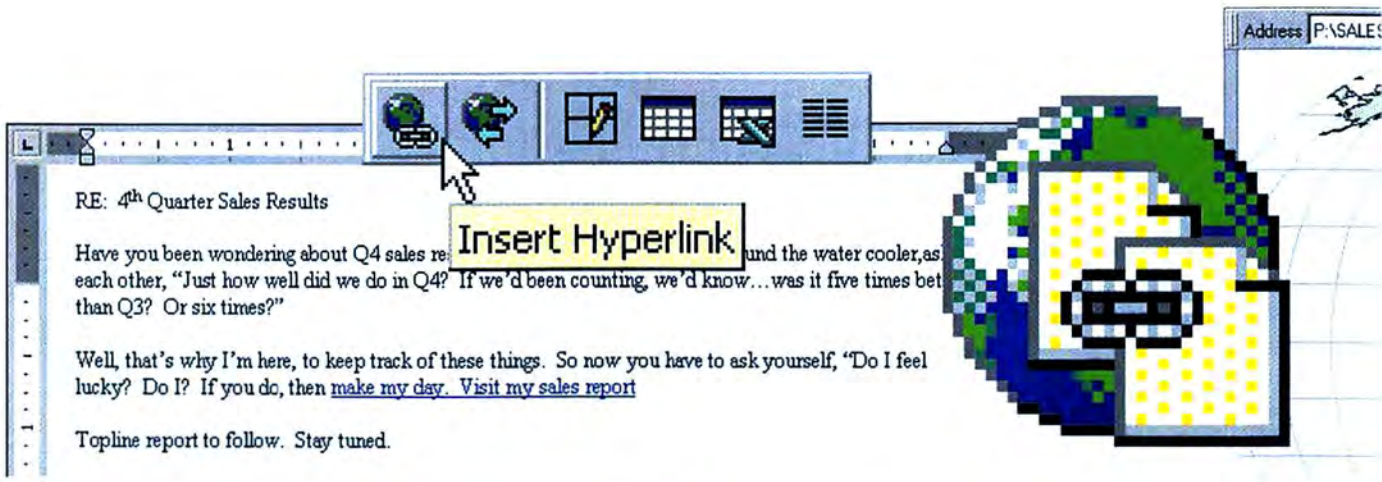
The KX-P6500's design can be frustrating. To print an envelope, you have to remove the paper stack from the input tray and adjust a hard-to-find slider. The printer's extremely curved paper path, with no straight-through option, presents problems if you try to print on heavier stock such as index cards. The on-screen help is terse and technical, and it covers only the software settings, not hardware-related issues like how to change the toner cartridge. *Panasonic, 800/742-8086, www.panasonic.com* ■

PRINT COSTS		SUPPORT			
List price of toner cartridge	Estimated cartridge life (pages)	Warranty (years)	Toll-free phone support	Weekday support (hours)	Weekend support
$32.99[1]	2200	1	●	11	○
$85	2500	1	○	16	●
$69	3000	2	●	12	○
$149	5000	2	●	12	○
$29.70[1]	2000	1	●	10	○

Beyond the Top 10

WE EVALUATED THESE MONOCHROME PRINTERS along with the others, but they didn't score high enough to reach the Top 10. For write-ups, see PC World Online (www.pcworld.com/t10printers).

- Canon LBP-465
- HP LaserJet 6P
- Okidata OkiPage 4w
- Okidata OL600e
- Panasonic KX-P6100
- Xerox DocuPrint 4508



Microsoft Office 97/now/

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to exotic, far-flung places, like

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stant hyperlinks
the other side of the office.

Once upon a time on the Web, you could follow any research lead or nutty hobby to the four corners of the planet, link by link by link. And yet you couldn't link your own sales report to a spreadsheet. This state of affairs prompted us to build lots of Web capabilities into new Microsoft® Office 97. Now it's ridiculously easy to insert hyperlinks into Office documents: just highlight your future link, click on the hyperlink button, browse to your link destination, and bingo. You've changed a passing reference into an actual link. Since you can publish fully functional Office work on your intranet, you and your colleagues can link to stuff that's actually useful—a spreadsheet that can be updated by a bunch of you simultaneously, for instance. You can also save Office files in HTML, the lingua franca of the Web. Hey, you may even want to send a few of them on a nice long trip. To explore the possibilities further, check out—need we say it?—our Web site.

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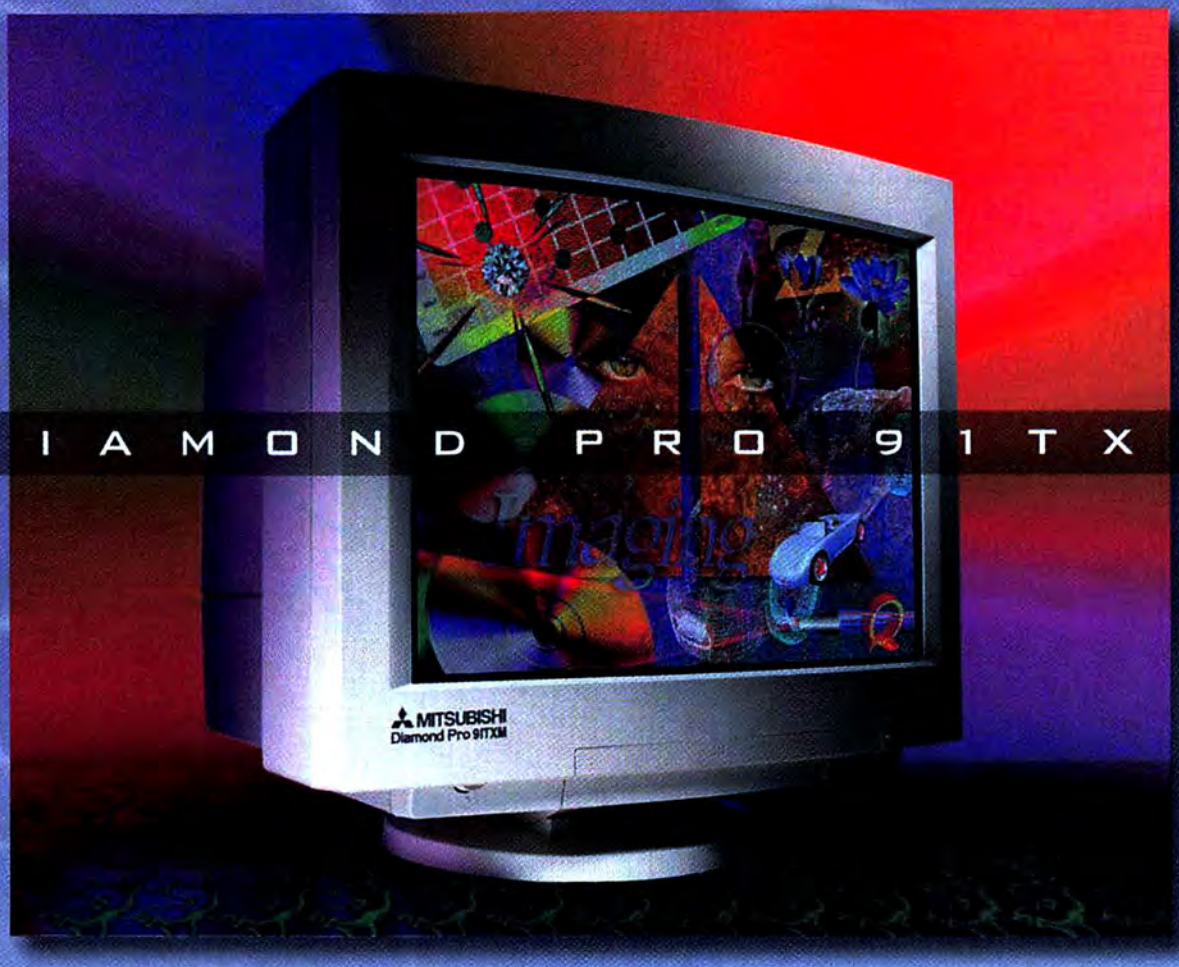

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* DVI: Diagonal viewable image

Circle 155 on reader service card

PC WORLD

TOP 100

204 Power Desktops

214 Budget Desktops

222 Notebooks

235 Printers

237 Monitors

239 Graphics Boards

241 Modems

PCs Break the $1000 Barrier

IF YOU THINK THE ONLY COMPUTER you can get on the cheap is a used 486 listed on the bulletin board at the supermarket, guess again. Today you can get a brand-spanking-new PC with a fast processor for less than $1000.

We evaluated three new sub-$1000 systems for this month's Top 20 Budget ▶

EDITED BY JOANNE ROBB

ONLY $995: The Vektron Corporate Station comes with a 15-inch monitor, but not many extras.

PHOTOGRAPHS: MARC SIMON ICONS: JEF

Desktops review: the Everex Explora 995, the Packard Bell Multimedia C115A, and the Vektron Corporate Station. All three are better equipped than the Monorail 7245, a $999 75-MHz PC with a built-in screen, which we tested in April. But as with the Monorail, none made our chart. All are missing one or more key features. The Explora isn't really even a sub-$1000 PC: If you factor a 14-inch monitor into the price, it's actually about $1200.

That said, if your needs are simple and you don't mind doing without cutting-edge features like a 12X CD-ROM drive, these cheap PCs can be pretty good deals. They should be especially attractive to people who need to equip an office on a budget or are looking for a low-cost computer for the family.

THE $1000 BARGAIN

OVERALL, WE WERE pretty impressed with what a cool grand can buy: Each of the machines includes a CD-ROM drive and a reasonably sized hard disk. Two of them, the Everex and the Packard Bell, come with 33.6-kbps modems; the Vektron Corporate Station has a network card.

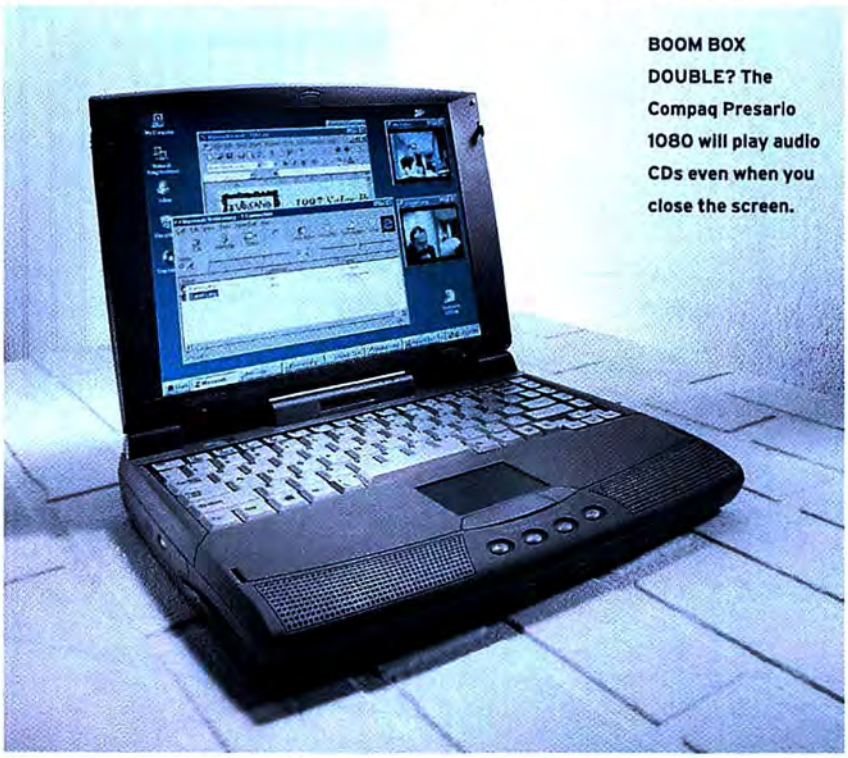
The Vektron, a Pentium-133 system priced at $995 with a 15-inch monitor, and the Everex Explora, based on Advanced Micro Devices' K5 PR133 processor and priced at $995 without a monitor (or $1220 with a 14-inch display), are both good systems for businesses that don't have the dollars to put a top-of-the-line PC on every desk.

The Vektron came closest to making our chart. You'll have to shell out an extra $75 to add a modem, but the Vektron does come with some surprisingly nice components. In particular, we were impressed with its crisp Princeton Ultra 50 monitor and the sizable 2.1GB hard drive.

Vektron's support policies are good for business buyers; parts and labor are covered for one year, and a phone support line is open 11 hours every weekday. When making anonymous calls, we sometimes had to wait a while to get through to a technician, but the assistance was good once we spoke to someone. To top it off, the Corporate Station performed remarkably well in our PC WorldBench tests: Its score of 182 is an impressive 9 percent above average for a Pentium-133.

The Everex Explora looked the next best to us. This one is pretty bare-bones—it's got only a 1.6GB hard drive and 1MB of video memory. And the optional 14-inch monitor is about what you would expect with a cheap system: blurry. But the Explora does come with a modem, an 8X CD-ROM drive, and a pair of generic computer speakers. And like the Vektron Corporate Station, it performs pretty well. With its AMD K5 PR133 processor, the Explora is designed to perform like a Pentium-133; in fact, in our tests it was slightly above average for the P-133 processor class. Everex's support policies are among the best: You get round-the-clock, toll-free technical support seven days a week, although we weren't impressed with the service we received when we made anonymous calls for help.

FASTER BROWSING: Two 56-kbps modems make our chart.



BOOM BOX DOUBLE? The Compaq Presario 1080 will play audio CDs even when you close the screen.

The Packard Bell Multimedia C115A, a Pentium-120 priced at $999 with a 14-inch monitor, was a terrible performer in our tests. With a PC WorldBench score of 146, it lags behind the average P-120 by 12 percent. Nevertheless, it includes all the basics from speakers to modem. It would make a nice machine for, say, a relative who doesn't want to commit a lot of cash to a computer but still wants to be able to e-mail the kids. But be forewarned: You might be the one fielding the calls for tech support. Packard Bell offers a fancy support package with round-the-clock phone service for the first year, but with a ranking of "worst" for service and reliability in our reader fax-back survey, it's doubtful that the company's support policies will be of much use if trouble strikes.

You'll be seeing more companies pitching sub-$1000 PCs in the months to come. (For previews of several other cheap PCs, see May's "$1000 Desktop PCs—Great Buys for Modest Needs.") In the

meantime, you can already find some good deals on PCs that have made it to our charts. Simply subtract the price of the monitor from some of our cheapest budget desktops, and you'll come up with a handful of systems for around $1000 each. For example, the Kingdom 6x86 P166+ Super Value in spot nine of this month's Budget Desktops chart costs only $1070 without the monitor. The Diamond Technologies P133, at number 18, is $1050 without the monitor. And price drops keep making higher-end PCs more affordable. Three of this month's five Budget Desktop Best Buys cost less than $2000. And the average price this month for a Power Desktop Best Buy is $2920—13 percent lower than in January.

MMX SCORES AGAIN

OF THE 12 NEW SYSTEMS on our charts this month, half are MMX machines. In fact, all three of the new models on the Power Desktops chart—a new home PC from Gateway 2000 and business machines from Dell and Multiwave—are in the Pentium MMX-200 class. The $3255 Dell OptiPlex GXi 200M earns a third-place Best Buy position and replaces the OptiPlex GXi 200. The 200M has a better graphics card than its predecessor (which held spot number four on last month's Power Desktops chart), but otherwise it's exactly the same.

At the number eight position, the $2619 Gateway 2000 P5-200 is a stylish Pentium MMX-200 computer that's unlike many home systems—it actually is an above-average performer for its processor class. With a PC WorldBench score of 233, a sizable software bundle, and a slew of good components, the P5-200 is a good system for the living room.

The $2750 Multiwave P-200 MMX ranks 14th. It offers excellent performance and has an impressive lineup of components, including a Matrox Millennium graphics card, a 12X CD-ROM drive, and a 33.6-kbps modem. What keeps it from placing higher on our Power Desktops chart are its support policies: With only 10 hours of daily phone support and a one-year warranty on labor and parts, there's some room for improvement.

Two firsts appear on our Budget Desktops chart this month: bargain-price Pentium MMX PCs and the first AMD-based equivalent of a Pentium-166 system.

The $2179 Dell Dimension M200a, our number two Best Buy, is the first new MMX system to make the Budget chart. It has a prize-winning combination of solid components, good design, and excellent service and reliability. The Quantex QP5/200 SM-3, a 200-MHz Pentium MMX PC we first tested in March, and the CLR Infinity P-166 MMX, which was first reviewed in April, both had price drops that brought them onto the chart.

The $1698 Polywell Poly 500QX, at number 14, is the first machine we've tested that uses AMD's K5 PR166 processor, which was designed to compete with the Pentium-166. The 500QX performed very well, leapfrogging ahead with speed that rivals that of some Pentium-200 systems.

Two other new systems—a business unit from Dell and a home machine from Hewlett-Packard—also made the Budget Desktops chart. ▶

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 14 for contact information.

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. The Top 20 charts are divided by price. Power desktops cost $2500 or more; power notebooks cost $2750 or more. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart 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? It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

What does the Top 20 PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell Dimension P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

Where do Top 20 scores for reliability, support quality, and support policies come from? The reliability and support quality scores come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The policies score is based on the vendor's support policies (such as length of warranty and support hours).

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 example, a budget PC that is rated "expensive" is high-priced only compared to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

Where can I find the online version of the Top 100? Go to PC World Online (www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but also some extra features you'll want to check out. For example, PC World Online includes reviews you won't find in print. If a product misses a chart and we don't cover it here, you can go directly to an online review by using the URL provided in each Top 100 section.

Have you ever wished you could build your own chart based on your buying criteria? You can, with Buyer's Guide, our Web site's unique chart customizer. Buyer's Guide combines your criteria with *PC World*'s current data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz processors and 1.6GB hard drives, Buyer's Guide will find and rank all the machines that fit your specifications.

Five new models made our Notebook PCs chart, including systems from Dell, Transmonde, WinBook, and Compaq. The prize for originality goes to Compaq's $4499 Presario 1080, in tenth place on the Power chart: You can also use it as a boom box. Its speakers are embedded on a curved palm rest that remains outside the case even when you close the screen. At 8.8 pounds, the Presario 1080 is heavy, but it comes with a modem and with CD-ROM and floppy drives built in; Compaq also includes a hefty software bundle for a notebook. We also have a new number one power notebook: The $3999 Latitude LM M166T, Dell's first MMX portable and the fastest on this month's chart.

New scores didn't alter positions of PCs on the charts. It's just harder to earn our highest praise.

SCORING GETS TOUGHER

YOU MAY HAVE NOTICED that our Top 20 Scorecard ratings have changed more than usual this month. Many of the scores for performance, features and design, and price were lowered a notch or two. As a result, overall ratings also dropped by several points.

Most of the changes result from adjustments we've made to our scoring criteria in order to keep pace with today's computers. In the last six months, systems have become much faster and cheaper. What we rated as an "outstanding" performer last fall may be only "very good" today, because it's being compared with a Pentium MMX-200 system. Similarly, a PC we rated as "very inexpensive" a few months ago may now be merely "inexpensive" compared with some of the new models hitting the shelves at $1000 or less. Our ratings for features and design have gotten tougher, too: On today's charts a system can't get an "outstanding" rating in this category without having at least a 2GB hard disk, a 12X CD-ROM drive, and a modem.

In most cases, our new scores didn't alter the relative position of PCs on the charts. Now it's just harder for systems to earn our highest praise.

BEYOND MMX

JUST NOW GETTING used to the idea of shopping for a new Pentium MMX system? Well, the next generation of PCs is already here. Next month we'll test several machines based on Intel's new 266-MHz Pentium II chip, the follow-up to the Pentium, and one PC that's based on AMD's new 200-MHz K6 PR2-200. Our preliminary tests reveal that Pentium II–based PCs are about 10 percent faster than Sys Technology's Performance Pro 200, the fastest PC we've tested for the Top 20 (see "Pentium II Computer Is Fastest PC Ever," May). PCs with the 200-MHz K6 chip are faster than Pentium Pro-200 systems, but only by a little. They are still about 8 percent slower than the Pentium II systems.

IN PERIPHERAL NEWS

THE BIGGEST NEWS on our Top 10 charts is the debut of 56-kbps modems. The U.S. Robotics Courier V.Everything 56k, in second place, earned a Best Buy. It's the fastest modem on the Top 10 Modems chart, but its steep $285 price keeps it from the number one spot. Another 56-kbps modem, the U.S. Robotics Sportster 56k Faxmodem, also has well-above-average performance; it's at number five on the chart.

In this month's color printer roundup, we saw many models that boasted near-photographic quality. The Epson Stylus Color 600 is a new ink jet that wins a Best Buy position.

JoAnne Robb is an associate editor for PC World. *Editorial Researcher Julie Campagna, Staff Editors John Goddard and Eric Hellweg, Senior Associate Editors Brad Grimes and Harry McCracken, Editorial Assistant Mick Lockey, Associate Editor Melissa Riofrio, and freelance writers Allyson Bates, Geoffrey Coffey, Jon Jacobi, and Natasha Wanchek contributed to the Top 100. Testing for the Top 100 by Ulrike Diehlmann, Robert James, Elliot Kirschling, Kevin Mitchell, Mike Salayko, and Susan Silvius.* *See page 14 for contact information.*

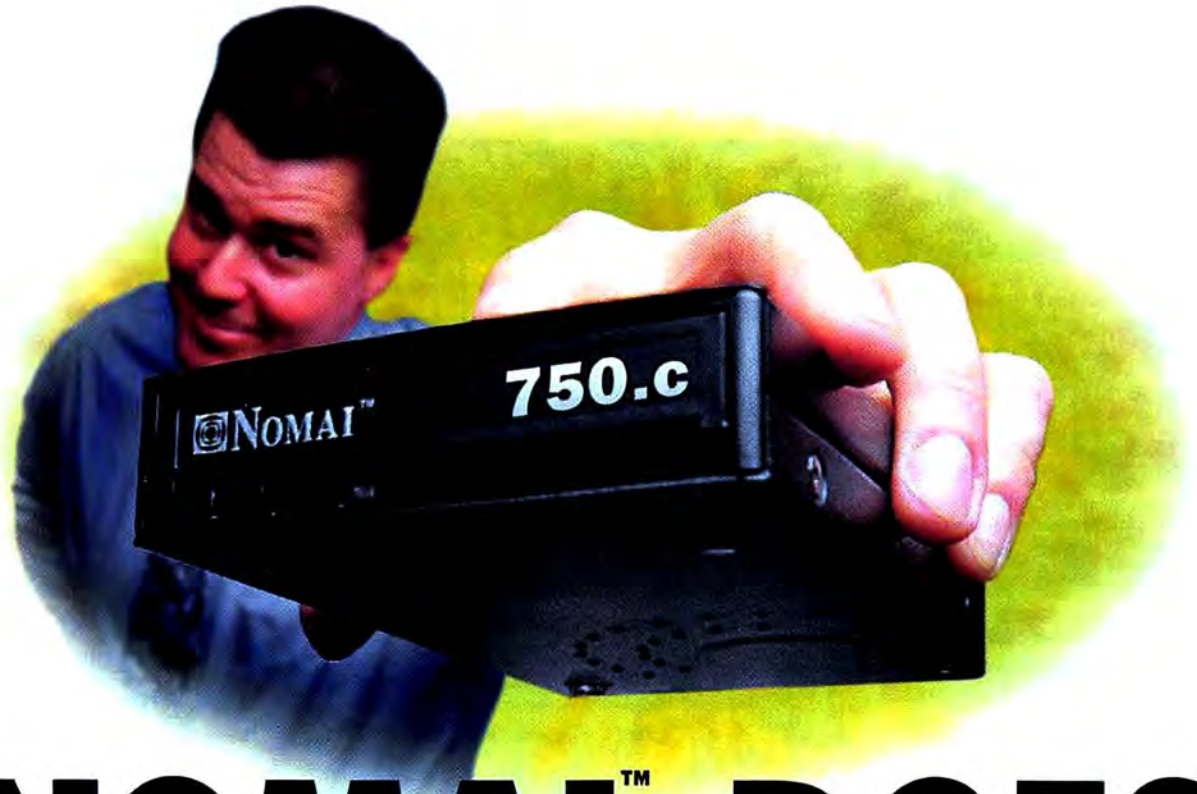
KEEP THAT BATTERY GOING

ILLUSTRATION: JEFFREY PELO

WHEN YOU'RE ON THE ROAD and far from any electrical outlet, you'll want to eke every last minute out of your notebook battery. Most notebook manuals tell you to maximize your power settings in the BIOS and in Windows 95. To set them in Windows 95, just go to the *Power* option in the Control Panel. The BIOS is a little tougher. If your manual doesn't tell you how to get into your computer's BIOS, you'll have to call tech support for help.

But here's the catch: Adjusting your notebook's power management settings doesn't always give you the maximum performance. With a little tweaking of your own, though, you can extend your notebook's battery life. Here are some tips that might help:

- **Because the clock in the lower right corner of the Windows 95 screen updates every minute, some notebooks register constant use, as if you were always typing at the keyboard. If you notice that your screen never dims (to signal sleep mode), disable the clock.**
- **If you have an infrared port, your notebook scans it regularly to see if you're transmitting any information. By disabling the drivers for the IR port, you stop this scanning. Just don't forget that you have to reenable the drivers when you want to transmit data.**
- **That nifty AutoPlay feature that can start any disc you drop into the CD-ROM drive might also be sapping your battery. As it does with the IR port, your computer constantly polls the CD-ROM drive to see if there's a disc in it. Under *System•Device Manager,* you can turn off 'Auto insert notification'. Your CD-ROM drive will still work, but you'll have to start any CD in the drive manually.**



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PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (3/17/97)	CPU	Comments
1	Dell Dimension XPS M200s 800/388-8542 www.dell.com	1	Mar 97	$2699	Pentium MMX-200	Dell's MMX Dimension has superb price, outperforms Pentium Pro sibling.
2	Dell Dimension XPS Pro200n 800/388-8542 www.dell.com	2	Jan 97	$2999	Pentium Pro-200	Feature-packed minitower is easy to open and upgrade; top reliability rating.
3	Dell OptiPlex GXi 200M 800/388-8542 www.dell.com	–	(NEW)	$3255	Pentium MMX-200	With new Matrox Millennium graphics card, replaces GXi on last month's charts.
4	Micron Millennia Pro2 200 B 888/634-8799 www.micronpc.com	5	Feb 97	$2959	Pentium Pro-200	Fast, loaded minitower with top-tier support policies; reliability could improve.
5	Gateway 2000 G6-200 800/846-2000 www.gw2K.com	6	Dec 96	$2689	Pentium Pro-200	Fast, SCSI adapter fit for workgroup server use; reliability could be better.
6	Micron Home MPC P200 888/634-8799 www.micronpc.com	11	Mar 97	$2649	Pentium-200	Price cut almost $500, home software bundle makes it family friendly.
7	HP Vectra VA 6/200 MT 800/752-0900 www.hp.com	8	Mar 97	$3183	Pentium Pro-200	Great corporate PC, price drop of $291; support hours are limited.
8	Gateway 2000 P5-200 800/846-2000 www.gw2K.com	–	(NEW)	$2619	Pentium MMX-200	Fast, well designed, great support policies; only fair reliability rating.
9	Dell OptiPlex GXpro 200 800/388-8542 www.dell.com	3	May 97	$4260	Pentium Pro-200	Great graphics card; excellent corporate PC; top support policies and service.
10	HP Pavilion 7370V 800/724-6631 www.hp.com	9	May 97	$3448	Pentium MMX-200	Good software bundle, USB ports; pricey, only one year phone support.
11	Netis N6200PCI 800/577-7526 www.netistech.com	17	Dec 96	$2580	Pentium Pro-200	Huge tower PC can take two CPUs; fast and cheap for its processor class.
12	Royal 3D-MMX 800/486-0008 www.royalcomp.com	18	Apr 97	$2695	Pentium MMX-200	Fast MMX PC with lots of software, fine multimedia, and 3-D graphics.
13	Sys Technology Performance Pro 200 800/613-9963 www.systechnology.com	–	Dec 96	$2879	Pentium Pro-200	Superfast, good graphics card, $80 price drop; otherwise fairly generic.
14	Multiwave P-200 MMX 800/234-3358 www.mwave.com	–	(NEW)	$2750	Pentium MMX-200	Has all the perks, good graphics; support policy could be better.
15	IBM PC 350 (Pentium MMX-200) 800/426-2968 www.pc.ibm.com	10	May 97	$3548	Pentium MMX-200	Expensive, slightly better configuration than IBM PC 350 Pentium-200.
16	CLR Infinity P-200 MMX 800/611-1555 www.clrusa.com	–	Apr 97	$2723	Pentium MMX-200	$276 price drop brings system onto the chart; no weekend support hours.
17	IBM PC 365 800/426-2968 www.pc.ibm.com	12	Mar 97	$4475	Pentium Pro-200	Huge price cut of $649; corporate PC has it all, even a rewritable optical drive.
18	Quantex QP6/200 SM-4 800/896-4898 www.quantex.com	16	May 97	$2649	Pentium Pro-200	Fast, includes modem; vendor now offers 30-day money-back guarantee.
19	Acma zPower Pro-200 800/786-6888 www.acma.com	–	Jan 97	$2695	Pentium Pro-200	$300 price cut, good graphics board, fast modem; no weekend support.
20	Sony VAIO PCV-120 800/476-6972 www.sony.com/pc	–	May 97	$2728	Pentium MMX-200	$191 cut lands system on chart; fast CD-ROM drive, large hard disk.

Best Buy See features chart, page 206; performance chart, page 208. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available May 27).

IF YOU'RE WILLING TO PAY A LITTLE MORE for a high-end PC, go straight to one of the 200-MHz Pentiums on our Power Desktops chart this month. You can get some great deals on Pentium-166s these days (see the Budget chart on page 214), but a Pentium-200, MMX-200, or Pentium Pro-200 PC will be 7 to 17 percent faster. An MMX-200 will run MMX-enabled software the fastest of any of these machines. We tested two new over-$2500 200-MHz PCs, but neither made the chart: Sys's $7548 Premier Pro 200, for graphics pros with deep pockets, and the Platinum 2240, held back by Packard Bell's poor reliability and service ratings. For details, visit PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Vendor's system reliability	Features and design	Price	Vendor's support quality/policies	Fax reprint number[1]	Reader service number
92	234/very good	best	very good	inexpensive	best/best	3494	672
91	230/very good	best	very good	inexpensive	best/best	3474	673
90	226/very good	best	outstanding	average	best/best	–	674
87	231/very good	good	very good	inexpensive	best/best	3489	675
86	234/very good	fair	very good	inexpensive	best/best	3458	676
86	216/good	good	very good	inexpensive	best/best	3496	677
86	229/very good	best	very good	average	good/poor	2496	678
86	233/very good	fair	very good	very inexpensive	best/best	–	679
86	230/very good	best	outstanding	very expensive	best/best	3514	680
82	222/very good	best	good	average	good/fair	3515	681
81	230/very good	[2]	very good	very inexpensive	[2]/poor	3460	682
81	232/very good	[2]	outstanding	inexpensive	[2]/fair	3519	683
81	236/outstanding	[2]	very good	inexpensive	[2]/fair	3459	684
80	235/outstanding	[2]	very good	inexpensive	[2]/fair	–	685
80	232/very good	good	good	average	good/best	3526	–
80	229/very good	[2]	very good	inexpensive	[2]/good	–	686
79	232/very good	good	very good	very expensive	good/best	3500	–
79	230/very good	poor	good	inexpensive	good/best	3518	687
79	231/very good	[2]	very good	inexpensive	[2]/fair	3515	688
78	225/very good	[2]	very good	inexpensive	[2]/good	–	689
Scorecard weightings ▶	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	908

[2] Insufficient data.

This Month's Best Buys

1 DELL DIMENSION XPS M200S

PRO: Performs like a Pentium Pro, comes with a 33.6-kbps modem

CON: Maximum RAM limited to 64MB

The first Dell Dimension to use Intel's new Pentium MMX-200 CPU, the Dimension XPS M200s earns its fourth month in the number one Best Buy spot on our Power Desktops chart with a winning combination of speed, high-quality components, good design, and good service.

The XPS M200s is as fast as the fastest Pentium Pro we've seen. But it's not priced like a Pentium Pro: At $2699, this MMX system costs $300 less than the Dell Pentium Pro-200 that earned our second-place Best Buy, and it's also priced about $550 lower than the third-place Pentium MMX-200 Dell OptiPlex.

The XPS M200s features the same high-quality design as other Dell Dimension minitowers, including an easy-open case and a wide base to help keep it stable on your desk. Dell also throws in extras like Microsoft Office 95 Professional, Altec Lansing ACS 290 speakers with subwoofer, and a 33.6-kbps modem.

Dell XPS M200s

The system's 4MB Matrox Millennium card isn't as appropriate for high-end graphics tasks as Dell's workstation-class graphics card, the Number Nine Imagine 128 Series 2. But the Matrox is fine for most graphics chores and costs about $350 less. Keep in mind that the M200s is limited to 64MB of system memory—only half the amount most other PCs can take. Although 64MB sounds like a lot, users of programs such as Photoshop and other demanding graphics software might want to be able to add more memory.

The XPS M200s's case is very easy to open. Just give a thumbscrew a few turns, and the side panel comes off to reveal an impeccable interior with plenty of free slots and bays. All the cable connectors sit right below the drive cage, so ribbon cables don't obstruct the slots.

Dell's system documentation is thorough and easy to understand. The company's support policies are very good, and its PC reliability rates among the best, according to *PC World* readers.

2 DELL DIMENSION XPS PRO200N

PRO: Very fast, comes with 33.6-kbps modem, top reliability rating, excellent support

CON: None significant

The XPS Pro200n is a powerful computer that would make a good choice for a Windows NT workstation thanks to its Pentium Pro-200 processor. But it's a tad slower than the number one Dimension XPS M200s and costs $300 more.

This fast $2999 system has the same minitower case as the M200s. The CD-ROM drive is located at the top of the ▶

TOP 20 POWER DESKTOPS

STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS M200s*	Pentium MMX-200	32	512	3.2	Matrox Millennium	4/WRAM	17/15.8	.28	12X
2	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	3.2	Number Nine Imagine 128 Ser. 2	4/VRAM	17/15.6	.28	12X
3	Dell OptiPlex GXi 200M*	Pentium MMX-200	32	512	3.2	Matrox Millennium	4/VRAM	17/16	.28	8X
4	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	3.1	Diamond Stealth 2000	4/EDO DRAM	17/16	.26	12X
5	Gateway 2000 G6-200*	Pentium Pro-200	32	256	2.1	STB Virge (OEM)	4/EDO DRAM	17/15.9	.26	12X
6	Micron Home MPC P200	Pentium-200	32	512	3.1	Diamond Stealth 3D/Monster 3D	4/EDO DRAM	17/16	.26	12X
7	HP Vectra VA 6/200 MT	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15.7	.28	8X
8	Gateway 2000 P5-200	Pentium MMX-200	32	512	3.8	STB Virge (OEM)	4/EDO DRAM	17/15.9	.28	12X
9	Dell OptiPlex GXpro 200	Pentium Pro-200	32	512	3.1	Matrox Millennium	4/WRAM	17/15.75	.28	8X
10	HP Pavilion 7370V	Pentium MMX-200	32	256	4	integrated	2/EDO DRAM	17/15.6	.28	16X
11	Netis N6200PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	8X
12	Royal 3D-MMX	Pentium MMX-200	32	512	2.5	ATI 3D Pro Turbo	4/SGRAM	17/16	.25	12X
13	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15	.26	12X
14	Multiwave P-200 MMX	Pentium MMX-200	32	512	2.1	Matrox Millennium	4/WRAM	17/16	.26	12X
15	IBM PC 350 (Pentium MMX-200)	Pentium MMX-200	32	512	2.5	Matrox Millennium	4/WRAM	17/15.7	.28	8X
16	CLR Infinity P-200 MMX	Pentium MMX-200	32	512	3.2	Number Nine Imagine 128	4/VRAM	15/13.7	.28	12X
17	IBM PC 365	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.7	.28	6X
18	Quantex QP6/200 SM-4	Pentium Pro-200	64	256	3.2	Matrox Millennium	4/WRAM	17/16.1	.26	12X
19	Acma zPower Pro-200	Pentium Pro-200	32	256	2.1	STB Velocity 3D	4/VRAM	17/15.5	.28	8X
20	Sony VAIO PCV-120	Pentium MMX-200	32	256	3.8	integrated	2/EDO DRAM	15/13.9	.25	16X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Toll call.

front panel, which makes it easily accessible, and the power and reset buttons lie in the center of the panel, well away from the floppy disk eject button so you can't confuse them. The interior may need better ventilation, however: The heat sink singed our hands when we touched it, despite the efforts of the large cooling fan that's also in the case.

Dell XPS Pro200n

The support policies for this system mirror those of its Dimension XPS M200s sibling: You get a three-year parts warranty (one year for labor) and round-the-clock toll-free support that gets a top ranking in our reader fax-back surveys.

3 DELL OPTIPLEX GXI 200M

PRO: Fast; above-average service, support, and system reliability

CON: Expensive, fairly limited expandability, application software not included

Dell's OptiPlex GXi 200 earned a Best Buy on our Power chart last month. This month, the OptiPlex GXi 200M—which comes with a different graphics card, the Matrox Millennium, and replaces its predecessor—jumps into third place. Like the GXi 200, it's an excellent PC for business.

The GXi 200M has everything you need in a high-end corporate desktop: fast performance, room for tons of memory, bountiful storage, built-in networking and sound, and some of the best support available. With a Pentium MMX-200 under its hood, it cruised to a PC WorldBench score of 226—a point faster than the older GXi and a mere 4 percent slower than the fastest PC on our charts, the Sys Performance Pro 200.

Like all OptiPlex models, the $3255 GXi 200M isn't for the faint of budget. Price is a major difference between the Dimension and OptiPlex lines: The OptiPlex GXi 200M costs $556 more than the number one Dimension XPS M200s. However, that isn't too surprising considering one of the major extras: OptiPlex systems are network certified. Thanks to the integrated

Dell OptiPlex GXi 200M

		EXPANDABILITY					CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
33.6	integrated Vibra 16c	minitower	64	512	1	2/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Sound Blaster AWE32 (OEM)	minitower	128	512	2	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Vibra	desktop	512	512	3	1/0	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Sound Blaster 16	minitower	512	512	3	3/0	4	3 [1]/1	24	Sat., Sun.	CIS, WWW
–	Ensoniq Vivo	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Sound Blaster AWE32	minitower	128	512	2	3/1	3	3 [1]/1	24	Sat., Sun.	CIS, WWW
–	integrated 16-bit	minitower	192	256	4	2/1	4	3/3	11 [2]	–	AOL, BBS, CIS, WWW
33.6	Ensoniq Soundscape Vivo (OEM)	minitower	64	512	1	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Sound Blaster 16	desktop	512	512	3	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Yamaha	minitower	128	256	2	2/2	5	1/1	24 [2]	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS
33.6	ESS AudioDrive 1868	minitower	128	512	3	3/1	3	1/lifetime	10	Sat.	BBS, WWW
33.6	Sound Blaster 32 PnP	minitower	128	512	2	3/1	4	1/1	24	Sat., Sun.	–
33.6	Ensoniq Soundscape Vivo	minitower	512	512	2	3/1	4	1/1	10	Sat.	BBS, WWW
–	–	desktop	192	512	4	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	Sound Blaster AWE32	minitower	256	512	2	2/0	5	3/3	12	–	WWW
–	–	desktop	512	256	3	0/1	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Ensoniq Soundscape Vivo PnP	minitower	128	256	0	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
33.6	Sound Blaster 16 PnP (OEM)	minitower	512	256	2	1/1	4	3/1	9.5	–	BBS, WWW
33.6	integrated Yamaha	minitower	128	256	2	2/0	5	1/1	24	Sat., Sun.	BBS, WWW

ethernet adapter, the OptiPlex will plug into your LAN right out of the box.

The 17-inch Dell D1728D-LS monitor we received delivers bright colors and clear, crisp graphics and text. For an extra $100, though, you can get Dell's top-of-the-line 17HS Trinitron, which displays even crisper text and has more on-screen controls. The built-in 16-bit sound, based on a Sound Blaster Vibra chip, is fine for a business machine. The 33.6-kbps U.S. Robotics Telephony modem is one of the best around.

This PC is intelligently designed and put together. The thumbscrew-secured desktop case is sturdy and easy to open. The expansion slots sit on a daughtercard above the motherboard, so adding cards is about as painless as that chore can be. But with only one available external drive bay, one free 32-bit slot, and two 16-bit slots, expansion options are fairly limited. And the three available DIMM sockets are sequestered behind snaking cables, making them somewhat difficult to reach. They help with the terrific memory expandability, though: The Dimension models top out at 64MB of RAM, while the OptiPlex's RAM can expand all the way up to 512MB. The system's manual is easy to understand and well organized.

As with all its OptiPlex PCs, Dell backs the GXi 200M with a three-year warranty on parts and one year on labor. Our readers give high reliability and service ratings to Dell systems.

Micron Millennia Pro2 200 B

4 MICRON MILLENNIA PRO2 200 B

PRO: Very fast, has highly rated modem and second processor socket, includes Microsoft Office, good support policies

CON: Long waits for technical support

Micron's Millennia Pro2 200 B is the PC for you if you need high-quality components plus an upgrade path to the world of dual processing. The $2959 price for this minitower buys top-notch components such as a U.S. Robotics Sportster 33.6-kbps internal modem—one of the better 33.6-kbps units available, according to past *PC World* tests. Micron also includes a nice pair of Advent AV007 speakers and an integrated Sound Blaster chip to ▶

complete the system's multimedia setup.

The Millennia Pro2's Intel motherboard includes a CPU socket for adding another Pentium Pro-200 processor—a rare but useful option that allows multiprocessing with an operating system that supports it, such as Windows NT. The system's DIMM sockets are capable of holding twice as much memory as SIMM sockets, and its RAM ceiling is 256MB, which will be plenty for most users' needs.

The Millennia Pro2's PC WorldBench score of 231 puts it in the upper echelon of high-performance systems. Micron rates well for reliability and support. The Millennia's warranty is notable—it covers the CPU and main RAM for five years and other parts for three. You also get free on-site service for the first year, plus 24-hour toll-free tech support. In our fax-back surveys, though, readers have reported long hold times.

5 GATEWAY 2000 G6-200

PRO: Fast, roomy, has SCSI controller

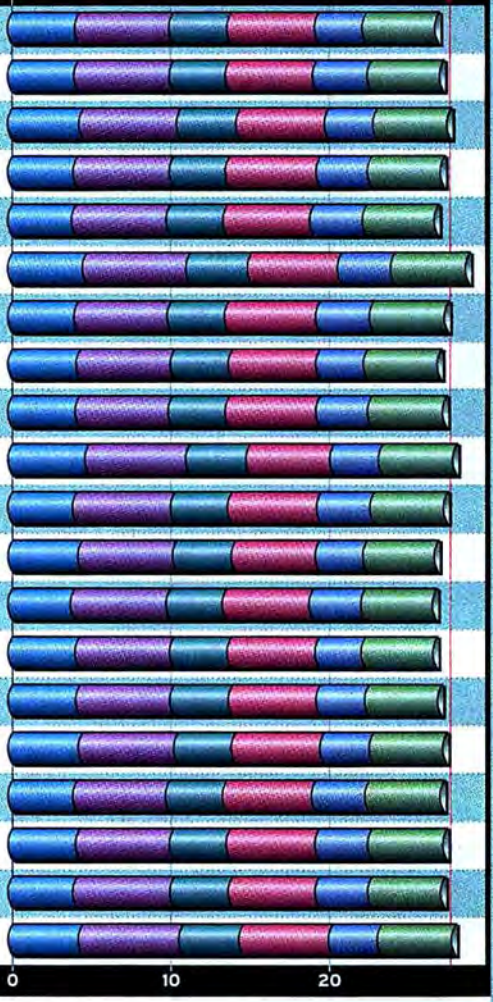
CON: Reliability rating is only fair, no modem

The $2689 Gateway 2000 G6-200 casts a shadow over much of the competition, and not just because its tower is several inches taller than the minitowers we usually see. It's also a very powerful Pentium Pro-200 system, capable of being a workstation or server in a workgroup environment. ▶

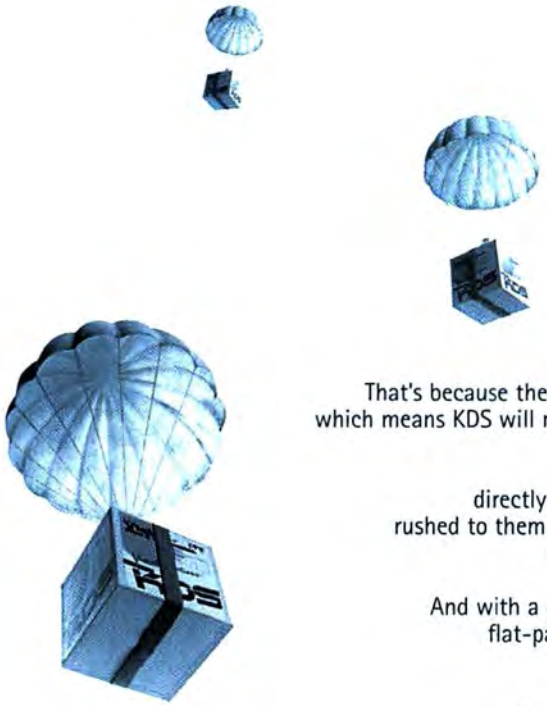
TOP 20 POWER DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension XPS M200s*	Pentium MMX-200	32	512	234
2	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	230
3	Dell OptiPlex GXi 200M*	Pentium MMX-200	32	512	226
4	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	231
5	Gateway 2000 G6-200*	Pentium Pro-200	32	256	234
6	Micron Home MPC P200	Pentium-200	32	512	216
7	HP Vectra VA 6/200 MT	Pentium Pro-200	32	256	229
8	Gateway 2000 P5-200	Pentium MMX-200	32	512	233
9	Dell OptiPlex GXpro 200	Pentium Pro-200	32	512	230
10	HP Pavilion 7370V	Pentium MMX-200	32	256	222
11	Netis N6200PCI	Pentium Pro-200	32	256	230
12	Royal 3D-MMX	Pentium MMX-200	32	512	232
13	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	236
14	Multiwave P-200 MMX	Pentium MMX-200	32	512	235
15	IBM PC 350 (Pentium MMX-200)	Pentium MMX-200	32	512	232
16	CLR Infinity P-200 MMX	Pentium MMX-200	32	512	229
17	IBM PC 365	Pentium Pro-200	32	256	232
18	Quantex QP6/200 SM-4	Pentium Pro-200	64	256	230
19	Acma zPower Pro-200	Pentium Pro-200	32	256	231
20	Sony VAIO PCV-120	Pentium MMX-200	32	256	225

*Best Buy



HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).



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Circle 170 on reader service card

The G6-200's PC WorldBench score of 234 is among the highest we've seen. And some of the system's features, like its STB Virge graphics card with 4MB of EDO DRAM, are first-class. It also has an Adaptec AHA-2940 Ultra Wide SCSI controller and nine open drive bays, and there are four free add-in card slots. To top it all off, the G6-200's SIMM sockets can hold up to 256MB of RAM.

Gateway 2000 G6-200

The size of the tower case gives easy access to all the open bays, slots, and sockets, and the drive bays' quick-release latches make upgrades simple. An extra fan keeps the processor from overheating.

Gateway bundles Microsoft Office Professional and a pair of Altec Lansing ACS 40 speakers with the G6-200, but no modem is included. (A 33.6-kbps unit costs an extra $79.) The company backs this PC with a three-year parts and labor warranty and round-the-clock support.

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/t20pcs).

8 GATEWAY 2000 P5-200

PRO: Fast, stylish appearance, 3.8GB hard drive

CON: RAM is limited to 64MB

The $2619 P5-200, Gateway's first MMX PC, is a powerful home computer with many of the extras buyers like, including color-coded cables and a hefty software package, plus plenty of room for additional components. The minitower model we reviewed (a desktop version is also available) has the same attractive curvy case as other systems in the P5 line. Throw in Gateway's top-ranking support and documentation, and this is a package well worth considering.

Gateway 2000 P5-200

The P5-200 is the fastest Gateway system we've tested—it earned a PC WorldBench score of 233, which is above average for an Pentium MMX-200. The configuration should satisfy most users looking for a cutting-edge computer. One of its most notable features is the roomy 3.8GB Maxtor hard drive. Another nice touch is the way the modem's sound is routed through the Ensoniq Vivo sound card instead of through the computer's speaker. This greatly improves audio quality when using the modem as a speakerphone. The P5-200's sound itself is high-quality, since the system comes with a set of Altec Lansing speakers. The 17-inch Crystal Scan display, while not quite as nice as those in Gateway's Vivitron series, still provides a crisp, clear picture. The graphics adapter, an STB board that uses S3's Virge VX chip, handles basic 3-D images and can display over 65,000 colors at a resolution of 1280 by 1024. The software bundle is hefty, with a good mix of games and reference titles. You can substitute Office 97 for Microsoft Works 95 for an additional $29.

The system is well designed and assembled. The sculpted, eggshell-colored case holds a decent number of slots for additional boards. There are plenty of open drive bays, too, but you'll have to remove the front of the chassis for full access to them. RAM is expandable only to 64MB—but this won't be a problem unless you work with very large files.

The P5-200's manuals are as nice on the inside as they are on their glossy, multicolored outsides, with plenty of helpful content. If you don't find the information you need, phone help is available around the clock. Gateway also pledges to replace parts free of charge for three years after you buy a PC. From the good scores readers give Gateway's service in our fax-back survey, the company delivers what it promises.

About the only potentially serious drawback to buying a Gateway PC is the vendor's reliability score in our survey: It was just fair in our readers' experiences. But with top-notch service as a net to fall back on, that may not be a problem that should deter you.

14 MULTIWAVE P-200 MMX

PRO: Terrific speed, good 17-inch monitor, 33.6-kbps modem

CON: SIMM sockets are hard to access, scant software bundle, one-year warranty

For the small office, Multiwave's $2750 Pentium MMX-200 PC is a muscle machine: This minitower system earned an impressive PC WorldBench score of 235, which is above average for its top-of-the-line processor class.

Multiwave P-200 MMX

Multiwave includes some mouth-watering components in the P-200 MMX. The Matrox Millennium graphics card's 4MB of video memory drives realistic 3-D images to a clean 17-inch ViewSonic Optiquest V775 monitor. (This display does have one irritating quirk: The enigmatic button on front only puts the screen to sleep; to turn it off, you must reach around back and flip the power switch.) Sound? Music and multimedia CDs have a sharp, immersive quality thanks to a speaker set and massive subwoofer. The software bundle is mostly business-oriented and includes Microsoft Office Professional. Notable extras: A surge-protection strip shields your PC from nasty power spikes, and a preinstalled SCSI adapter not only controls the 2.1GB hard drive, it also lets you attach devices—such as a scanner or backup drive—without opening the system.

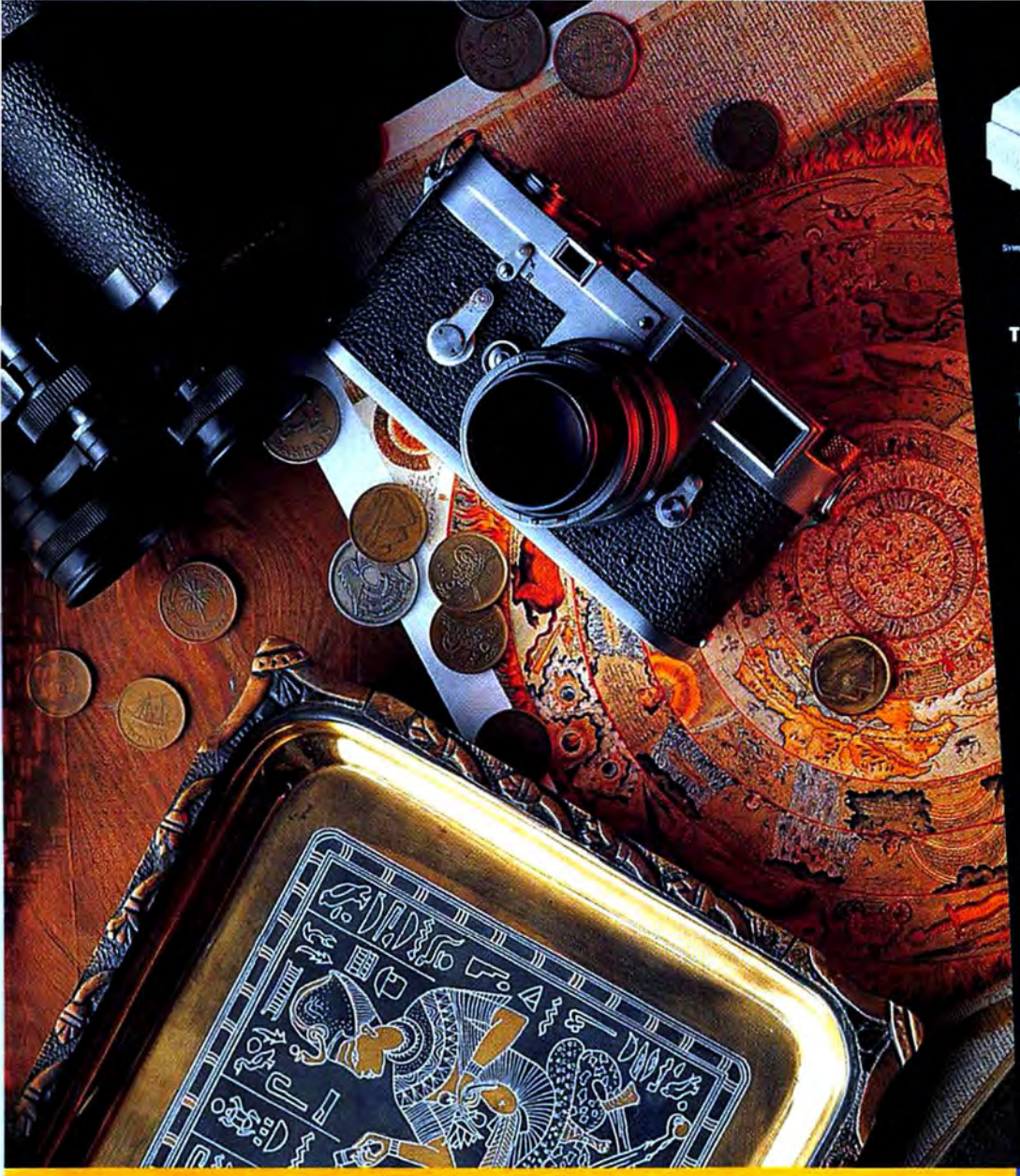
Inside the Multiwave P-200 MMX, you have easy access to four free card slots and four open drive bays. Memory upgrades aren't as simple—the two free SIMM sockets are obscured by a web of cables.

Multiwave's warranty covers the PC with only a year of free parts and labor. The company offers just 10 hours of support daily, and it charges for on-site service. Documentation is piecemeal—a pile of manuals, one for each component. ▶

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/t20pcsnaps).

- **Netis MX 200**
- **Packard Bell Platinum**
- **Sys Premier Pro 200**



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– WINDOWS MAGAZINE, MAY 1996

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*PC World, best overall PC company for reliability and service, December, 1996.

MICRON POWER℠ WARRANTY

- 5-year limited warranty on microprocessor and main memory
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- 1-, 2- or 3- year optional on-site service agreement for Micron desktop and server systems
- 30 days of free Micron-supplied software support for Micron desktop systems. 3 optional network operating system incident resolutions included for Micron server systems
- 30-day money-back policy
- 24-hour technical support

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- Integrated SVGA graphics
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- 3.5" floppy drive
- 9 drive bays: 6 internal 3.5", 3 external 5.25"
- Microsoft Mouse, 104-key keyboard
- Integrated hardware instrumentation
- Dedicated server technical support, 7x24
- 5-year/3-year limited Micron Power warranty
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*On-site service for the Vetix LX server is provided by Digital Equipment Corporation and is optional.

VETIX LXI-N

- Intel 200MHz Pentium Pro processor
- 32MB ECC EDO RAM
- 2GB Ultra Wide SCSI-3 hard drive

$2,999
Bus. lease $102/mo.

VETIX LXI

- Intel 200MHz Pentium Pro processor
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Windows NT Server 4.0 (10-user license)
- Intel LANDesk Server Manager 2.52
- NOS/software support (3 incident resolutions/1st year), 7x24

32MB ECC EDO RAM, 2GB Ultra Wide SCSI-3 hard drive — **$4,599** Bus. lease $156/mo.

64MB ECC EDO RAM, 4GB Ultra Wide SCSI-3 hard drive — **$5,099** Bus. lease $160/mo.

VETIX 2LXI

- Dual Intel 200MHz Pentium Pro processors
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Windows NT Server 4.0 (10-user license)
- Intel LANDesk Server Manager 2.52
- NOS/software support (3 incident resolutions/1st year), 7x24

128MB ECC EDO RAM, Dual 2GB Ultra Wide SCSI-3 hard drives (4GB total) — **$6,499** Bus. lease $204/mo.

256MB ECC EDO RAM, Dual 4GB Ultra Wide SCSI-3 hard drives (8GB total) — **$7,999** Bus. lease $251/mo.

NETWORKING AND SERVER ACCESSORIES

3Com® OfficeConnect Hub 8/TPC	$149
3Com OfficeConnect Switch 140	$969
3Com OfficeConnect Remote 530 Access Router	$1,099
APC Smart-UPS 700 with Power Chute plus software	$389
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Seagate Backup Exec	$249
Mylex dual channel Ultra SCSI-3RAID caching controller with 4MB RAM	$899

CLIENTPRO FEATURES

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- 3Com 3C509 network adapter
- Integrated S3 Trio VIRGE/DX graphics accelerator, 2MB EDO RAM
- Integrated wavetable sound
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows® 95
- Intel LANDesk Client Manager
- 5-year/3-year limited Micron Power warranty

CLIENTPRO MTA

- Intel 133MHz Pentium processor
- 16MB EDO RAM
- 15" Micron 15FGx, .28dp (13.7" display)

$1,599
Bus. lease $54/mo.

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PC WORLD TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (2/7/97)	CPU	Comments
1	Dell Dimension P133v 800/388-8542 www.dell.com	1	Dec 96	$1749	Pentium-133	$30 price cut; sound and modem are perks at this price; good first PC.
2	Dell Dimension M200a 800/388-8542 www.dell.com	–	NEW	$2179	Pentium MMX-200	First MMX PC to be budget Best Buy; relatively slow; has all the basics.
3	Micron Millennia LXA P166 800/634-8799 www.micronpc.com	–	Jan 97	$1649	Pentium-166	Tops the P-133 version with $50 price drop.
4	IBM PC 350 (Pentium-166) 800/426-4968 www.pc.ibm.com	5	Dec 96	$1992	Pentium-166	$233 price cut on corporate PC; lacks sound.
5	Dell OptiPlex GS+ 200L 800/388-8542 www.dell.com	–	NEW	$2098	Pentium-166	32MB of RAM standard; easy to upgrade; P-200 Gs+ also a good buy.
6	Gateway 2000 G6-180 800/846-2000 www.gw2K.com	6	Dec 96	$2039	Pentium Pro-180	Faster than a P-200; no modem or software package; up $55.
7	Gateway 2000 P5-166 800/846-2000 www.gw2K.com	–	Feb 97	$2199	Pentium-166	Quick P-166, fast graphics card; system reliability rating could be better.
8	HP Pavilion 5320 800/724-6631 www.hp.com	–	NEW	$1848	Pentium-150	On slow side; good software bundle; only one year of support.
9	Kingdom 6x86 P166+ Super Value 800/385-3436 www.kingdomcomputers.com	7	May 97	$1297	Cx6x86-P166+	$80 price drop; comes with 16X CD-ROM drive, but no modem.
10	HP Vectra VE 5/133 800/752-0900 www.hp.com	10	Dec 96	$1739	Pentium-133	$247 price cut on corporate PC; Unified Memory Architecture slows it down.
11	CyberMax Cyrix Max C3 P166+ 800/443-9868 www.cybmax.com	12	Feb 97	$1499	Cx6x86-P166+	Tested with 24MB of RAM, but now sold with 32MB; $100 price drop.
12	Quantex QP6/200 SM-1 800/896-4898 www.quantex.com	9	Aug 96	$1999	Pentium Pro-200	Loaded, $100 off; reliability a problem, but support ratings up slightly.
13	DirectWave MVP P-133 800/882-8108 www.directwave.com	8	Oct 96	$1459	Pentium-133	Well-built multimedia PC fast for P-133; tech support hours limited.
14	Polywell Poly 500QX 800/999-1278 www.polywell.com	–	NEW	$1698	AMD K5-PR166	First AMD 166 chip we've tested performs like a P-200; good value.
15	Royal Computer P133 Triton II 800/486-0008 www.royalcomp.com	–	Nov 96	$1325	Pentium-133	Good price/performance, fine graphics card, wavetable sound.
16	Diamond Mid Tower P166 800/989-7253 www.diamondtech.com	–	Apr 97	$1395	Cx6x86-P166+	Bargain but generic; modem, 3-D graphics; lowest support rating.
17	CLR Infinity P-166 MMX 800/611-1555 www.clrusa.com	–	Apr 97	$1886	Pentium MMX-166	Fast; $174 off; mediocre monitor.
18	Diamond Technologies P133 800/989-7253 www.diamondtech.com	18	Jan 97	$1315	Pentium-133	Very fast for P-133, inexpensive; 33.6-kbps modem; $80 price cut.
19	USA Flex Family Special 800/872-3539 www.usaflex.com	19	July 96	$1549	Pentium-133	$50 cut on decked-out P-133; manuals are sparse.
20	Quantex QP5/200 SM-3 800/896-4898 www.quantex.com	–	Mar 97	$2399	Pentium MMX-200	$100 price drop pulls MMX PC onto our chart; reliability rating a problem.

Best Buy See features chart, page 216; performance chart, page 218. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available May 27).

WITH 200-MHZ PCS SHIPPING EN MASSE and faster systems like Pentium IIs on the way, you can pick up a P-166 or P-133 nowadays for a song. At the high end of budget deals, there's the Dell Dimension P133v for $1749—a nicely equipped P-133 machine with good support. But at the low end, finding both good support and power is still tough. Diamond Technologies' 18th-place P133, for instance, includes a high-quality modem and graphics card, but only 9 hours of support on weekdays. Three sub-$1000 PCs we tested this month, although fine for basic uses, skimp even more on power or support. For more on these and other systems that missed the Budget chart, visit PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	Price	Vendor's system reliability	Features and design	PC WorldBench score/performance	Vendor's support quality/policies	Fax reprint number [1]	Reader service number
85	average	best	good	188/good	best/best	3462	690
85	expensive	best	very good	219/very good	best/best	–	691
84	average	good	good	200/good	best/best	3473	692
82	average	good	outstanding	197/good	good/best	3468	–
80	average	best	satisfactory	198/good	best/best	–	693
79	average	fair	good	218/very good	best/best	3466	694
78	expensive	fair	very good	199/good	best/best	–	695
78	average	best	good	180/good	good/fair	–	696
78	inexpensive	[2]	good	197/good	[2]/good	3527	697
77	average	best	good	166/satisfactory	good/poor	3465	698
77	inexpensive	[2]	good	205/good	[2]/good	–	699
77	average	poor	very good	224/very good	good/best	3405	700
76	inexpensive	[2]	very good	194/good	[2]/best	3439	701
74	average	[2]	good	213/very good	[2]/good	–	702
74	inexpensive	[2]	good	191/good	[2]/fair	3453	703
74	inexpensive	[2]	good	199/good	[2]/poor	3512	704
74	average	[2]	good	208/good	[2]/good	–	705
73	inexpensive	[2]	good	185/good	[2]/poor	3484	706
73	inexpensive	[2]	good	181/good	[2]/best	3525	707
73	expensive	poor	very good	227/very good	good/best	3497	708
Scorecard weightings ▶	Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	909

[2] Insufficient data.

Dell Dimension P133v

This Month's Best Buys

1 DELL DIMENSION P133V

PRO: Fast, well designed, top reliability rating

CON: Limited RAM expandability

You can buy faster machines, but you can't find a better combination of support, reliability, and design than Dell's "v" line of basic PCs for first-time and budget buyers. The Dell Dimension P133v is a powerful multimedia minitower that offers good features and performance for just $1749, $30 less than last month. Its PC WorldBench score of 188 is very good for a Pentium-133. Our test model even came with a 16-bit sound card, something you don't usually find in a bare-bones Dell. (Speakers cost an extra $35 to $185.) A 33.6-kbps fax-modem is also included.

The "v" series of PCs is both nicely designed and well put together. The case is easy to open, thanks to latches and thumbscrews, and two cooling fans ensure that you don't fry your investment. The system's ports are clearly labeled. For expanding memory, the P133v uses DIMMs, which hold more memory on a module than SIMMs. But there are only two sockets, so it can hold no more than 64MB of synchronous RAM—a low limit these days, though probably more than enough for most users. The 15-inch Dell 15TX Trinitron monitor accompanying our test system was a little dark and couldn't be brightened, unlike other Dell 15TX monitors we've tested. Nevertheless, it displayed crisp images and text.

If you can spend a little more, Dell's budget Dimension P-200 system may be worth a look. With 32MB of RAM, a 33.6-kbps modem, a 2.1GB hard drive, and full multimedia, the $1999 Dimension P200v is nicely set up for the home office. It earned a PC WorldBench score of 213, which is 13 percent faster than the P133v's. The system comes with a 15-inch Dell 15LS monitor, but if you want Dell's high-end 15-inch Trinitron, it costs only $49 more. The warranty is the same as for the Dimension P133v: three years of coverage on parts and one year on labor.

2 DELL DIMENSION M200A

PRO: Inexpensive; clean interior; excellent service and support

CON: Slowest Pentium MMX-200 tested, monitor quality could be better

The Dimension M200a minitower may not be a superfast machine, but it's the first new Pentium MMX system to earn a Best Buy on the Budget Desktops chart. With a score of 219 on the PC WorldBench—4 percent below average for its processor class—the M200a is the slowest Pentium MMX-200 system we've tested yet. But at $2179, it's also about $500 less than the average Pentium MMX-200 price. ▶

TOP 20 BUDGET DESKTOPS

STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension P133v*	Pentium-133	16	256	2.1	Integrated S3 Trio64V+	2/EDO DRAM	15/14	.25	12X
2	Dell Dimension M200a*	Pentium MMX-200	16	256	2.1	integrated (S3)	2/DRAM	15/13.6	.28	12X
3	Micron Millennia LXA P166*	Pentium-166	16	512	2.5	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.5	.28	12X
4	IBM PC 350 (Pentium-166)*	Pentium-166	16	256	1.3	integrated S3 Trio64V+	2/EDO DRAM	15/13.7	.28	6X
5	Dell OptiPlex GS+ 200L	Pentium-166	32	256	2.1	integrated S3 Trio64V+	2/VRAM	15/14	.28	8X
6	Gateway 2000 G6-180	Pentium Pro-180	16	256	2.5	Matrox Mystique	2/SGRAM	15/13.9	.26	12X
7	Gateway 2000 P5-166	Pentium-166	16	256	2.5	ATI Rage 3D	2/SGRAM	17/15.9	.25	12X
8	HP Pavilion 5320	Pentium-150	16	256	1.6	integrated	2/EDO DRAM	15/13.8	.28	8X
9	Kingdom 6x86 P166+ Super Value	Cx6x86-P166+	16	256	2.1	PCI-60V	2/EDO DRAM	15/13.8	.28	16X
10	HP Vectra VE 5/133	Pentium-133	16	256	1.1	integrated SiS 6205	2/EDO DRAM	15/14	.28	8X
11	CyberMax Cyrix Max C3 P166+	Cx6x86-P166+	24	512	2.1	STB Lightspeed 128	4/MDRAM	15/13.8	.28	12X
12	Quantex OP6/200 SM-1	Pentium Pro-200	32	256	2.5	STB Lightspeed 128	2/MDRAM	17/16	.26	12X
13	DirectWave MVP P-133	Pentium-133	16	512	1.6	Diamond Stealth 3D 2000	4/EDO DRAM	17/14.3	.28	8X
14	Polywell Poly 500QX	AMD K5-PR166	32	512	2.5	Diamond Stealth 3D 2000	2/EDO RAM	15/13.8	.28	12X
15	Royal Computer P133 Triton II	Pentium-133	16	512	1.6	STB Lightspeed 128	2/MDRAM	15/13.9	.28	8X
16	Diamond Mid Tower P166	Cx6x86-P166+	16	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.9	.28	8X
17	CLR Infinity P-166 MMX	Pentium MMX-166	16	512	2.5	ATI Mach 64	2/EDO DRAM	17/15.8	.28	8X
18	Diamond Technologies P133	Pentium-133	16	512	2.1	Diamond 2000 Stealth 3D	2/EDO DRAM	15/13.9	.28	8X
19	USA Flex Family Special	Pentium-133	16	256	1.7	Expert Color 3D Accelerator	4/EDO DRAM	15/13.7	.27	8X
20	Quantex OP5/200 SM-3	Pentium MMX-200	32	512	3.2	Matrox Millennium	4/WRAM	17/16	.25	12X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Toll call.

Dell Dimension M200a

This Dimension offers some solid components for the money, such as a roomy 2.1GB hard drive, a 12X CD-ROM drive, a 33.6-kbps modem, and Microsoft Office Professional software. Unfortunately, the 15-inch LS monitor that came with our unit is not Dell's best: The picture isn't as sharp as we would like to see. For an additional $75, you can upgrade to a higher-quality 15-inch Trinitron.

Upgrades will be easy, though expandability is somewhat limited: To remove the chassis, simply turn the large thumbscrew on the left side of the case. Once inside, the way is clear to the one free DIMM socket, one free ISA slot and the three free PCI slots. The maximum amount of memory the system will hold is 64MB—a little low compared with most other PCs, but adequate for the average user. The interior also includes a large heat sink and a cooling fan.

Dell's documentation continues to be a model, complete with charts, illustrations, index, and glossary. If the troubleshooting guide can't help, the company provides 24-hours-a-day toll-free phone support that readers rate as tops in our fax-back survey.

If you want the latest technology at a reasonably affordable price, the Dimension M200a would make a good choice of machine.

3 MICRON MILLENNIA LXA P166

PRO: Fast, well built

CON: No modem, no software bundle

The Micron Millennia LXA P166 is slightly more expensive than its sibling, the Millennia LXA P133 that ranked number two on the Budget chart last month, but with a $50 price drop, the $1649 LXA P166 now has the better overall combination of speed, price, and features. If you want to pay a little less in exchange for a slightly slower system, it's still worth considering the $1599 LXA P133. Both are above-average performers in their processor classes.

Micron Millennia LXA P166

The LXA P166 is a solid system that includes almost everything you need, though

		EXPANDABILITY					CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
33.6	Creative Labs Vibra 16	minitower	64	512	1	3/1	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Sound Blaster 16 (OEM)	minitower	64	512	1	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Integrated Sound Blaster 16	minitower	128	512	2	3/1	6	3 [1]/1	24	Sat., Sun.	CIS, WWW
–	–	desktop	192	512	4	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16	compact	128	256	2	0/0	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Ensoniq Soundscape Vivo 90	tower	128	256	2	3/6	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Integrated	minitower	128	512	1	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Integrated Yamaha 16Bit	desktop	128	256	2	1/0	3	1/1	24 [2]	Sat., Sun.	AOL, BBS, CIS, WWW
–	Schubert 16Bit SRS 3D	tower	128	512	3	3/3	5	3/3	13	Sat.	WWW
–	Sound Blaster 32 PnP	desktop	192	256	4	1/1	3	3/3	11 [2]	–	AOL, BBS, CIS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	0	3/2	4	3/1	12	Sat.	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	256	0	2/1	3	3/1	24	Sat., Sun.	BBS, WWW
33.6	Sound Blaster AWE 32	minitower	256	512	2	3/0	3	3/3	11	Sat., Sun.	BBS, WWW
33.6	Supersound Origins	minitower	128	512	2	3/0	4	3/5	12	Sat.	BBS, WWW
33.6	ESS Audio Driver	minitower	512	512	4	3/1	5	1/lifetime	10	Sat.	BBS, WWW
33.6	3D Wavetable Sound	minitower	128	512	3	3/1	4	1/1	9	–	BBS, WWW
–	Sound Blaster 16 PNP	minitower	256	512	2	2/0	6	3/3	12	Sat.	WWW
33.6	Wavestar 32	desktop	128	512	3	3/0	4	1/1	9	–	BBS, WWW
33.6	proprietary 16-bit sound	minitower	128	512	2	3/1	4	3/3	24	Sat., Sun.	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	2	3/2	4	3/1	24	Sat., Sun.	BBS, WWW

at this price you don't get a modem or applications. The internal design of this minitower is spare, clean, and open, and the motherboard is easily accessible, so adding cards or upgrading memory is a snap. The machine also comes with plenty of available expansion slots, drive bays, and SIMM sockets. The included Diamond Stealth Multimedia 3D 2000 video card brims with a hefty 4MB of EDO DRAM, enough to give you high-resolution images in true color. The audio is good if not inspiring, with an integrated Sound Blaster 16 sound chip and fair-quality Advent 270 speakers. And the system's 2.5GB hard disk should be roomy enough for most users.

Besides 24-hours-a-day technical support, Micron offers a three-year parts and one-year labor warranty and a year of free on-site service. Lately, though, our readers report long hold times on the toll-free tech support line. But they continue to be satisfied with the reliability of Micron PCs. While the company still doesn't provide interactive on-screen help, the printed manuals are easy to read and contain plenty of diagrams.

IBM PC 350 (P-166)

4 IBM PC 350 (PENTIUM-166)

PRO: Networking tools, USB ports, infrared kit

CON: Subpar monitor

A $233 price drop helps this IBM PC 350 hold its Best Buy position. Network administrators will be especially pleased with the network features of this $1992 computer.

Although we didn't test them, the system comes with special software tools that allow network administrators to monitor and work on the system remotely. According to IBM, NetFinity can update software and track PC configurations across a network, while Wake-on-LAN lets administrators perform upgrades and take inventory when no one is in the office. Wake-on-LAN–enabled network cards do not come with the base system, however. Token ring and ethernet versions of the cards each cost $120 extra.

The IBM PC 350 comes with two Universal Serial Bus ports. USB allows you to daisy-chain several peripherals—from ▶

keyboards to printers—to a single high-speed port. (USB peripherals are expected later this year.) The system also has a special port in back for connecting an infrared receiver/transmitter. The optional infrared kit costs $79.

With a PC WorldBench score of 197, the PC 350 is an average Pentium-166 performer. Its 15-inch IBM G50 monitor is crisp and comes with great controls, but its colors seem a bit dark.

5 DELL OPTIPLEX GS+ 200L

PRO: Fast, built-in networking

CON: Limited expandability, no modem

A new system in the same line as the Dell OptiPlex GS+ 5200L (last month's fourth-place Budget Desktops Best Buy), the OptiPlex GS+ 200L has a slightly different configuration. With a Pentium-166 processor, 32MB of RAM, and a set of speakers, the new GS+ is better than the 5200L, which has a Pentium-200 CPU but just 16MB of RAM. The P-200 model performs a little faster and is still an excellent buy.

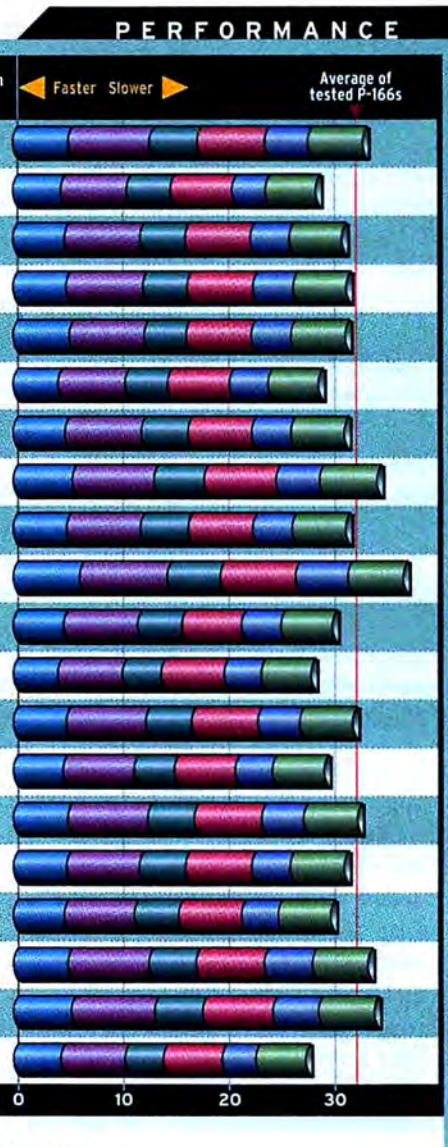
The slim $2098 GS+ 200L is the entry-level system in Dell's network-ready corporate desktop line. It's a good choice for the business buyer who needs a reliable, low-cost PC with a space-saving design and built-in connectivity.

Inside you'll notice Dell's usual attention to detail. The system is clean and ▶

TOP 20 BUDGET DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension P133v*	Pentium-133	16	256	188
2	Dell Dimension M200a*	Pentium MMX-200	16	256	219
3	Micron Millennia LXA P166*	Pentium-166	16	512	200
4	IBM PC 350 (Pentium-166)*	Pentium-166	16	256	197
5	Dell OptiPlex GS+ 200L*	Pentium-166	32	256	198
6	Gateway 2000 G6-180	Pentium Pro-180	16	256	218
7	Gateway 2000 P5-166	Pentium-166	16	256	199
8	HP Pavilion 5320	Pentium-150	16	256	180
9	Kingdom 6x86 P166+ Super Value	Cx6x86-P166+	16	256	197
10	HP Vectra VE 5/133	Pentium-133	16	256	166
11	CyberMax Cyrix Max C3 P166+	Cx6x86 - P166+	24	512	205
12	Quantex QP6/200 SM-1	Pentium Pro-200	32	256	224
13	DirectWave MVP P-133	Pentium-133	16	512	194
14	Polywell Poly 5000X	AMD K5-PR166	32	512	213
15	Royal Computer P133 Triton II	Pentium-133	16	512	191
16	Diamond Mid Tower P166	Cx6x86-P166+	16	512	199
17	CLR Infinity P-166 MMX	Pentium MMX-166	16	512	208
18	Diamond Technologies P133	Pentium-133	16	512	185
19	USA Flex Family Special	Pentium-133	16	256	181
20	Quantex QP5/200 SM-3	Pentium MMX-200	32	512	227

*Best Buy



HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

Joystick.

Joy, as in fun to drive. Stick, as in Dodge Stratus' available AutoStick® transmission.

AutoStick is an automatic transmission that can be shifted like a manual. But since AutoStick works without a clutch, you work less and play more. Drop Stratus' gear selector into AutoStick mode and you're in control. Push one way to upshift, the other way to downshift. Hold gears longer for better acceleration, use the engine for braking, or knock it down a gear to set up for that corner. In brief: enjoy.

Of course Stratus offers other good stuff to help keep the adrenaline level up. Like race-bred, modified double-wishbone suspension, the road-holding stability of cab-forward design and a 2.5 liter six-cylinder engine that is included on AutoStick-equipped models.

*That's a lot to like. In fact, Stratus is so likeable that in J.D. Power and Associates latest APEAL Study℠, Stratus tied as the "Most Appealing Entry Mid-Size Car."**

Stratus comes complete and ready to play. Joystick not required, but highly recommended.

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Stratus The New Dodge

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Dell OptiPlex GS+ 200L

easy to upgrade. On top of the processor is the largest heat sink that we've ever seen, but in this case bigger is better. A good heat sink is quieter than a fan, and this one doesn't hinder upgradability, as many do. The downside is that there are only two free add-in card slots and no open drive bays.

Video signals are generated by an integrated S3 Trio64V+ chip with 2MB of VRAM and pumped to a 15-inch Dell monitor that displays as good a picture as you'll find in that size. Our test PC arrived with a nice pair of Altec Lansing speakers and a Sound Blaster 16 sound card.

Dell continues to get the highest ranking for reliability and support in our reader fax-back surveys. It also offers a top-notch support policy with round-the-clock toll-free lines, free on-site service, and a 30-day money-back guarantee.

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/t20pcs).

8 HP PAVILION 5320

PRO: Generous software package, inexpensive; color-coded cables and ports ease setup

CON: Slow for a P-150, difficult to add RAM, can't use a free ISA slot

Hewlett-Packard's Pavilion 5320 is a sleepy home computer that's geared toward first-time buyers. With a PC WorldBench score of 180, it's the slowest Pentium-150 machine we've tested, performing more like an average Pentium-133. Nevertheless, if speed is not your main concern, you may be interested in this budget desktop's affordable price, decent components, and trendy software.

HP Pavilion 5320

The Pavilion 5320 comes with good components, including an 8X CD-ROM drive and a 33.6-kbps modem. The big selection of software will appeal to both kids (The Magic School Bus Explores the Solar System) and adults (Quicken SE and QuickBooks Pro). The 15-inch monitor is clear and has the curved design and attachable speakers that come with all HP home PCs. The 5320 doesn't have the flashy features of higher-end HP systems like the 7370V that earned a spot on our Power Desktops chart, but at $1848 it's also $1600 less than its more expensive sibling.

The color-coded cables and ports that Pavilions come with are great for novices who have never set up a computer before. But more experienced users may be disappointed with the desktop's interior design and the limited upgrade options. The Pavilion offers only one free external drive bay; no internal bays are open. To reach the two free SIMM sockets, you have to remove the graphics board and carefully maneuver around cables. The daughtercard in the motherboard provides three open slots (one PCI, two ISA), but the CPU's extra large heat sink prevents you from putting a card into the one of the ISA slots.

Support could also be better for a home system. The manuals are slick and comprehensive, with large illustrations, but some of HP's phone support policies are disappointing. Although tech support is around the clock, you'll be making a toll call. After the first three months you own the PC, you'll also have to pay $25 to resolve software problems. Technicians will answer your hardware questions for free, but only for a year. In our reader fax-back surveys, HP gets top ratings for reliability, while service is rated good.

14 POLYWELL POLY 500QX

PRO: Very fast, inexpensive, tidy interior, good software selection

CON: Substandard keyboard, blurry monitor

If the Polywell Poly 500QX is any indication of the success of AMD's new K5-PR166 chip, then Intel has some stiff competition. Although AMD expected its chip to perform like a Pentium-166, the Poly 500QX nips at the heels of some P-200 systems we've tested, including Dell's Dimension P200v. A few components are a little shoddy, but at $1698, it's not a bad starter PC, especially if you're looking for a multimedia machine.

Polywell Poly 500QX

The Polywell Poly 500QX comes with all the multimedia fixings: a fast modem, a 12X CD-ROM drive, and a set of decent speakers. Titles in the home-oriented software bundle range from Microsoft Works to The Magic School Bus. Our test system came with a good graphics card—Diamond's Stealth 3D 2000—but the 15-inch monitor was blurry. The Keytronic keyboard seems poorly constructed, with awkwardly sized keys: for example, <Backspace> is too small, and <Enter> is too large.

This putty-colored minitower has some interesting design lines—the power button sits on a convex, raised section of the chassis—but the interior is much more noteworthy, with plenty of room to navigate. Bundled cables don't interfere with the four free card slots and the two free SIMM sockets. A cooling fan provides a cross-breeze for the processor.

Polywell provides decent support. The documentation—which comes in a fancy black affair that looks like a Cadillac owner's manual—has both an index and a glossary, but doesn't cover basics like system setup. The three-year parts and five-year labor warranties are longer than average, and the technical support lines are toll free and open 12 hours a day during the week and 8 hours on Saturdays. ▶

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/t20pcsnaps).

- **Acer Power P200MMX**
- **Altura Pentium MMX-166**
- **CyberMax Intel Promax 3 P200 MMX**
- **Everex Explora 995-P-133**
- **Kingdom Pentium Pro 180**
- **National Microcomputer P200 MMX**
- **Packard Bell C115A**
- **Quantex QP5/200P p200MMX**
- **Vektron Corporate Station P-133**

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Model	CRT/Viewable	Max Resolution	Controls	ESP*
14S	14"/13.2"	1024 X 768	DIGITAL	$199
15B	15"/13.8"	1024 X 768	DIGITAL	$249
15Q+	15"/13.8"	1280 X 1024	DIGITAL ON SCREEN	$299
17MB	17"/15.8"	1024 X 768	DIGITAL	$379
17B+	17"/15.8"	1280 X 1024	DIGITAL ON SCREEN	$499

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PC WORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (3/7/97)	CPU	Comments
1	Dell Latitude LM M166ST 800/388-8542 www.dell.com	–	NEW	$3999	Pentium MMX-166	Fast; long battery life; average reliability rating, but good vendor support.
2	Dell Latitude XPi P133ST 800/388-8542 www.dell.com	2	Aug 96	$2999	Pentium-133	$100 price drop; no CD-ROM for this price, but good battery life and trackball.
3	WinBook LM 800/468-2162 www.winbook.com/	3	May 97	$3199	Pentium-133	Fast, good battery life; keyboard could be better.
4	Transmonde Vibrant 133T 888/988-2882 www.transmonde.com	–	NEW	$2999	Pentium-133	Fast, terrific battery life, interesting design; vendor support rated poor.
5	Micron TransPort MRX 888/634-8799 www.micron.com	4	Apr 97	$3477	Pentium-133	$330 price cut; 24-hour support, but only one-year labor warranty.
6	WinBook FX 800/468-2162 www.winbook.com/	5	May 97	$3599	Pentium-133	Sturdy notebook with comfortable keyboard; built-in modem; $200 off.
7	HP OmniBook 800CT 800/322-4772 www.hp.com/go/omnibook	8	Mar 97	$3240	Pentium-133	$180 price drop, but few peripherals.
8	AcerNote Nuovo 800/558-2237 www.acer.com/aac/	7	Apr 97	$3399	Pentium-133	Stylish; stupendous battery life, dim screen, just one year of free support.
9	Gateway 2000 Solo 2100 S5-150 800/846-2000 www.gw2K.com	–	Apr 97	$3999	Pentium MMX-150	$200 price drop; only one-year warranties; Solo 2200 also a good value.
10	Compaq Presario 1080 800/345-1518 www.compaq.com	–	NEW	$4499	Pentium MMX-166	Audiophiles will like this sleek portable; heavy, expensive.
	BUDGET NOTEBOOKS					
1	HP OmniBook 5500CS 800/322-4772 www.hp.com/go/omnibook	1	Jan 97	$1620	Pentium-100	$90 price drop; CD-ROM drive costs $315 extra.
2	WinBook XP5 Pro P120 800/468-2162 www.winbook.com/	–	NEW	$1899	Pentium-120	Sturdy, good value; comfortable keyboard; battery life could be better.
3	Compaq Armada 1130T 800/345-1518 www.compaq.com	2	Apr 97	$1999	Pentium-120	Bright screen, rugged design; sibling Armada 1120 also a good buy.
4	AcerNote Light Multimedia 373 800/733-2237 www.acer.com/aac/	5	Feb 97	$1999	Pentium-133	$200 off sleek notebook with 6X CD-ROM drive and long battery life.
5	Toshiba Satellite Pro 420CDS 800/457-7777 www.computers.toshiba.com	6	Sep 96	$1824	Pentium-100	Substantial $375 price cut; internal AC adapter; support quality a problem.
6	WinBook XP5 Pro P150 800/468-2162 www.winbook.com/	–	NEW	$2599	Pentium-150	Smaller screen than the P-120 and P-133 in this line, but still a good deal.
7	Samsung Sens Pro 500 800/933-4110 www.sosimple.com	8	Feb 97	$2199	Pentium-120	Big $500 price drop on system that covers the basics; good support policies.
8	CTX EzBook 720CS 800/888-9052 www.ctxintl.com	3	May 97	$1699	Pentium-120	Comes with game pad, headphones; low screen quality; support weaker.
9	Gateway 2000 Solo 2100 S5-120 800/846-2000 www.gw2K.com	4	Jan 97	$2299	Pentium-120	Fast, but has shortest battery life on chart; $100 price drop.
10	Mega Image Megabook 880 800/250-1876 www.megai.com	–	Feb 97	$1649	Pentium-100	$200 off brings this machine onto the chart, but it's slower than a P-75.

Best Buy See features chart, page 224; performance chart, page 226.

[1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available May 27).

THE 16 NEW NOTEBOOKS WE TESTED this month range from Dell's Latitude LM M166ST, an MMX portable that wins a Best Buy, to Acom's Patriot 8800 P79R, which missed the chart but looks like something you'd see on *Star Trek*. Our favorite of those that didn't rank? The IBM ThinkPad 560. Its steep $4199 price kept it from placing, but its 1.5-inch profile and light 5.6-pound traveling weight are great for on-the-go business people. To read up on these and other notebooks that didn't make the chart, check out the reviews on PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/ rating	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Fax reprint number [2]	Reader service number
85	212/outstanding	average	average	very good	above average/good	5:52/very good	heavy	–	709
84	166/good	inexpensive	average	good	above average/good	5:20/very good	average	3771	710
83	182/good	inexpensive	average	very good	average/fair	5:46/very good	heavy	3831	711
83	190/very good	inexpensive	average	outstanding	below average/poor	6:19/outstanding	very heavy	–	712
83	187/very good	average	average [3]	very good	[4]/fair	5:46/very good	heavy	3816	713
82	188/very good	average	average	very good	average/fair	4:15/good	heavy	3832	714
82	168/good	inexpensive	average [3]	good	[4]/fair	4:07/good	light	3811	715
81	166/good	average	average [3]	good	[4]/fair	11:40/outstanding	heavy	3817	716
81	199/very good	average	average	outstanding	below average/fair	3:12/good	heavy	3815	717
81	197/very good	expensive	average	good	above average/good	5:02/very good	heavy	–	718
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent		
83	152/very good	inexpensive	average [3]	good	[4]/fair	4:00/good	average	3807	719
80	169/very good	average	average	good	average/fair	2:58/good	heavy	–	720
80	140/good	average	average	good	above average/good	3:57/good	average	3820	721
79	142/good	average	average [3]	satisfactory	[4]/fair	5:01/very good	average	3828	722
79	142/good	average	average	good	below average/good	4:02/good	heavy	3771	723
78	183/outstanding	expensive	average	very good	average/fair	3:24/good	average	–	724
78	152/very good	average	[4]	good	[4]/good	4:52/very good	average	3829	725
77	167/very good	inexpensive	[4]	satisfactory	[4]/poor	4:28/good	heavy	3833	726
76	171/very good	average	average	good	below average/fair	2:15/satisfactory	average	3805	727
76	87/poor	inexpensive	[4]	satisfactory	[4]/fair	2:47/satisfactory	average	–	728
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	All products:	910

[1] Limited data; score is based on responses for this company and average of all companies. [4] Insufficient data.

POWER NOTEBOOKS

This Month's Best Buys

1 DELL LATITUDE LM M166ST

PRO: Blazing speed, big bright screen

CON: Heavy, no modem

The first MMX notebook we've seen from Dell, and a new Best Buy, the Latitude LM M166ST is aimed at business users who want a quality machine outside the office. Packing a Pentium MMX-166 chip, a whopping 40MB of RAM, and a generous 2.1GB of storage, this powerful notebook earned an impressive PC WorldBench test score of 212—faster than some of the desktop MMX-166 systems we've tested. The price for all this power: a reasonable $3999.

Dell Latitude LM M166ST

Seasoned travelers may pause at the Latitude's hefty 9.2 pounds—a weight that includes a credit-card–size AC adapter and a removable 10X CD-ROM drive. But battery life is good. In ▶

TOP 20 NOTEBOOK PCs

STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude LM M166ST*	Pentium MMX-166	9.2	40	2160	active	12.1	800x600	65,536	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800x600	256	lithium ion	trackball
3	WinBook LM	Pentium-133	8.6	16	1083	active	12.1	800x600	65,536	lithium ion	touchpad
4	Transmonde Vibrant 133T	Pentium-133	10.4	32	1440	active	12.1	800x600	65,536	NiMH	touchpad
5	Micron TransPort MRX	Pentium-133	9.2	32	1400	active	11.3	800x600	65,536	lithium ion	eraserhead & touchpad
6	WinBook FX	Pentium-133	9.4	32	2167	active	12.1	800x600	65,536	lithium ion	eraserhead
7	HP OmniBook 800CT	Pentium-133	6.6	16	1440	active	10.4	800x600	256	lithium ion	mouse
8	AcerNote Nuovo	Pentium-133	10	16	1400	active	11.8	800x600	65,536	lithium ion	touchpad
9	Gateway 2000 Solo 2100 S5-150	Pentium MMX-150	8.8	40	1300	active	12.1	800x600	65,536	lithium ion	touchpad
10	Compaq Presario 1080	Pentium MMX-166	8.8	16	1440	active	12.1	800x600	65,536	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	HP OmniBook 5500CS*	Pentium-100	8	16	1358	dual-scan	11.3	800x600	65,536	lithium ion	eraserhead
2	WinBook XP5 Pro P120*	Pentium-120	8.8	16	1400	dual-scan	12.1	800x600	256	lithium ion	eraserhead
3	Compaq Armada 1130T	Pentium-120	7.5	16	1080	active	10.4	800x600	256	NiMh	trackball
4	AcerNote Light Multimedia 373	Pentium-133	7.6	16	1300	dual-scan	11.3	800x600	65,536	lithium ion	touchpad
5	Toshiba Satellite Pro 420CDS	Pentium-100	8.8	16	772	dual-scan	11.3	800x600	65,536	lithium ion	eraserhead
6	WinBook XP5 Pro P150	Pentium-150	8.4	16	1083	active	11.3	800x600	256	lithium ion	eraserhead
7	Samsung Sens Pro 500	Pentium-120	8	16	1440	active	12.1	800x600	65,536	NiMH	touchpad
8	CTX EzBook 720CS	Pentium-120	9.8	16	1084	dual-scan	12.1	800x600	65,536	NiMh	touchpad
9	Gateway 2000 Solo 2100 S5-120	Pentium-120	8.2	16	810	dual-scan	11.3	800x600	256	NiMH	touchpad
10	Mega Image Megabook 880	Pentium-100	7.6	16	1358	active	10.3	800x600	65,536	NiMH	trackball

*Best Buy ● Yes ○ No [1]Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

our tests, the lithium ion battery lasted nearly 6 hours. The keyboard is comfortable and quiet, though touch typists may dislike the tiny <Backspace> key and short spacebar. Moving the pointer on the screen with the touchpad is hassle-free, and the mouse buttons have just the right amount of click. Text is sharp and graphics are brilliant on the 12.1-inch active-matrix screen. There's no modem.

Dell's support policies are good: Besides round-the-clock phone support, the company covers parts for three years and labor for one. Readers responding to our monthly fax-back survey give good marks for service. Dell's documentation is also clear and helpful.

2 DELL LATITUDE XPI P133ST

PRO: Excellent battery life, large screen

CON: No internal CD-ROM drive option, cramped keyboard, somewhat reckless trackball

If you don't need a CD-ROM drive in your power notebook, then the $2999 Dell Latitude XPi P133ST is your best choice. It's slower than the Latitude LM M166ST, its top-ranking speedster sibling, but its PC WorldBench score of 166 is better than average for a Pentium-133. The XPi's 5.3-hour battery life is very good—though a little shorter than that of the LM—and at 7.2 pounds, it's 2 pounds lighter.

Dell Latitude XPi P133ST

The XPi's NeoMagic video chip has a fast 128-bit core and 1MB of video DRAM to accelerate display. The crisp 11.3-inch active-matrix screen has a maximum 800 by 600 resolution, which is typical of today's power notebooks. The Latitude XPi is sturdy, but its keyboard is a little cramped for big hands. The trackball is a bit unruly, but not too much so. Bundled software includes Traveling Software's LapLink, a file transfer program, and Starfish's Sidekick 95, a personal information manager. Support policies for this unit are a little better than those offered with the Latitude LM.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
10X	–	72	1	●	○	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	28.8	40	1	●	●	●	1/1	13	Sat. only	BBS, WWW
6X	33.6	64	1	○	○	●	1/1	11	–	WWW
8X	33.6	48	2	●	○	●	3/1	24	Sat., Sun.	CIS, WWW
8X	33.6	40	1	●	●	●	1/1	13	Sat. only	BBS, WWW
–	–	48	0	○	●	●	3/3	12	–	AOL, BBS, CIS, WWW
6X	28.8	64	0	○	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
8X	33.6	40	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
10X	33.6	48	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	64	1	●	●	●	3/3	12	–	AOL, BBS, CIS, WWW
8X	–	40	1	●	●	●	1/1	13	Sat. only	BBS, WWW
–	–	48	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	33.6	64	0	○	○	○	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	–	40	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
8X	28.8	40	1	●	●	●	1/1	13	Sat. only	BBS, WWW
6X	–	80	0	○	○	●	3/3	24	Sat., Sun.	BBS
6X	–	72	2	●	●	●	1/1	9	Sat., Sun.	WWW
8X	–	40	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	0	○	●	●	1/1	24	Sat., Sun.	WWW

New This Month

The following PCs made our Power Notebooks chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

4 TRANSMONDE VIBRANT 133T

PRO: Long battery life; very fast

CON: Poor service policies; heavy

The $2999 Transmonde Vibrant is like the Energizer bunny: With a battery life of more than 6 hours in our tests, it just keeps going. You do have to use two batteries to get that result, but the second battery comes standard. This Pentium-133 notebook is also fast: Its PC WorldBench score of 190 is only a little under the average speed of a Pentium-166 desktop.

The Vibrant is comfortably packed with features like 32MB of RAM, a 6X CD-ROM drive that swaps places with the floppy, and a built-in 33.6-kbps modem for e-mail and the Internet.

Transmonde Vibrant 133T

The design of the Vibrant is appealing and thoughtful: The second battery pack attaches to the underside of the case and acts as a prop that holds the notebook up on a diagonal. With the keyboard on this slant, typing is very comfortable, though the spacebar is too short for true touch typists. The touchpad is a little jumpy, and the mouse buttons are extremely small. The display is clear but doesn't have consistent brightness.

The biggest downside of this notebook is Transmonde's service and support. For starters, the system's on-screen support mirrors the manual's sparse information. Technical support is available for only 11 hours on weekdays, none on weekends. In our fax-back surveys, readers rate reliability as average and service as below average. But if you're willing to risk poor service, this notebook's long battery life and good performance make it a worthwhile purchase. ▶

10 COMPAQ PRESARIO 1080

PRO: Holds floppy and CD-ROM drives simultaneously; excellent sound and video quality

CON: Pricey; poor keyboard, heavy

A notebook that's targeted at home users, the $4499 Compaq Presario 1080 is a pick-up-and-go portable with both a 10X CD-ROM drive and floppy built in. A sleek, gray, futuristic-looking machine with great multimedia, the 1080 could easily double as a very expensive boom box. With a PC WorldBench score of 197, it's also fast–but its performance is a little under average for a Pentium MMX-166 notebook. And with built-in components, the Presario weighs a hefty 8.8 pounds. Nevertheless, with perks like a battery that lasts 5 hours in our tests, this Presario lands a place on our chart.

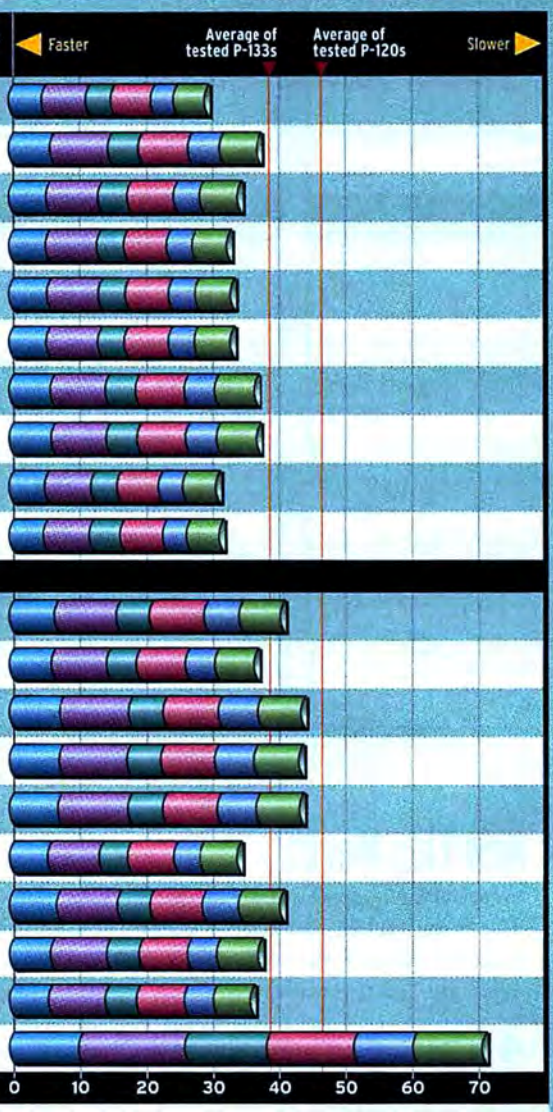
Compaq Presario 1080

The Presario has most of the features you'll need in a notebook. The crisp 12.1-inch active-matrix color screen looks great, and the touchpad is easy to control. The keyboard could be better: The keys feel mushy, and the spacebar is a little on the small side. The internal 33.6-kbps ▶

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM M166ST*	Pentium MMX-166	40	256	212
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	WinBook LM	Pentium-133	16	256	182
4	Transmonde Vibrant 133T	Pentium-133	32	256	190
5	Micron Millennia TransPort MRX	Pentium-133	32	256	187
6	WinBook FX	Pentium-133	32	256	188
7	HP OmniBook 800CT	Pentium-133	16	256	168
8	AcerNote Nuovo	Pentium-133	16	256	166
9	Gateway 2000 Solo 2100 S5-150	Pentium MMX-150	40	256	199
10	Compaq Presario 1080	Pentium MMX-166	16	256	197
	BUDGET NOTEBOOKS				
1	HP OmniBook 5500CS*	Pentium-100	16	256	152
2	WinBook XP5 Pro P120*	Pentium-120	16	256	169
3	Compaq Armada 1130T	Pentium-120	16	–	140
4	AcerNote Light Multimedia 373	Pentium-133	16	–	142
5	Toshiba Satellite Pro 420CDS	Pentium-100	16	–	142
6	WinBook XP5 Pro P150	Pentium-150	16	256	183
7	Samsung Sens Pro 500	Pentium-120	16	256	152
8	CTX EzBook 720CS	Pentium-120	16	256	167
9	Gateway 2000 Solo 2100 S5-120	Pentium-120	16	256	171
10	Mega Image Megabook 880	Pentium-100	16	–	87

*Best Buy



HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

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*10/31/96 evaluation by Ron Jarmuth, Chief Automation Technology Branch, HQDA–IMCEN, Pentagon Automation Technology Branch. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Company. All rights reserved. Kingston is a registered trademark and Computing Without Limits and TurboChip are trademarks of Kingston Technology Company. Windows NT is a registered trademark of Microsoft Corporation.

Circle 128 on reader service card

modem has a second phone jack so you can attach your phone through it for auto-dialing from your computer. On the back, Compaq spares us the trouble of flimsy port covers, omitting them entirely. Most unusual for a laptop, the Presario has a generous software bundle, including home and office titles.

When you close the cover, you still have access to the audio-CD control buttons at the front of the keyboard. The high-quality speakers are on the outside, too, so the notebook can serve as a stereo when you're not using it for computing.

Compaq offers a one-year parts and labor warranty and round-the-clock toll-free tech support. Its service gets a thumbs-up in our reader fax-back surveys, but reliability is rated as only average.

BUDGET NOTEBOOKS

This Month's Best Buys

1 HP OMNIBOOK 5500CS

PRO: High-speed infrared port, very good documentation, great price

CON: Dual-scan screen somewhat washed out

With a price drop of $90—down to $1620—the OmniBook holds its position as our top budget notebook Best Buy for the second month in a row. With a combination of speed and low price, this portable offers buyers an excellent deal.

HP OmniBook 5500CS

The 5500CS is the fastest P-100 notebook we've tested. With a PC WorldBench score of 152, it's 7 percent faster than the next P-100 on our charts, the Toshiba Satellite Pro 420CDS. The OmniBook is also relatively long-winded: It lasted for 4 hours in our battery-life tests. Additionally, you'll find some higher-end perks, such as an infrared port and a video port that lets you use a TV screen as a monitor.

The price doesn't include a CD-ROM drive (a 10X drive is $315). The screen quality isn't as good as we would have liked: As with many dual-scan displays, we had a tough time finding the cursor.

HP lacks weekend support, and the weekday toll-free support is available just 12 hours daily, but the warranty covers both parts and labor for three years. In our fax-back data, HP's reliability rating is average, and its service is rated fair.

2 WINBOOK XP5 PRO P120

PRO: Outstanding keyboard, good price, very good performance

CON: Heavy; average reliability and support

This $1899 entry-level model in WinBook's new line of multimedia portables is a great value. Its PC WorldBench score of 169 places it in excellent company—it outscores many P-133s we've tested. It should be a hit with cost-conscious users.

The notebook's physical design tops the list of pluses. The full-size keyboard spells an end to cramped fingers and typos, as does the eraserhead pointing device, which neatly avoids the inadvertent cursor-repositioning-while-typing conundrum so common to the touchpad. (Touchpad aficionados can still have one installed as an option for $80.) Our test model's 12.1-inch screen was clearer than that of many other dual scans. Unlike its higher-end P150 sibling, the P120 does not include a modem.

WinBook XP5 Pro P150

This WinBook's case is also well designed. Port covers are sturdier than most we see. You can replace the removable floppy drive with the 8X CD-ROM module or with an optional $259 second battery. Despite the cost, the latter is something you may well want to consider, given the somewhat disappointing battery life of just under 3 hours per charge in our tests. Keep in mind, though, that the second battery will add more weight to the unit's already heavy 8.8 pounds.

WinBook XP5 Pro P120

WinBook offers one-year parts and one-year labor warranties and lifetime toll-free tech support. However, phone support is available for only 13 hours a day, and not at all on Sundays.

New This Month

The following PC made our Budget Notebooks chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 WINBOOK XP5 PRO P150

PRO: Great keyboard, multimedia-ready

CON: Average reliability and support

Like its P-120 sibling, the WinBook XP5 Pro 150 offers good value. Its $2599 price is the best we've seen for a P-150 laptop, and its PC WorldBench score of 183 is well over average for its processor class.

As with the P-120 XP5, you can replace the floppy drive with either an 8X CD-ROM drive or an optional $259 second battery. That second battery would double the so-so 3.5-hour battery life.

At 11.3 inches, the P-150's active-matrix color screen is smaller than its P-120 cousin, though the quality is excellent. The keyboard is comfortable and full size. We like the eraserhead pointing device, but you can elect to install a touchpad. The WinBook comes with a 28.8-kbps PC Card modem.

The cogent system manual includes easy-to-follow sections on power management, upgrading, system configurations, and maintenance. This WinBook also comes with the same support as its sibling: one-year parts and labor warranties and lifetime toll-free tech support. ■

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Notebook PCs chart. For write-ups, see PC World Online (www.pcworld.com/t20pcsnaps).

- Acom Patriot 8800 P79R
- CTX EzBook P-133
- DFI 6620 Multimedia Notebook
- Digital HiNote VP TS30G
- Fujitsu 635T LifeBook
- Hitachi MX-Note P-166 MMX
- Hitachi Series E-133T
- IBM ThinkPad 560
- Jetta Jetbook 5026
- Olivetti Echos Pro 150 S
- Texas Instruments Extensa 900CDT

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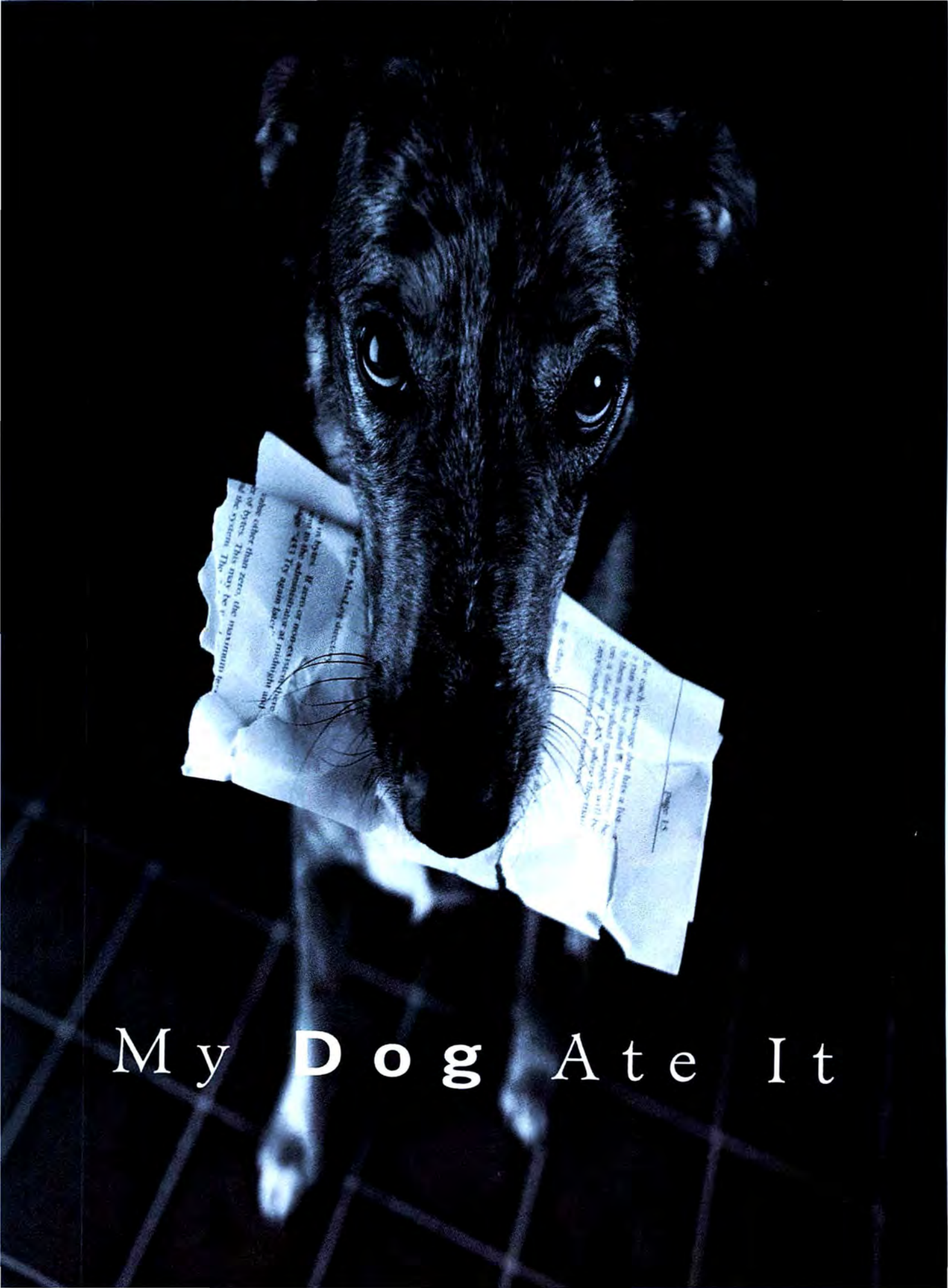

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Circle 100 on reader service card

Win a CyberMax Cyrix Max C3 P166+

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a CyberMax Cyrix Max C3 P166+, a Cyrix 6x86-P166+ PC in this month's Top 20. Send in a separate copy of the survey for each of your PCs.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 6-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by June 30.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
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How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer	○ Diamond	○ Hyundai	○ Packard Bell	○ Tangent
○ Acma	○ Digital (DEC)	○ IBM	○ Panasonic	○ Texas Instruments
○ ALR	○ DTK	○ Insight	○ PerComp	○ Toshiba
○ Apple	○ EPS	○ Intelesys	○ Pionex	○ Twinhead
○ AST	○ Epson	○ Leading Edge	○ Polywell	○ Unisys
○ Austin (IPC)	○ Everex	○ Micro Express	○ Quantex	○ USA Flex
○ Compaq	○ Fujitsu	○ Micron	○ Robotech	○ Vektron
○ Compudyne	○ Future Tech	○ Midwest Micro	○ Samsung	○ WinBook
○ Comtrade	○ Gateway 2000	○ MIS	○ Sharp	○ Xi
○ CTX	○ Hewlett-Packard	○ Nat'l Micro	○ Sony	○ Zenith (ZDS)
○ CyberMax	○ HiQ	○ NCR	○ Swan	○ Zenon
○ Dell	○ Hitachi	○ NEC	○ Sys Tech.	○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ Pentium Pro
○ 80486
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1-2 weeks
○ 3-4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec ○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Answer for the most recent problem—*other than DOA*—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec ○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

How long after you purchased your PC did the problem occur?
○ Less than 1 month ○ 1-3 months ○ 4-6 months ○ 7-12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Wrong configuration ○ Device conflicts ○ Other
○ Incorrectly installed software ○ Faulty peripheral ○ OS problem ○ Don't know

If a component failed, which one was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1-2 minutes ○ 3-5 minutes ○ 6-10 minutes ○ 11-20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes-1 hour ○ 2-5 hours ○ 6-10 hours ○ 11-24 hours ○ 1½-2 days ○ 3-5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1-2 days ○ 3-7 days ○ 8-14 days ○ 15-30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was it resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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G6-266XL

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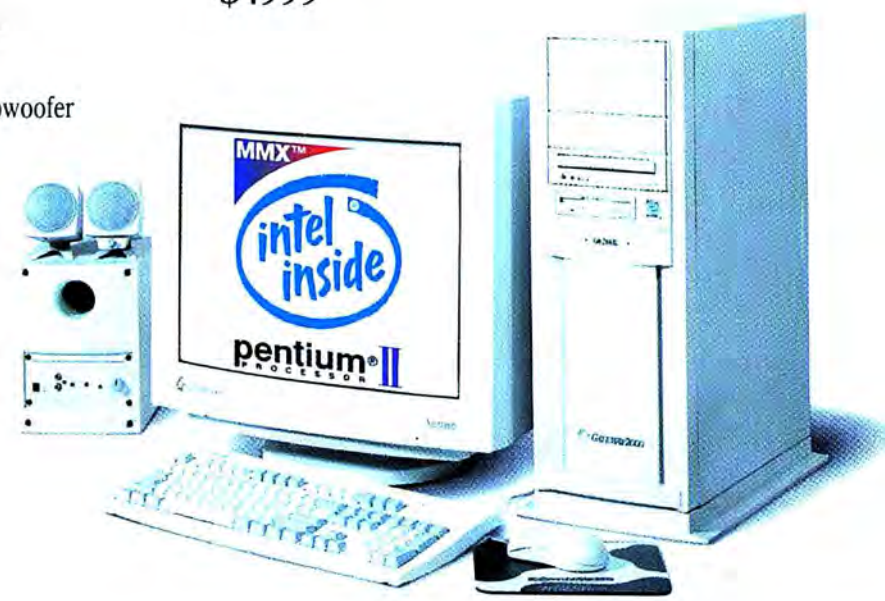

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PC WORLD

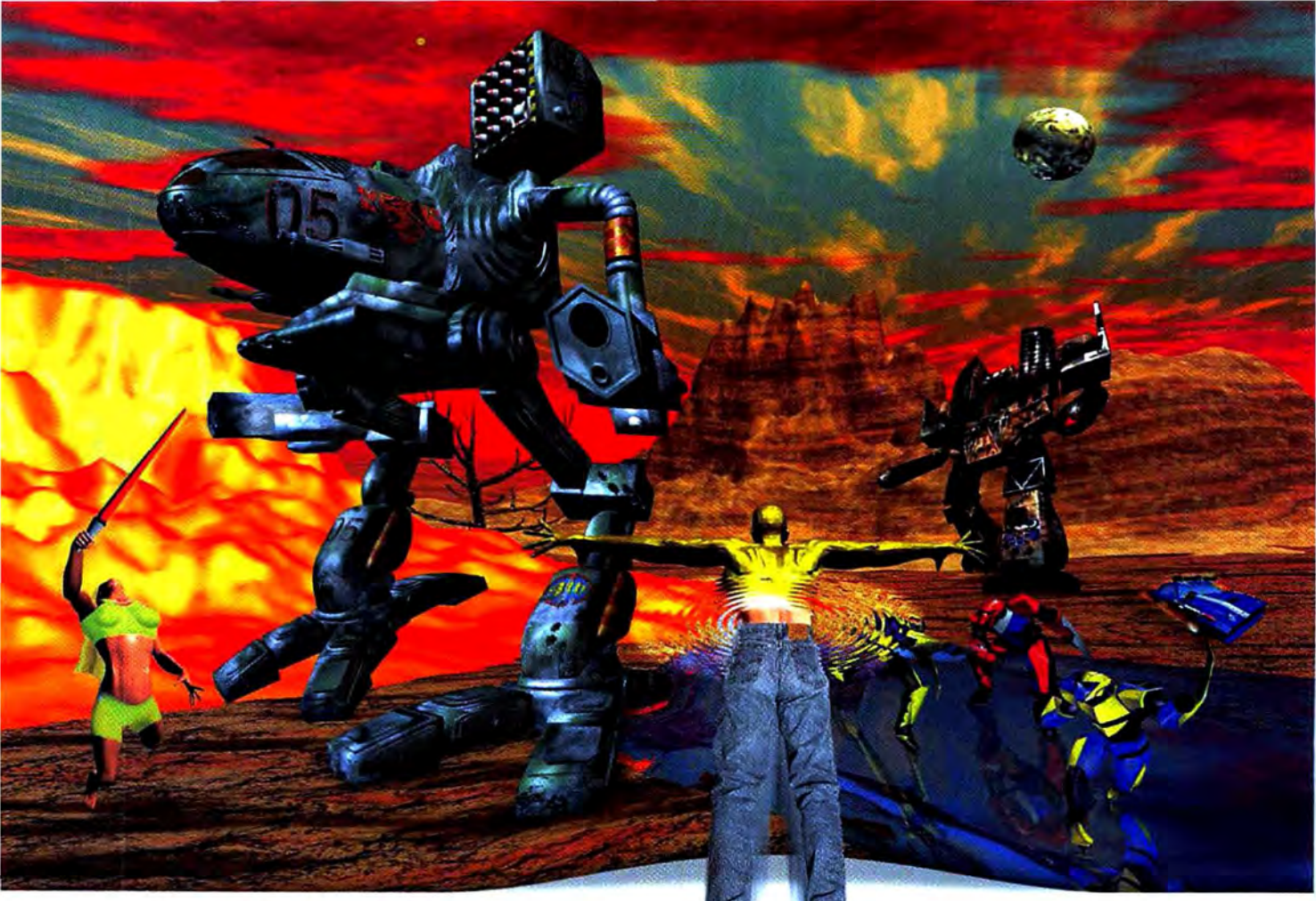
TOP 10 PRINTERS

	MONOCHROME PERSONAL PRINTERS	Month tested	Street price (2/7/97)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	Brother HL-720 800/827-6843 www.brother.com	retested this month	$350	80	5.5	2.6	**FEATURES:** 6-ppm laser. Standard 512K of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 100 output. **PRO/CON:** Low price; fast performance; good print quality; 200-sheet input tray beats all on chart except NEC SuperScript 860's. Output tray takes up a lot of space.	610
2	HP LaserJet 5L Xtra 800/752-0900 www.hp.com	retested this month	$399	80	3.8	2.4	**FEATURES:** 4-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 100 sheets input, 100 output. **PRO/CON:** Compact and easy to use, with excellent print quality and paper handling, plus a good bundle of business-minded software. Slowest text speed on chart.	611
3	NEC SuperScript 660plus 800/632-4636 www.nec.com	retested this month	$349	79	5.1	2.5	**FEATURES:** 6-ppm laser. Standard 256K of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO/CON:** Low price; good print quality and speed; includes parallel cable and two-year warranty. Paper trays are flimsy; two-piece toner cartridge is hard to install.	612
4	NEC SuperScript 860 800/632-4636 www.nec.com	retested this month	$449	78	7	2.4	**FEATURES:** 8-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 50 output. **PRO/CON:** Blistering text speed; easy controls for creating booklets and more; two-year warranty. Pricey; gray-scale graphics are blotchy; pages collate in reverse order.	613
5	Panasonic KX-P6500 800/742-8086 www.panasonic.com	retested this month	$449	75	5.6	2.3	**FEATURES:** 6-ppm laser. Standard 512K of RAM, 2400-by-600-dpi maximum resolution, 100 sheets input, 50 output. **PRO/CON:** Text and gray-scale print quality are very good, thanks to the 2400-dpi resolution enhancement; tower design saves space. Street price is high; on-screen help lacks detail.	614
	COLOR PERSONAL PRINTERS							
1	Epson Stylus Color 600 800/463-7766 www.epson.com	NEW	$299	82	2	0.6	**FEATURES:** 6-ppm monochrome/4-ppm color ink jet. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. Similar $229 Stylus Color 400 is just 720 dpi. **PRO/CON:** Near-photo quality without special inks; easy installation; two-year warranty. Mediocre text quality on plain paper.	–
2	HP DeskJet 694C 800/752-0900 www.hp.com	NEW	$299	80	2.2	0.3	**FEATURES:** 3-ppm monochrome/0.8-ppm color ink jet. 600-by-600-dpi maximum resolution, 100 sheets input, 50 output. The DeskJet 692C is identical. **PRO/CON:** Easy to use; prints well on plain paper; includes home and small-office applications. Printing photos requires special ink and paper.	615
3	Canon BJC-4200 Photo 800/848-4123 www.ccsi.canon.com	NEW	$299	79	1.4	0.3	**FEATURES:** 5-ppm monochrome/1-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input, 100 output. The $279 BJC-4200 lacks photo kit. **PRO/CON:** Bountiful software. Needs special paper and ink to print realistic photos; no manual feed slot; slowest printer on chart.	616
4	Epson Stylus Color 800 800/463-7766 www.epson.com	NEW	$449	78	3.7	0.7	**FEATURES:** 8-ppm monochrome/7-ppm color ink jet. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **PRO/CON:** Two-year warranty; network and PostScript options; very fast at 360 dpi. 1440-dpi printing is much slower; most expensive color printer on chart.	–
5	HP DeskJet 820Cse 800/752-0900 www.hp.com	retested this month	$399	77	4	0.3	**FEATURES:** 5-ppm monochrome/1.5-ppm color ink jet. 600-by-600-dpi maximum resolution, 150 sheets input, 50 output. **PRO/CON:** Near-laser text quality and speed; easy to use; includes Microsoft's excellent Publisher 97 desktop publishing app. Color graphics look fine except for photos.	617

Best Buy For expanded reviews, visit www.pcworld.com/t10printers. Windows 95-certified Plug and Play All products: 902

HOW WE TEST The overall rating for both monochrome and color personal printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

NEW PRINTERS, new tests, and updated ratings have changed the Top 10 chart this month. Check out "Personal Printers: Good, Cheap Color" on page 185 for full details. We retested 16 current printers as well as testing five new color models from Canon, Epson, and Hewlett-Packard. The Brother HL-720 and the HP LaserJet 5L Xtra tie for our monochrome Best Buy. Epson's new Stylus Color 600 earns the color printer Best Buy. ■



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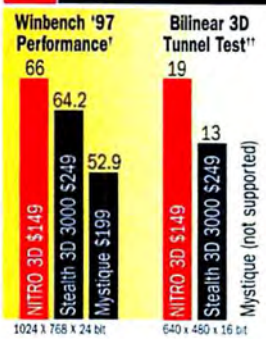

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Copyright 1997 STB Systems, Inc. All rights reserved. All trade names referenced are the trademarks, service marks or registered trademarks of their respective holders. Mechwarrior® 2 image © 1996 FASA Corporation. †WinBench 97 1.0 tests conducted on a Gateway P5-200 MMX, PCI 2.0 Bus, 512K cache, 32MB SDRAM, 1024 x 768 x 24 bit, at 75Hz refresh without GDI bypass as required for Microsoft certification. Memory and driver versions: STB Nitro 3D*(4 MB) 1.50G 2/26/97, Diamond Stealth 3D 3000 (4MB) 4.04.00.2104 12/10/96, and Matrox Mystique (4MB) 3.30 1/30/97. ††Single pass bilinear filtering tunnel 3D test. Prices and specifications subject to change without notice. *Price for 2 MB after introductory rebate. **Software shown included with 4MB model. 2MB includes Mechwarrior2: Mercenaries and Hyperblade.

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TOP 10 MONITORS

	15-INCH MONITORS	Last reviewed	Street price (3/24/97)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	**Dell UltraScan 800HS** 800/289-3355 www.dell.com	Feb 97	$399	83	excellent/ excellent	**FEATURES:** 13.7-inch viewable screen, .25mm Trinitron tube, up to 110-Hz refresh rate [1], Level 2ab Plug and Play ready [2], 24-hour daily toll-free support. **PRO/CON:** Low price, terrific text and graphics detail, easy-to-use on-screen gauges; brief one-year warranty, very faint line across screen.	662
2	**Nokia Multigraph 449Xa** 800/296-6542 www.nokia.com	NEW	$399	82	very good/ very good	**FEATURES:** 13.8-inch viewable screen, .25mm Diamondtron tube, up to 80-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 12-hour weekday toll-free technical support. **PRO/CON:** Very sharp text and graphics, built-in speakers, extensive on-screen controls, color-adjustment software, TCO'95 compliant; expensive.	664
3	Hitachi SuperScan Pro 500 800/536-6721 www.nsa-hitachi.com	Apr 97	$349	81	very good/ very good	**FEATURES:** 13.6-inch viewable screen, .28mm dot-pitch tube, up to 85-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 8-hour daily toll-free technical support. **PRO/CON:** $20 price drop, very crisp text detail, accurate color graphics; small screen size, tedious button pressing to navigate on-screen menus.	663
4	Samsung SyncMaster 15GLi 800/933-4110 www.sosimple.com	Oct 95	$379	80	very good/ good	**FEATURES:** 13.6-inch viewable screen, .28mm dot-pitch tube, up to 100-Hz refresh rate [1], Level 2b PnP ready [2], color calibration software, three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Low price, very sharp text, bright graphics, extensive on-screen menus, easy to adjust; small viewable screen.	665
5	ViewSonic 15GS 800/888-8583 www.viewsonic.com	Feb 97	$355	79	good/ very good	**FEATURES:** 13.8-inch viewable screen, .28mm dot-pitch tube, up to 108-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty on parts and labor, 11-hour weekday toll-free support. **PRO/CON:** $44 price cut, very crisp graphics, TCO'92 compliant; controls require repetitive button pressing, no image tilt control.	666
6	MAG InnoVision DX15T 800/827-3998 www.maginnovision.com	Aug 96	$359	79	very good/ very good	**FEATURES:** 13.9-inch viewable screen, .25mm Trinitron tube, up to 85-Hz refresh rate [1], Level 2b PnP ready [2], limited three-year warranty. **PRO/CON:** $10 price drop, text and spreadsheet cells are easy to read, realistic color graphics; navigating on-screen menus requires too much button pushing, faint line across screen.	667
7	Panasonic PanaSync/Pro P15 800/742-8086 www.panasonic.com	NEW	$399	79	very good/ very good	**FEATURES:** 14-inch viewable screen, .27mm dot-pitch tube, up to 75-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Fine text and color graphics are very detailed, big screen, easy-to-adjust on-screen controls; lacks a tilt control to make a crooked picture level.	668
8	Panasonic PanaMedia PM 15 800/742-8086 www.panasonic.com	June 96	$399	79	very good/ good	**FEATURES:** 14-inch viewable screen, .27mm dot-pitch tube, up to 107-Hz refresh rate [1], Level 2b PnP ready [2], speakers and mike, three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Low price, big screen, very sharp text, ample on-screen controls; easy-to-adjust screen is a little less bright in the corners.	669
9	Sony CPD-100VS 800/476-6972 www.sony.com/pc	Feb 97	$519	78	excellent/ excellent	**FEATURES:** 13.8-inch viewable screen; .25mm Trinitron tube; up to 85-Hz refresh rate [1]; Level 2b PnP ready [2]; built-in speakers, subwoofer, and microphone; 24-hour daily toll-free support. **PRO/CON:** $10 price drop, great text and graphics detail, boombox sound quality, easy to adjust; one-year warranty, expensive.	670
10	CLR VisionPro 15 800/611-1555 www.clrusa.com	Apr 97	$330	78	very good/ good	**FEATURES:** 13.6-inch viewable screen, .28mm dot-pitch tube, up to 75-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty. **PRO/CON:** Lowest price on chart, text and Web pages are easy to read, bright graphics, ample on-screen menus; finding menu items requires tedious button pushing, small viewable screen.	671

Best Buy — For expanded reviews, visit www.pcworld.com/t10monitors. — All products: 907

[1] Highest refresh rate at 800 by 600 resolution. [2] Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally; Level 2ab uses Access.bus to enhance synchronization. However, Windows 95 doesn't fully utilize monitor Plug and Play.

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, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), 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.

DELL stays on top this month, but a new second-place Best Buy, the $399 Nokia Multigraph 449Xa, nudges the Hitachi down to third. Another newcomer is the $399 Panasonic PanaSync/Pro P15, in seventh. Like the Nokia, the Panasonic's monitor displays complex spreadsheets, Web pages, and scanned photos in very good detail. But for the same price, the Nokia is a better deal: You get built-in speakers that sound good and more on-screen controls. ■

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TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (3/25/97)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	**Hercules Terminator 3D/DX** 800/532-0600 www.hercules.com	NEW	$149	104	189 very good	**FEATURES:** 4MB of EDO DRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Xing MPEG software, S3 Virge/DX chip. **PRO/CON:** 2-D and 3-D graphics improved over Terminator 3D, excellent MPEG playback, good software; AVI playback is mediocre.	636
2	**Matrox Mystique** 800/361-1408 www.matrox.com/mga	May 97	$149	102	185 very good	**FEATURES:** 4MB of SGRAM, 130-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Compcore MPEG software, bundled games, MGA-1064SG chip. **PRO/CON:** $40 price drop, best 3-D on chart, good AVI and MPEG video playback, 2MB version also good; refresh rates hard to set.	637
3	**Diamond Stealth 3D 3000XL** 800/468-5846 www.diamondmm.com	Mar 97	$213	102	184 very good	**FEATURES:** 4MB of VRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Mediamatics MPEG software, bundled games, S3 Virge/VX chip. **PRO/CON:** Slight price drop, good for graphical apps, great software utilities, excellent AVI and video playback; pricey.	638
4	STB Velocity 3D 888/234-8750 www.stb.com	Feb 97	$199	101	187 very good	**FEATURES:** 4MB of VRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Mediamatics MPEG software, bundled games, S3 Virge/VX chip. **PRO/CON:** Good for graphically intense programs, upgradable memory, lifetime warranty; mediocre AVI and MPEG video playback.	639
5	STB Lightspeed 128 888/234-8750 www.stb.com	Aug 96	$99	101	186 very good	**FEATURES:** 2.25MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, Tseng Labs ET6000 chip. **PRO/CON:** $40 price drop, performs well with business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	640
6	Matrox Millennium 800/361-1408 www.matrox.com/mga	Apr 97	$219	100	187 very good	**FEATURES:** 4MB of WRAM, 120-Hz refresh rate at 1024 by 768, Compcore MPEG software, bundled game and 3-D graphics program, MGA-2064W chip. **PRO/CON:** Fast, superb AVI and MPEG video, great software utilities, upgradable memory; expensive, no bilinear interpolation for sharp images.	641
7	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.ca	Jan 97	$189	99	180 very good	**FEATURES:** 4MB of SDRAM, 150-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, ATI MPEG player, bundled games and 3-D graphics programs, ATI Rage II chip. **PRO/CON:** Connects to a TV, excellent AVI and MPEG video; 3-D quality is merely okay.	642
8	VideoLogic GrafixStar 600 800/578-5644 www.videologic.com	Apr 97	$149	99	189 very good	**FEATURES:** 4MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bundled multimedia apps, bilinear video interpolation, Xing MPEG software, Tseng Labs ET6000 chip. **PRO/CON:** Very fast, excellent software utilities; no 3-D acceleration, average AVI and MPEG performance.	643
9	Diamond Stealth 3D 2000XL 800/468-5846 www.diamondmm.com	Feb 97	$135	98	183 very good	**FEATURES:** 4MB of EDO DRAM, 100-Hz refresh rate at 1024 by 768, 3-D acceleration, Mediamatics MPEG software, bundled games, S3 Virge chip. **PRO/CON:** Slight price drop, 4MB of RAM displays more colors and helps with 3-D effects; smooth AVI and MPEG playback; no bilinear interpolation.	644
10	Hercules Dynamite 128/Video 800/532-0600 www.hercules.com	Mar 97	$119	98	186 very good	**FEATURES:** 4MB of MDRAM, 90-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. **PRO/CON:** Great price for 4MB card, good performance all the way up to 1280 by 1024, cool utilities; poor documentation, no 3-D acceleration.	645

Best Buy For expanded reviews, visit www.pcworld.com/t10graphics. Windows 95 Plug and Play All products: 904

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors (reported here) and at 1024 by 758 and 65,536 colors. Boards were tested in a Dell Dimension XPS P133c with 16MB of EDO DRAM and 256K of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

THE TERMINATOR IS BACK: Hercules' new Terminator 3D/DX—a faster, slightly costlier version of last month's number four Terminator 3D—strong-arms its way into the top spot. Several boards jumped up the chart thanks to price drops, including the STB Lightspeed 128 with a $40 cut, and the Matrox Millennium, which shed $50. A $40 drop in price helped the Matrox Mystique hold its second-place Best Buy position. ■

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TOP 10 MODEMS

	EXTERNAL MODEMS	Month tested	Street price (3/15/97)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	Practical Peripherals PC288LCD V.34 770/840-9966 www.practinet.com	Mar 97	$329	85	2:28	**FEATURES:** 28.8-kbps, distinctive ring, stores multiple profiles, 230.4-kbps modem-to-PC speed, QuickLink II fax/data software, Caller ID, lifetime warranty. **PRO/CON:** Fast, LCD English-language status display, loaded with features like manual volume control; very expensive.	652
2	U.S. Robotics Courier V.Everything 56k 800/877-2677 www.usr.com	NEW	$285	85	2:26	**FEATURES:** 56-kbps, FlashROM, distinctive ring; callback, password, and Caller ID security; RapidComm Win/DOS fax/data software. **PRO/CON:** Best performer on the chart, great documentation, toll-free tech support, manual volume control; expensive, takes up a lot of desktop space.	653
3	Zoom V.34X Plus 800/631-3116 www.zoomtel.com	Mar 97	$119	80	2:52	**FEATURES:** 33.6-kbps, MNP-10EC error control, stores multiple profiles, distinctive ring, DOS/WinFax Lite fax/data software. **PRO/CON:** Fantastic price, easy-to-follow documentation, seven-year warranty; below-average performance, no security features such as password protection.	654
4	Motorola ISG Premier 33.6 800/566-3266 www.mot.com/modems	Jan 97	$230	80	2:28	**FEATURES:** 33.6-kbps, FlashROM, 230.4-kbps modem-to-PC speed, distinctive ring, stores 20 profiles, QuickLink II fax/data software. **PRO/CON:** Among the fastest we've tested, toll-free tech support, 30-day money-back guarantee; on the expensive side overall, documentation not for novices.	655
5	U.S. Robotics Sportster 56k Faxmodem 800/342-5877 www.usr.com	NEW	$219	80	2:34	**FEATURES:** 56-kbps, FlashROM, distinctive ring, Caller ID, RapidComm Win/DOS fax/data software. **PRO/CON:** A top performer, great documentation for beginners and experts alike, manual volume control; second least expensive modem on the chart, but pricey compared to all modems.	656
	PC CARD MODEMS						
1	Motorola Montana 33.6 800/427-2624 www.mot.com/pccards	Mar 97	$199	91	2:36	**FEATURES:** 33.6-kbps, FlashROM, 230.4-kbps modem-to-PC speed, digital line protection with alert, QuickLink Mobile fax/data software. **PRO/CON:** Top performer on PC Card chart, did especially well over noisy line conditions, making it good for cellular use, $41 cut; installation required support call.	657
2	U.S. Robotics Megahertz XJ4336 800/527-8677 www.usr.com/mobileusr	Mar 97	$269	87	2:38	**FEATURES:** 28.8-kbps, FlashROM, 230.4-kbps modem-to-PC speed, MNP-10EC error control, stores multiple profiles, digital line-voltage protection with alert. **PRO/CON:** Great performer, thorough documentation for beginners and experts alike, painless installation; expensive.	658
3	Practical Peripherals ProClass 288 V.34 Data/Fax Modem with EZ-Port 770/840-9966 www.practinet.com	Jan 97	$159	87	2:42	**FEATURES:** 28.8-kbps, FlashROM, 230.4-kbps modem-to-PC speed, distinctive ring, stores multiple profiles, password protection, QuickLink II fax/data software. **PRO/CON:** Above-average performer, built-in phone jack, cheapest PC Card on the chart, lifetime warranty; installation not as easy as we'd like.	659
4	TDK CyberExpress 3000 800/999-4835 www.tdksystems.com	Jan 97	$179	85	2:49	**FEATURES:** 33.6-kbps, MNP-10EC error control, distinctive ring, stores multiple profiles, 250-kbps modem-to-PC speed, QuickLink II fax/data software. **PRO/CON:** Nice price, toll-free tech support, digital line-voltage protection with alert; slowest performer on chart and below average overall.	660
5	Hayes Optima 33.6 V.34+Fax 770/441-1617 www.hayes.com	NEW	$249	85	2:42	**FEATURES:** 33.6-kbps, FlashROM, multiple profiles, digital line-voltage protection, 230.4-kbps modem-to-PC speed, password security, SmartCom LE fax/data software. **PRO/CON:** Above average performer, Hayes will cross-ship to replace your modem; expensive, not upgradable.	661

Best Buy For expanded reviews, visit www.pcworld.com/t10modems. Windows 95-certified Plug and Play All products: 906

HOW WE TEST We test a pair of identical modems on a simulated phone network. For the phone line test, we send a text file over 55 line conditions. For the file type test, we send five files—graphics, text, program, and compressed file types, plus a mixture of these four types—over one line condition. We then average the results of the two tests. The overall rating is based on performance (43 percent), features (26 percent), price (12 percent), support (10 percent), and ease of use (9 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

THE FIRST 56-KBPS MODEMS show up on our chart this month—the external U.S. Robotics Courier V.Everything 56k and Sportster 56k Faxmodem. Because so few 56-kbps modems are available, and they connect to each other at 33.6-kbps, we tested them at this speed. The Courier is the fastest on our chart, but overall doesn't pass the Practical Peripherals PC288LCD V.34—number one for the third straight month. The two are Best Buys. ■

Are Files You Can't Use Keeping You In The Dark?

MacOpener opens Macintosh floppies, CD-ROMs, and removable cartridges on your PC!

If you're in the dark and blind-sided, because the file you need is on a Mac disk that you can't open on your PC, you need MacOpener. It's the fast, easy way to access any Mac formatted disk on your PC.

Don't let Mac/PC incompatibility leave you in the dark again. Get MacOpener, the utility that lets you see Mac disks and cartridges on your PC, just as if they were PC disks.

You'll find MacOpener at leading software dealers for about $49.

Conversions Plus includes MacOpener. And it also converts files so you can use them in the software of your choice!

If you're doubly in the dark, because the file you need was created in software you don't have, Conversions Plus is your answer. With Conversions Plus, you can use any file on any disk, word processing, spreadsheets, databases or graphics, including E-mail enclosures from the Internet. You can convert, edit, print and save them, all in your own software, retaining the original formatting, including embedded graphics.

You'll find Conversions Plus at leading software dealers for about $99.

Both products run under Windows 95, Windows 3.1 and Windows NT

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PC WORLD @HOME

Exposing the Body, Easy PC/TV Combo

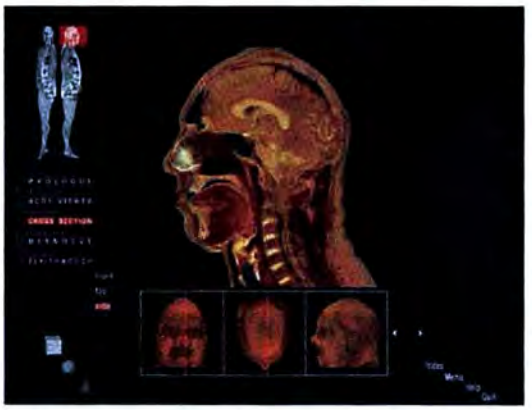
SURRENDER EARTHLINGS

IF YOU'RE ONE of the 243 people left on the planet who doesn't have Microsoft's Word, Works, or Encarta, consider this a warning: With the release of **Microsoft Home Essentials 97**, any further resistance is futile. At a street price of $109, this three-CD bundle includes Word 97, Works 4.0, Encarta 97, Greetings Workshop (for creating cards, calendars, and whatnot), Microsoft Arcade (solo games), The Internet Gaming Zone (for playing games over the Net), lots of fonts and clip art, and the ubiquitous Microsoft Internet Explorer 3.01 and Microsoft Network sign-up software (with two free months of service). Microsoft's conquer-the-world marketing strategy is in full force with this software bundle, right down to the Internet Explorer Shortcut that is installed slyly on your desktop. All this for $109? There's nothing left to say, except "Take me to your leader." —*James A. Martin*

Microsoft Home Essentials 97

GRADE: A; PRICE: $109 street; Microsoft; 800/426-9400; www.microsoft.com/homeessentials/

READER SERVICE NO. 629



THE BODY HUMAN: High-tech photos of a real cadaver show it like it is in Body Voyage.

SLICE OF LIFE

IN THIS STRIKING disc, medical photojournalist Alexander Tsiaras and science writer Jeff Goldberg peel back layer after layer of the human body, using high-resolution photos and CAT-scan imagery. **Body Voyage: A Three Dimensional Tour of a Real Human Body** makes creative use of virtual reality fly-throughs, and its candid portrayal of its subject, a real frozen cadaver, sets it apart from other anatomy CD-ROMs. Short of buying your own MRI, you won't get a more realistic look at the inner you. But the disc's dispassionate depiction of the body as fascinatingly complex olive loaf makes for questionable after-lunch viewing. —*Steven Anzovin*

Body Voyage: A Three Dimensional Tour of a Real Human Body

GRADE: A-; PRICE: $39.95 list; Time Warner Electronic Publishing; 800/759-0190, pathfinder.com/twep/products

READER SERVICE NO. 630

CREATIVE TOOLS

LET THE YOUNG da Vinci in your family try their hand at digital art using the **Genius Kids Designer** drawing tablet. Aimed at 4- to 10-year-olds, the tablet provides a 7-by-5-inch drawing pad; a strawberry-shaped button that functions as an <Esc>, <Enter>, or right-mouse key; and a stylus shaped like an ear of corn. The tablet is solid, but the lightweight stylus may not be sturdy enough to hold up in the hands of very young users. The tablet can be used instead of or alongside your regular mouse—useful if you want to help your fledgling *artiste* with the creative ▶

Boffo Boob Tube

WATCHING TV ON A PC is nothing new. But who wants to install a tube by cracking the computer case? TVGenie, an inexpensive external tuner that turns your PC into a TV, is an alternative. Although the back of the device looks like a snake's nest of cables, setup is really a snap. To flip from PC screen to TV broadcast or to change channels, you use a TV-style infrared remote control. The toughest chore is finding a place to *put* TVGenie. Atop the monitor makes sense, but it's too wide to squat on the narrow upper edge of most displays. Solve that problem, though, and you'll be watching television in less time than it takes Letterman to finish his monologue. —Gregg Keizer

TVGenie

GRADE: B+; PRICE: $149 list; Aver; 800/863-2332; aver.com

READER SERVICE NO. 631

A CLICK AWAY: TVGenie makes it easier than ever to watch television on your computer.

PHOTOGRAPH: ROBERT CARDIN

EDITED BY Christina Wood

process. The tablet is bundled with Broderbund's KidPix Studio paint and animation application. —*Anne Kandra*

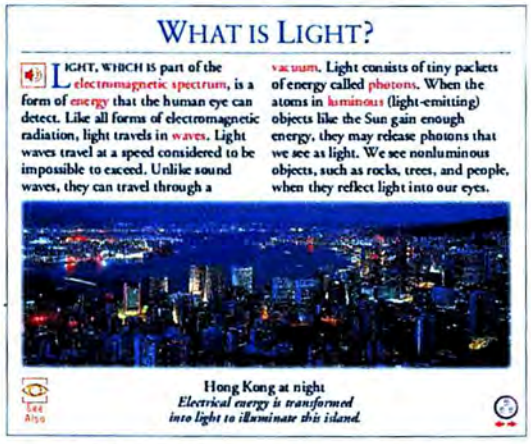
Genius Kids Designer

GRADE: B-; PRICE: $99 street; KYE International Corp.; 800/456-7593; www.genius-kye.com

READER SERVICE NO. 632

NOT SO WEIRD SCIENCE

THE NEXT TIME your children ask how a 727 gets off the ground, brush up on Bernoulli's principle with this excellent reference. Compared with the animated cartoon flair of The Universe According to Virtual Reality, **Encyclopedia of Science 2.0** appears stodgy. But the quality and depth of information in astronomy, chemistry, life sciences, and physics can't be ignored. Navigating between scientific principles and those who discovered them is easy. You can participate in research through a link to Science Online (a three-month subscription is included). It's a must-have for science buffs from middle school to middle age. —*Peter Scisco*



FROM LIGHT TO ATOMS, the Encyclopedia of Science explains the major scientific principles of our time.

Encyclopedia of Science 2.0

GRADE: A-; PRICE: $40 street; DK Multimedia; 800/356-6575; www.dk.com

READER SERVICE NO. 633

REMIND YOURSELF

I'VE GOT POST-IT NOTES stuck all over my house, urging me to walk the dog, buy milk, and so on. With 3M's **Post-it Notes 1.5**, they can cover my PC desktop, too. In this new version, you can use the notes in applications (not just on the desktop), send them as e-mail, and, best of all, actually print them out on six-form sheets of yellow Post-It paper. You don't have to print all six at once; the paper is designed so it can go through the printer repeatedly. A starter pack is included with the software; refills cost $18.99 for 25 sheets. —*Michael S. Lasky*

Post-it Notes 1.5

GRADE: A; PRICE: $24.99 list; 3M Corp.; 800/330-3966; www.mmm.com/psnotes

READER SERVICE NO. 634

BIRD IS THE WORD

LOOKING FOR A low-maintenance pet that requires no food or water? Check out **Fin Fin on Teo the Magic Planet**, an "Artificial Life" creature that lives in your PC and looks like Flipper with wings and a beak. You communicate with it via a microphone or the SmartSensor, a sound-and-motion detector. Fin Fin responds to your gestures and the tone of your voice. Make cooing noises, and it approaches and (maybe) does tricks; slap the motion detector, and it leaps away with a startled expression on its beak. Fujitsu's idea is that children will develop a relationship with this creature and learn how their behavior affects it. Unfortunately, interacting with Fin Fin is like playing with a goldfish—dull. At least you'll never have to explain why you had to flush Fin Fin down the toilet. —*Daniel Tynan*

Fin Fin on Teo the Magic Planet

GRADE: C-; PRICE: $39.95 with microphone (list); $69.95 with SmartSensor (list); Fujitsu Interactive; 800/992-5433; www.fujitsu-interactive.com/

READER SERVICE NO. 635 ■

F Y I

ACCORDING TO the hype, everyone is wired. But where do they all point their browsers? 60.5 percent of the time, Web users are innocently looking for news and entertainment. But 26.5 percent of their time is spent cruising for "adult content."

SOURCE: PC METER'S ONGOING WEB MEASUREMENT DATA

KEEPING UP

Internet Room Service

BUSINESS TRAVEL CAN be a real pain. You go days without seeing family, friends, and pets. What's more, surfing the Internet through hotel phones can be an enormous hassle—not to mention expensive. Well, nothing can be done about the family and pets, but soon it may be easier to browse the World Wide Web on the road. LodgeNet Entertainment—one of the companies that provides video-on-demand in hotel rooms—is testing a limited Web browser that's built into your hotel room's TV. If all goes well, you may check into a hotel room sometime soon and find chocolate on the pillow, fluffy towels in the bathroom, and a remote control that lets you roam the Web.

A Billboard in Your Living Room?

ACCORDING TO America Online, members spend 1 million hours daily yakking it up in chat rooms. What self-respecting online service would miss a marketing opportunity like that? So, AOL has started selling advertising in its public chat rooms. Next time you decide to mouth off in the Sports Center, you might find yourself looking at those Budweiser frogs while you do. On the bright side, if the discussion gets dull, you can always click the ad to go to the vendor's Web site.

Browsing Your Way to the Top

IS EVERYONE IN your office getting promoted faster than you, or are your friends getting MBAs while you sit home evenings watching *Seinfeld?* Well, finally there's a place where people get recognized for the skills *you* have. Check out Big Shot at www.spe.sony.com/Pictures/tv/bigshot/. Your knowledge of TriStar TV programs such as *Seinfeld, The Nanny,* and *Mad About You* helps you rise from lowly mailroom clerk to producer and, eventually, studio head. If your poor memory (or your virtual golf game) keeps you from a legitimate virtual promotion, just click the Cheat button.

—Christina Wood

ILLUSTRATIONS: MARC ROSENTHAL

ALR Revolution MP II+
Starting at $2,195 MSRP

ALR Revolution MP Pro
Starting at $3,995 MSRP

ALR Evolution Dual6
Starting at $1,995 MSRP

Do the Math

These days, you've probably heard a lot of other companies talk about how their servers offer the most bang for the buck or the lowest cost per user. But have you ever noticed that they don't include ALR in those comparisons? Take one look at our entry-level and mid-range servers, and it's easy to see why. Our dual processor-ready powerhouses provide all the performance and features of those competitive servers, for less money. Period.

And at ALR, we don't lock you into one type of model. We offer a wide range of servers, including three that are specifically targeted towards departmental and small business use. Choose between Pentium® or Pentium® Pro technology. Full-size or mid-size tower. Then add just those options that you need. *You* pick the server that best suits your applications and budget.

No matter which of these models you choose, you'll receive the same dedication to flexibility and reliability that have made our high-end Revolution servers international award-winners. We've loaded these systems with features like dual processing support, extensive ECC memory support, excellent expansion, and ALR InforManager™ integrated server management. Pentium Pro chip-based full-size towers even include ALR ActiveCPR,™ our own advanced processor protection and auto-recovery system. Last but not least, we back them with our industry-leading 5 year/36 month warranty.

So the next time another server manufacturer tells you how great their system is, pull out this ad for reference. We're confident that after you hear *their* sales pitch, you'll be calling *our* toll-free number.

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ALR® Advanced Logic Research, Inc. 5 YEAR 36 MONTH warranty

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ALR's Low Cost Server Solutions

ALR Revolution MP Pro	**HP® NetServer™ LH Pro**
200-MHz Intel® Pentium® Pro 32-MB ECC RAM (exp. to 1-GB) Eleven Storage Bays Seven PCI Expansion Slots 730 Watt **Redundant** Power Supply ALR InforManager™ with Active CPR™ Server Management Software 3 Year On-site Service 5 Year/36 Month Warranty	200-MHz Intel® Pentium® Pro 32-MB ECC RAM (exp. to 1-GB) Nine Storage Bays Five PCI Expansion Slots 410 Watt Power Supply HP® Navigator™ & ASR Management Software 3 Year On-site Service 3 Year Warranty
$3916*	**$5816***

ALR Evolution Dual6	**Compaq® Proliant™ 800**
200-MHz Intel® Pentium® pro 32-MB ECC RAM (exp. to 1-GB) 4.2-GB SCSI Hard Drive Six Storage Bays Seven Expansion Slots 315 Watt Power Supply ALR InforManager Server Management Software 1 Year On-site Service 5 Year/36 Month Warranty	200-MHz Intel® Pentium® pro 32-MB ECC RAM (exp. to 512-MB) 4.2-GB SCSI Hard Drive Five Storage Bays Seven Expansion Slots 240 Watt Power Supply Compaq® Insight Manager™, SmartStart, ASR2 3 Year On-site Service
$3872*	**$4330***

ALR Revolution MP II+	**IBM® PC Server 320**
166-MHz Intel® Pentium®/MMX 32-KB L1 Cache 32-MB ECC RAM (exp. to 512-MB) 2.1-GB SCSI Hard Drive Eleven Storage Bays Ten Expansion Slots (7 PCI) 300 Watt Power Supply ALR InforManager Server Management Software 1 Year On-site Service 5 Year/36 Month Warranty	166-MHz Intel® Pentium® 16-KB L1 Cache 32-MB ECC RAM (exp. to 256-MB) 2.1-GB SCSI Hard Drive Ten Storage Bays Eight Expansion Slots (3 PCI) 300 Watt Power Supply IBM® ServerGuard™ 3 Year On-site Service
$3796*	**$5401***

*Estimated street price. Based on IDC, 3/10/97.

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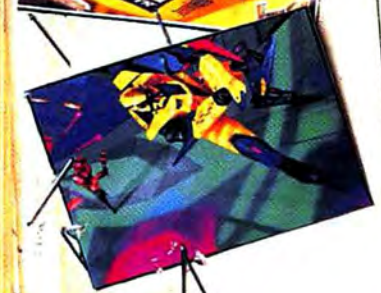
Circle 9 on reader service card

MANIFESTO OF THE NEW 3D REALITY



A movement is brewing. And with its birth, the PowerVR architecture begins the awesome struggle against conventional 3D; and against the techno-bourgeoisie who attempt to enslave the gamer masses. These ~~manipulative~~ technologists are turning their machines of propaganda against GAMERS, desperately trying to make them believe that their 3D performance is good enough.

Well, it is not! This naked, ~~shameless~~ exploitation of gamers has gone on far too long. Rise up! For we have created the ultimate instrument of change: the PowerVR technology. And we declare that the true console game experience on the PC will be our domain.

SEGA Entertainment

ACTIVISION

COMPAQ

PSYGNOSIS

namco

kalisto

VideoLogic

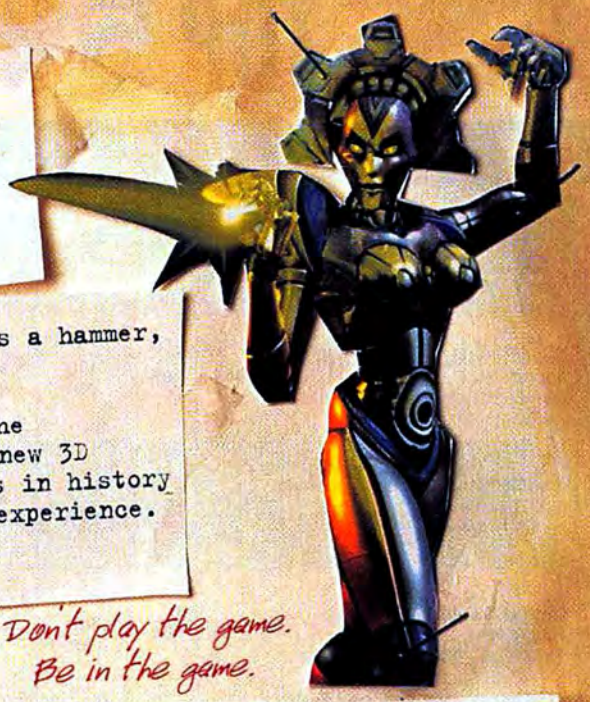
Gremlin

Now is the time to question reality.
The age of conventional 3D graphics is coming to a close. Withering, decaying and exhausting itself.
An incredible technology has emerged from the ruins.

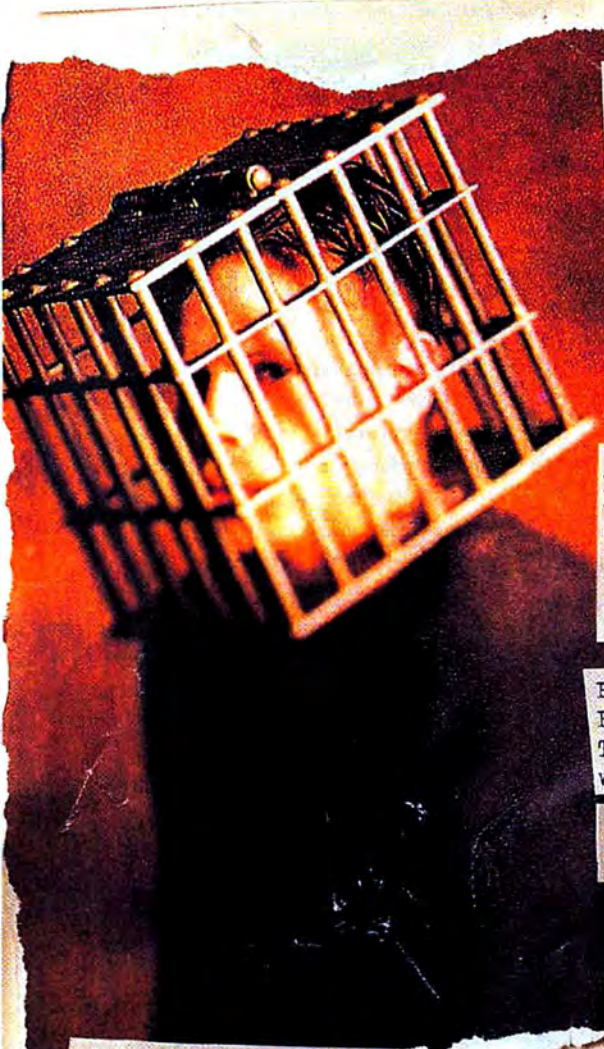
PowerVR™ is more than a new 3D solution. It is a hammer, ready to smash the stale PC game experience.

Gamers, hoist up your joystick. Rage against the stagnant sensory experience. Unite around this new 3D reality. You will be the first group of gamers in history to transcend the bleakness of the existing 3D experience.

We are pouring gasoline on the fires of creation.



Don't play the game. Be in the game.



Intense 3D graphics is not a gift. It's a birthright.

The world's leading computer makers are building a PowerVR future. More are quickly joining the Movement. You'll know they're one of us if they flash the PowerVR Ready sign.

Namco, Sega Entertainment, Kalisto, Vic Tokai and others are bringing forth the most awesomely intoxicating games.

Accelerated, Enhanced and Extreme certifications demonstrate support.

This is the dawn of high res and high frame rates.

POWERVR READY

Buy PowerVR Ready Systems. Buy PowerVR Ready add-in cards: These are the machines that will drive the revolution.

Revolt against hardware that doesn't carry the PowerVR Ready sign. (1-800-366-9782)

www.powervr.com

The Neo Realitarian Movement has begun.

Free yourself from the tyranny of their inferior 3D experience.

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Circle 158 on reader service card

PC WORLD

TOP 5 HOME PCs

	SYSTEMS	Street price (3/10/97)	Overall rating	PC WorldBench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	Dell Dimension XPS M166s 800/388-8542 www.dell.com	$2349	90	223 outstanding	best/ best	fair	**FEATURES:** Pentium MMX-166, 32MB of SDRAM, 4GB hard drive, 12X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** Reasonably priced with hefty hardware. Faster than some Pentium MMX-200s. Includes Microsoft Office Small Business Edition but no other software. Mail-order only. Good foundation for home office.	646
2	Hewlett-Packard Pavilion 5320 800/724-6631 www.hp.com/info/pchome1	$1848	86	180 good	best/ good	outstanding	**FEATURES:** Pentium-150, 16MB of RAM, 1.6GB hard drive, 8X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** HP's lowest-price entry-level machine. Software bundle includes Works, Encarta 97, Quicken SE, Hansel and Gretel, Great Word Adventure, Magic School Bus, In the Company of Whales, and SimCity 2000.	647
3	Hewlett-Packard Pavilion 7370V 800/724-6631 www.hp.com/info/pchome1	$3148	84	222 outstanding	best/ good	outstanding	**FEATURES:** Pentium MMX-200, 32MB of RAM, 4GB hard drive, 16X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor, game pad, 3-D video card with 6MB of RAM. **PRO/CON:** Super muscle machine, perfect for serious gamers, but on the expensive side. Includes Works, Mech Warrior 2, and Whiplash.	648
4	Compaq Presario 2100 800/345-1518 www.compaq.com	$1298	84	148 fair	good/ fair	outstanding	**FEATURES:** 133-MHz Cyrix MediaGX, 24MB of RAM, 2GB hard drive, 8X CD-ROM drive, 33.6-kbps fax-modem, 14-inch monitor. **PRO/CON:** Very inexpensive, but performs like a P-100. Suitable as a basic first PC or Net station, but lacks power to handle high-end games. Limited bundle includes Quicken SE, Works, and Netscape Navigator.	649
5	Hewlett-Packard Pavilion 7350P 800/724-6631 www.hp.com/info/pchome1	$3048	83	200 good	best/ good	outstanding	**FEATURES:** Pentium MMX-166, 32MB of RAM, 2.5GB hard drive, 16X CD-ROM drive, 33.6-kbps fax-modem, 17-inch monitor, built-in color scanner. **PRO/CON:** Great if you like to work with art, video, and photos; expensive if you don't need the image editing software or scanner. Includes Adobe Photo Deluxe and Kai's Power Goo.	650

Best Buy — All products: 905

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC WorldBench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service survey.

DELL COMES UP a winner once again: The new Dimension XPS M166s lands at the top of our chart this month. Dell computers have been Best Buys for seven months in a row, but this Pentium MMX-166 sets the record for highest overall rating and highest PC WorldBench score to date. It's also loaded with hardware perks and is backed by Dell's first-class reliability and service. This speed demon is reasonably priced at $2349. But don't expect a load of software. It comes with just one, very useful, package: Microsoft Office Small Business Edition.

Once you get past the number one slot, Hewlett-Packard dominates the Top 5. The Pavilion 5320's low price, outstanding setup, and great reliability and service ratings ensured its number two position on the chart. This Pentium-150 is cheap at $1848, and with 16MB of RAM, you'll get plenty of processing power for most titles. It's not enough for high-end multimedia titles, however.

The number three Pentium MMX-200 system is slower than Dell's Dimension XPS M166s by just a hair—and its service rating can't quite match that of the Dell. However, the Pavilion 7370V is a dream machine if you're a serious gamer.

At number four is Compaq's Presario 2100. Its low $1298 price brought this system onto the chart. This PC is built around Cyrix's new MediaGX chip. The MediaGX is a jack-of-all-trades, handling SVGA graphics and audio as well as regular CPU tasks on a single chip. But performance suffers—the 2100 has the lowest score on the chart. The MediaGX runs at 133 MHz with 24MB of RAM, but it performs more like a Pentium-100.

HP's Pavilion 7350P just held on to a place in the Top 5. It's a great PC if you like to play with digital photos, video, and art—you get tons of image editing software and a built-in 5-by-7-inch color scanner.

We also tested Monorail's Model 133 PC, which didn't crack the Top 5 because of its so-so PC WorldBench score of 147 and limited upgradability. It costs $1299 and looks like a *Star Trek* PC terminal, but this P-133 machine is a good option only if your computing needs are modest and space is your biggest concern.

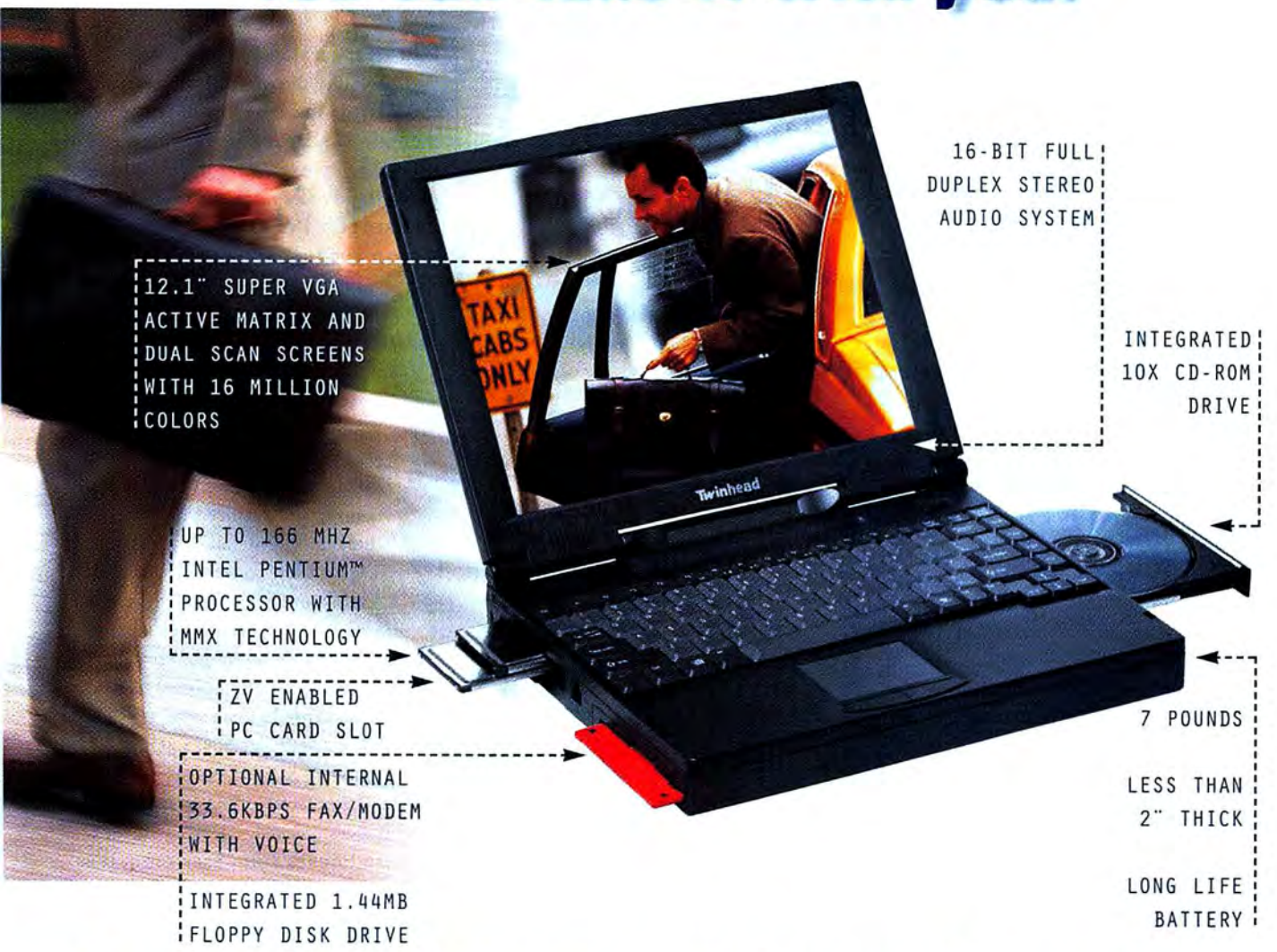
—*Kirk Steers*

DELL DIMENSION XPS M166s: Speedy MMX but limited software.

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

ILLUSTRATION: JEFFREY PELO

You can take it with you.



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Slimnote 9133TZ
Survivor of the 5th Annual PC Computing Torture Test
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MMX™ intel inside pentium® PROCESSOR

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Circle 240 on reader service card

On the Next Geraldo: Bass Gets Backup Religion

READY FOR the next *Geraldo*? "Men Who Back Up Too Much—and the Women Who Love 'em." I'll be on the show because last year my hard drive crashed—leaving me, a PC geek, computerless for a week. Although I had diligently backed up my drive, all my backup tapes were worthless (see *Home Office*, July 1996, for the sordid details). It was awful. I missed deadlines and, even worse, I couldn't play any games on the Internet.

I like the *Geraldo* idea: The audience will be packed with PC users clutching pocket protectors and waving backup tapes. Viewers will race to their machines and back up their files during commercials.

But seriously, it's clear that others have backup problems too. After the column came out, I was inundated by e-mail from readers with similar experiences. To get the straight skinny on how to avoid future disasters, I talked with dozens of software product managers, tape drive engineers, and tape backup geeks (yes, they do exist). Brain numbing as it was, I got enough insider tips to ensure that my data is *really* backed up. Here are the important ones:

Give it a rest. I do my backups at night, when I'm not using the PC. Sure, I've heard the claims that 32-bit Windows 95 backup apps operate in the background. But when I asked the people who make backup equipment when *they* do a backup, most said—good guess—when the system's not in use. Play it safe: At backup time, turn off your screen saver and don't fiddle with the mouse, play Quake, or go online. Take your spouse out to dinner instead—and *don't* talk about computers!

Do a comparison. I want to make sure everything on the tape matches what's on my drive. So I set my backup software to do its most exhaustive byte-by-byte comparison. At the time of my fiasco, I was using the Quick Compare option in Seagate's Backup for Windows 95. Seagate has since wisely removed that option.

Clutching **pocket protectors** and waving backup tapes, **viewers** will race to their PCs and back up their files during **commercials.**

Do spot restores. For the first few backups with a new drive, randomly restore about 50 data files and three or four apps from various sessions on different parts of the tape. Restore them to directories other than their original locations. (Make sure the apps don't need to be in the original location—Paint Shop Pro, for example, is fine.) Load the data files into the program and look for glitches. Call me crazy, but I do this two or three times a year.

Take care of your tapes. Your backup program should let you retension (rewind) tapes to remove slack. One backup guru suggested I do it to new tapes, after every few backups, if a tape has been dropped—and probably during full moons. You should clean the drive's read/write head monthly with a cleaning cartridge, and keep the tapes away from monitors, phones, and other magnetic sources.

Backup gear. I've used a lot of backup software and tape drives. I probably have more backups of my data than the National Security Agency has of its. My hands-down favorite software is Computer Associates' Cheyenne Backup for Windows 95, thanks mainly to its neat disaster-recovery feature: If my hard drive fails, I can boot from a floppy and restore files without having to reinstall Win 95. And despite some convoluted syntax in a few of the dialog boxes, Cheyenne's interface is the best around. There's also built-in virus checking so I don't unwittingly back up infected files.

What drive do I use now? I picked HP Colorado's T4000s, a 4GB (8GB compressed) SCSI tape drive. It's fast and has been trouble-free so far—keep your fingers crossed. For my wife's PC I use an Iomega Ditto Easy 3200. It's slower than the T4000s and holds only 1.6GB (3.2GB compressed), but it's cheap and plugs easily into a parallel port.

Honestly, I realize backing up isn't terribly exciting even for computer geeks—until you need to retrieve lost data. Then it's not only exciting, it's even more glamorous than appearing on *Geraldo*.

Cheyenne Backup for Windows 95 $50 street; Computer Associates; 800/424-3936; sales@cheyenne .com; www.cheyenne.com
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Ditto Easy 3200 $249 street; Iomega; 800/697-8833; www.iomega.com
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T4000s $399 street; HP Colorado; 800/826-4111; www.hp.com/
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Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information. ■

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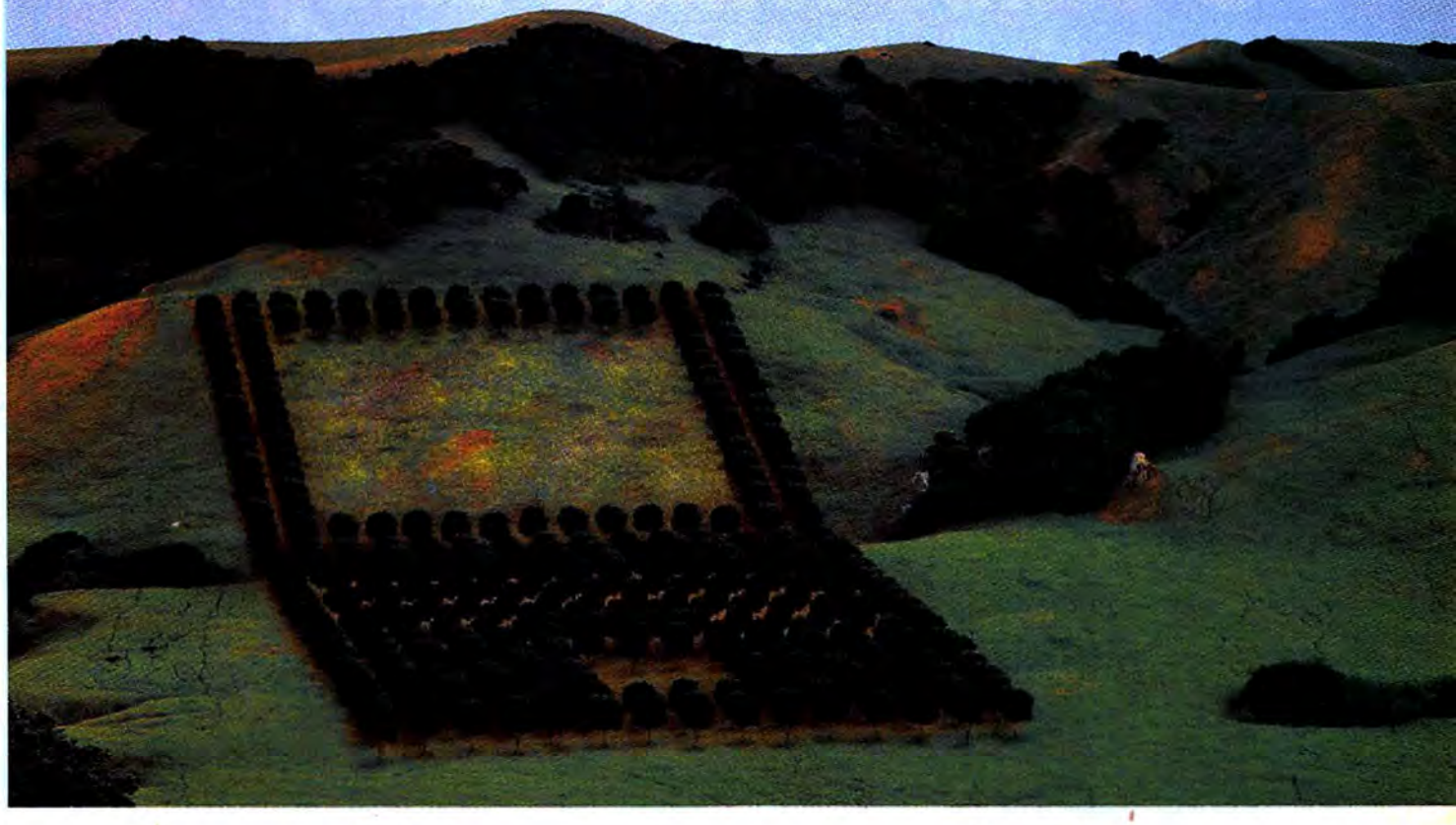

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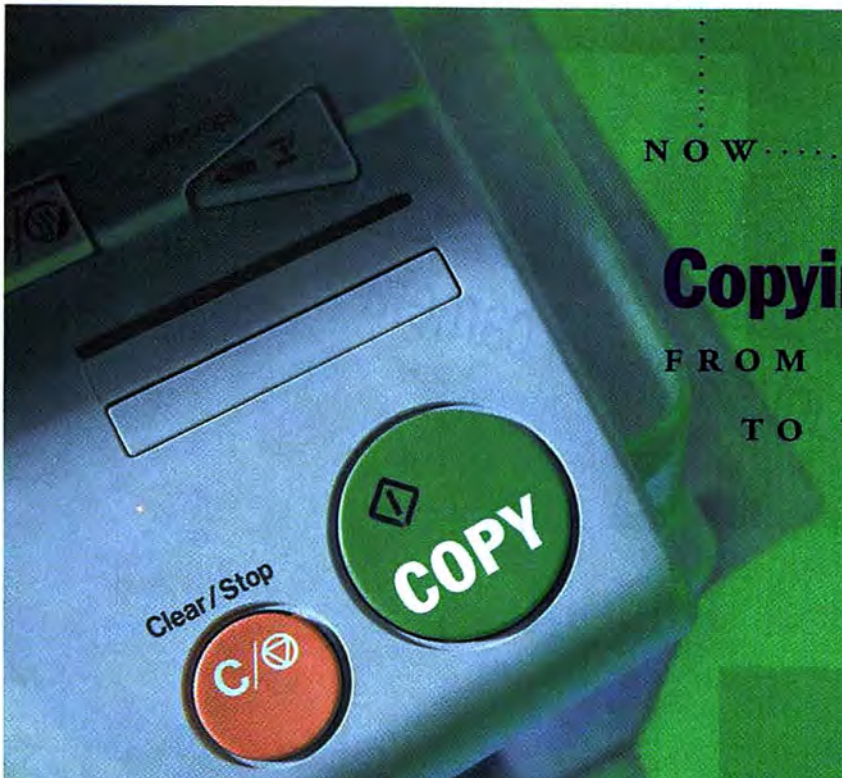

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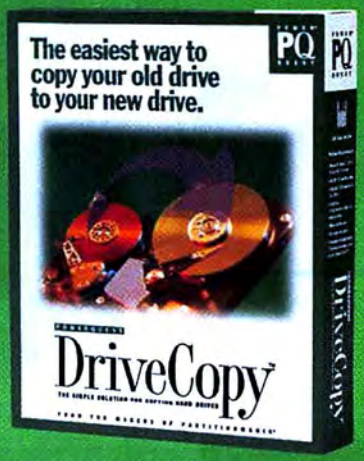

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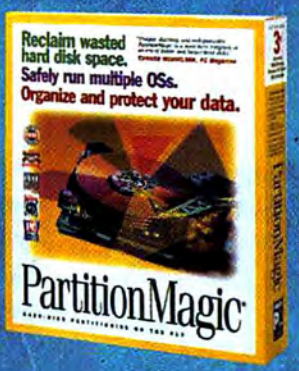

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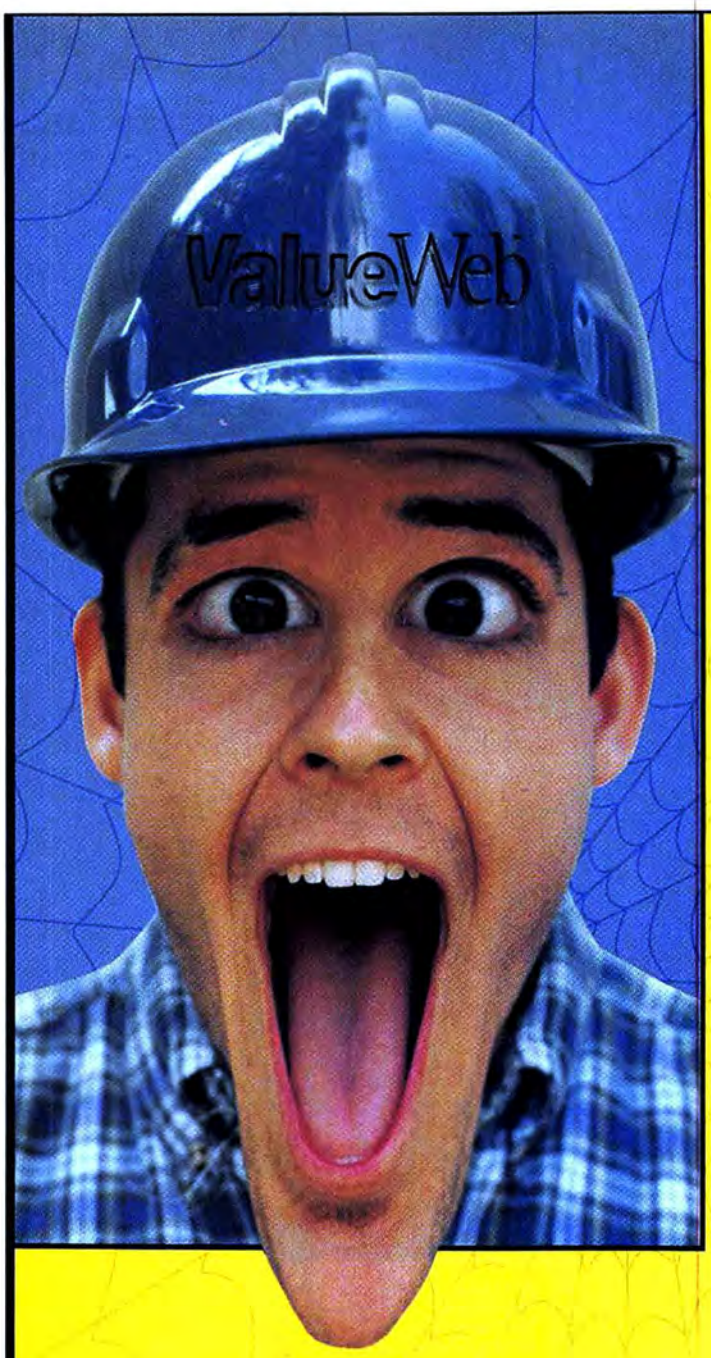

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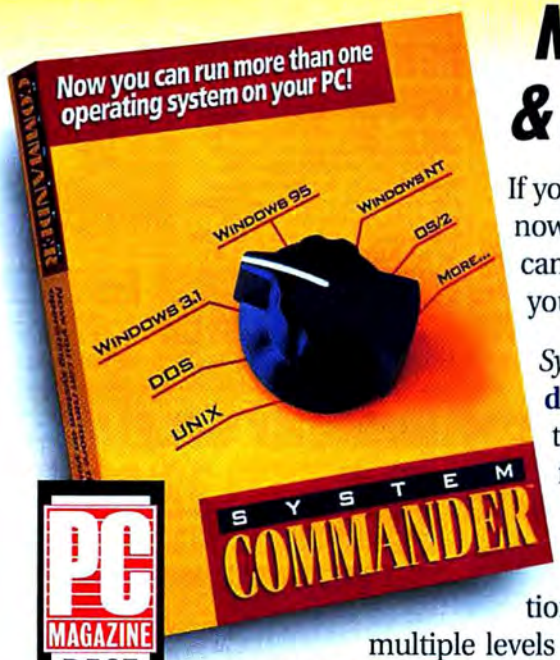

PC MAGAZINE BEST OF 1996
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HERE'S HOW

ANSWER LINE

What's Slowing Down Your Modem?

I OWN A 28.8-kbps U.S. Robotics Sportster modem, and my Internet service provider is also equipped with 28.8-kbps modems. However, I can never establish a connection faster than 14.4 kbps. I contacted my local telephone company and asked them to check the wiring in my home. The company found no problems but told me that they will not guarantee data transmission faster than 14.4 kbps, and that if I achieved anything faster, I would be lucky.

Are telephone lines routinely capable of data transmission at the rate of 28.8 kbps? If not, why is there such a rush to buy ever-faster modems?

Mitchel W. Little, Windsor, Colorado

YES, A MODERN ANALOG telephone system in good repair is routinely capable of 28.8-kbps connections. But a multitude of negative forces between your modem and your ISP's modem can conspire to slow transmission speed.

The chief culprit is line noise, and it's often caused by loose connections, water seeping into lines, and even copper-hungry prairie dogs. If you hear crackling and static on the line, your chances of connecting at 28.8 kbps are slim. The phone company may need repeated efforts to track down and remove the noise. But the hassle will pay off in faster connections.

Even when line quality is sparkling, though, other problems can stymie data transmission. Older equipment in rural areas can limit speed. And in booming suburbs, phone companies may respond to heavy demand by compressing and *multiplexing* traffic—transmitting two or more signals over a single channel.

Because compression reduces the available signal frequency range, it limits your modem's ability to transmit at full speed. If every connection you make tops out at 14.4 kbps, chances are you're stuck in the slow lane until your local phone company updates its equipment.

However, if you try dialing in to a variety of online services and BBSs and find that some connect at higher rates, the problem may be with your ISP's phone company. If so, complain—your provider may have enough clout with its phone company to improve service. If not, find an ISP operating in a more modem-friendly locale.

WHEN SYSTEM MONITOR IS MISSING A MODEM

THANKS FOR THE TIP on using Win 95's System Monitor to track modem performance. However, I ran into one problem other readers may have encountered as well. I followed your instructions, but didn't find my modem listed among the items available to add to System Monitor's display until I dialed out with a Dial-Up Networking connection that uses the modem. Also, the "bytes/second" measurement might confuse those who don't know that modem speeds are measured in bits per second and that there are 8 bits in a byte.

John Mello, Woonsocket, Rhode Island

YUP, IT'S A GREAT TIP, useful for diagnosing problems with connection speeds. But to add a modem to System Monitor's display, you just need to be connected (or at least dialing out) with the modem. I'm sorry I left out that important step. Another thing: You must use a 32-bit, TAPI-compliant communications program (such as Windows 95's Dial-Up Networking and HyperTerminal programs, or CompuServe's WinCIM 3.0.1 front end). System

By Scott Spanbauer

ILLUSTRATION: PETER HOEY

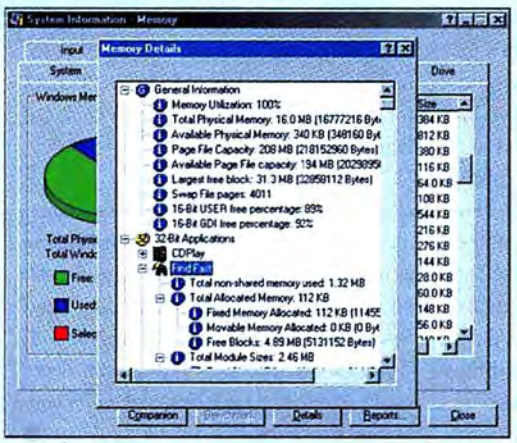
Monitor simply ignores the modem activity of 16-bit Windows and DOS communications programs.

As for bytes sent and received per second, these numbers represent the actual data sent and received, not the overall connection speed negotiated by two modems. Once you log in, bytes received will drop to zero until you read a Web page, for example, or download a file. And as you point out, there are 8 bits to a byte. With a 28.8-kbps connection and all other factors being favorable (the remote system isn't bogged down with users, say, and your phone line is free of noise), a file might download at the rate of 3.5 kilobytes per second. Multiply that by 8 and you get pretty close to 28.8 kilobits per second.

Examine Memory Usage Under Norton Utilities' Microscope

YOU HAVE 16MB of RAM in your Windows 95 system, but after you open your usual suite of programs, your system starts bogging down—because you've used up all your physical RAM. You send Windows on a time-consuming trip to the hard disk swap file every time you switch between applications or launch new ones. What's using all that memory? Find out in the Memory page of Symantec's Norton Utilities 2.0 System Information dialog box. It delivers copious details on every 32- and 16-bit program, library (.dll) file, and Windows 95 system component in use.

To access it, choose *Start•Programs•Norton Utilities•System Information•Memory*, or in the Norton System Doctor choose *Utilities•Information•System Information•Memory*. Click *Details*, then expand the General Information branch for an overview of system memory.



RUN DOS GAMES IN WINDOWS 95

I AM TRYING TO play a popular CD-ROM-based DOS game under Windows 95, which is supposed to be compatible with almost everything. However, when I try to run the game, it either fails or runs with a black screen and is unresponsive to the joystick and keyboard. I've tried running it using every conceivable DOS prompt and MS-DOS mode option, with no luck. Is there another trick to getting this program to run?

Steven Shaw, Internet

IT'S POSSIBLE that this program simply won't run under Windows 95's graphical interface or in MS-DOS mode. Before you commit open-file surgery on autoexec.bat and config.sys, do a little research. Since the game is popular, another player may have come up with a solution. Look for a frequently asked questions file in online service forums devoted to the game, on fans' Web pages, or in Usenet newsgroups. The game manufacturer's Web site or tech support line may also have an answer. You may even find a Windows 95 version of the game for downloading. Finally, you can download Microsoft's Windows 95 software-compatibility file from www.microsoft.com/windows/download/win95app.exe. The self-extracting archive file, in both Excel and Windows Help versions, lists programs that won't run in Windows 95, plus workarounds for others. Newer programs don't appear on the list, however.

If even this compatibility file doesn't help, try booting to the command prompt (press **<F8>** when 'Starting Windows 95' appears, then choose 'Command prompt only') and run the program there. For games on a CD-ROM or requiring a mouse, you'll also need to load the drivers for those devices in config.sys and autoexec.bat. Loading real-mode drivers prevents Windows 95 from loading its 32-bit drivers the next time you boot to the graphical interface, so you'll need to create a multiboot setup that lets you choose to install the drivers and skip the graphical interface, or vice versa. The figure on the next page contains config.sys and autoexec.bat files that you can modify to do just that.

To make the multiboot setup work, you also need to edit Win 95's msdos.sys file in the C:\ directory. Before you do, right-click the file in Explorer, choose *Properties*, uncheck *Read-only*, then click *Apply*. Open the file in a text editor, change the line BootGUI=1 to **BootGUI=0** (or add this line to the [Options] section if it doesn't exist), then save the file and exit. Reapply the read-only attribute when you're done. ▶

CONTENTS

ANSWER LINE
260 Connection speed obstacles, diagnose modem problems
261 Monitor memory, run games under Windows

WINDOWS
268 Clean up after installs, find the right font
270 Override default file extensions, use smaller wallpaper files, hide Windows start-up screen
272 DOS tune-up tips, delete old swap file

SPREADSHEETS
274 Create a spreadsheet calendar, copy formats quickly

WORD PROCESSING
278 Add dates to your documents
280 Fix corrupted Word menus, switch between WordPerfect toolbars

DATABASE TIPS
282 Design summary reports in Access

INTERNET TIPS
286 Order by e-mail, check out free e-mail
288 Find out about encryption software

HARDWARE TIPS
290 Protect your data

MULTIMEDIA TIPS
292 Put multimedia presentations on TV

UPGRADE GUIDE
294 Install a SCSI board

INTERNET

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▶**Here's How:** Turbocharge that old PC with a new motherboard.

PC WORLD

CONFIG.SYS	AUTOEXEC.BAT
[menu]	goto %config%
menuitem=Windows	:command
menuitem=Command	lh c:\windows\command\mscdex
menudefault=Windows, 10	.exe /d:cdrom001
[common]	lh c:\mouse\mouse.com
device=c:\windows\himem.sys	rem Replace the above commands
device=c:\windows\emm386.exe noems	with
dos=high,umb	rem the commands that load your
[Windows]	drivers
[Command]	goto end
device=c:\cdrom\cdrom.sys	:windows
rem Replace the above line with the command	win
rem for loading your CD-ROM driver	:end
[common]	

EDIT YOUR CONFIG.SYS AND AUTOEXEC.BAT FILES to load the drivers necessary for your games and bypass Windows' graphical interface. Just follow the instructions in the rem lines.

You can also boot game sessions using a Windows 95 or MS-DOS Startup floppy. Just remember to add the CD-ROM and mouse drivers.

DECODING WINDOWS 95'S MS-DOS MODE

I RECENTLY UPGRADED from Windows 3.11 to Windows 95. The install program disabled the commands that load the DOS CD-ROM extensions and mouse drivers to allow Windows 95's 32-bit protected-mode drivers to load with the graphical interface. If I press <F8> during boot-up and select 'Command prompt only', those drivers don't load. But when I select Start•Shut Down and choose 'Restart the computer in MS-DOS mode', the drivers load, eating up conventional memory. I've even tried renaming config.sys and autoexec.bat to prevent them from loading, to no avail. How are these programs being loaded?

Vernon Craig, Flint, Michigan

WINDOWS 95 USES one of two files (or both) to set MS-DOS mode's configuration. When you upgraded, Windows 95 probably moved existing CD-ROM settings to a file in the \Windows folder called dosstart.bat, then placed the rem statement in front of the CD-ROM and mouse driver commands in autoexec.bat. The rem statement keeps the command from being executed.

To prevent the drivers from loading, right-click *dosstart.bat* in Explorer, choose *Edit*, preface the commands you don't want to run with **rem**, then save the file.

There's an off-chance the drivers are loading elsewhere, however. The first time you start in MS-DOS mode, Windows 95 creates an Exit To DOS program information file in the same folder. Exit to DOS uses dosstart.bat or autexec.bat by default when you restart in MS-DOS mode. But you can also set it up to use custom config.sys and autoexec.bat files, which could be where the unwanted drivers are loading. In general, you should not have to set up these custom boot files in Exit To DOS, since they become the default setting for every DOS program set to run in MS-DOS mode. If a particular program requires a special driver or setting in MS-DOS mode, edit the settings in the program's Shortcut instead. To view your default MS-DOS mode settings, right-click the *Exit To DOS* file in Explorer and select *Properties•Advanced*. Make any necessary changes in the 'CONFIG.SYS for MS-DOS mode' and 'AUTOEXEC.BAT for MS-DOS mode' fields, then click *OK* twice to save.

Find files from this article at www.pcworld.com/software_lib. Answer Line *welcomes your questions and pays $50 for published items. Contributing Editor Scott Spanbauer is author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240). See page 14 for contact information.* ■

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Today's networked world, with its instant, pervasive communications, is making for a business environment that moves faster and is more fiercely competitive than ever before. And while many businesses are utilizing multimedia, e-mail, and the Internet to a competitive advantage, they are also realizing that there's a competitive downside to our increasingly wired environment: Information overload is making it harder than ever to stand out and be noticed, while the hectic pace of business calls for ever-faster response times. As a solution, more and more businesses are innovating with video to get the attention

DESIGN: ELAINE KWONG

of clients and customers—fast.

To fortify customer relationships, introduce client service team members, make sales presentations and product launches more memorable, add impact to Web sites, or just gain valuable "face time," many businesses are discovering the benefits of using their PCs to communicate with video. And as they do, they are finding a time- and money-saving alternative to face-to-face meetings that also adds a touch of humanity to a world dominated by impersonal voice mail and e-mail.

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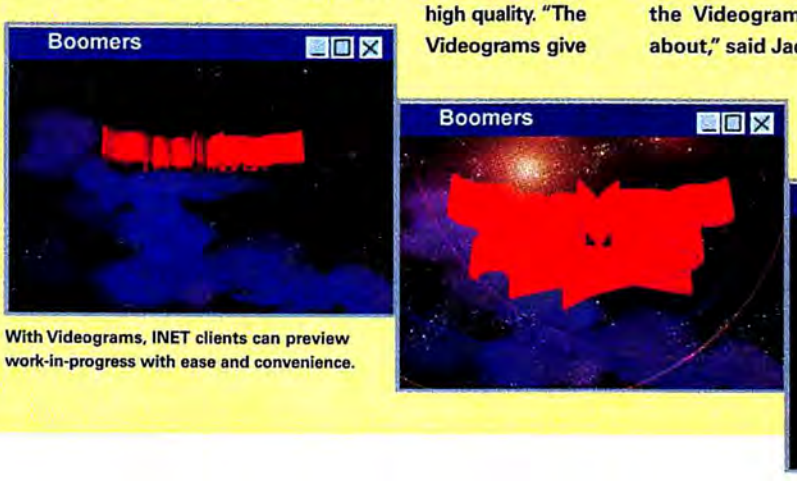
INET Multimedia develops content—everything from traditional TV commercials and product demo videos to CD-ROM animations and Web sites—for a variety of clients in the traffic-clogged Houston-metro area. With Videograms and a Pentium 133 system, INET is finding an efficient, easy-to-use timesaver. "We used to spend a good part of our work week stuck in traffic, heading to clients to get feedback on projects," said Robert Jacobs, director of video production at INET. "Now, we just e-mail a Videogram for rough off-line approvals. It saves us a tremendous amount of downtime and courier costs," he added.

Since INET downloads video direct from a betacam deck to an AVI file, the Videograms it produces are of exceptionally high quality. "The Videograms give our clients a very good idea of what the finished product will look like, even when we bump up the screen size beyond 320 x 240 pixels. We use them to make interim edits and revisions, and now only have to show up in person when it's time to sign off on the final cut," noted Jacobs.



With Videograms, INET clients can preview work-in-progress with ease and convenience.

Memorable marketing with Videograms.

Leave it to multimedia experts to figure out innovative ways to use Videograms to connect with their customers. At a recent trade show, instead of hauling around company brochures with business cards, INET came armed with promotional Videograms on floppies. "It sure got their attention. They could pop in the floppy, click on the Videogram icon, and instantly see what we're all about," said Jacobs. "People pick up all sorts of literature at trade shows and then trash it in the hotel room. Our Videogram made it back to their offices."

Save time with smaller files.

The smaller the file, the quicker the upload (and download). Here are some tips on creating files that won't keep you—or the recipients of your Videograms—waiting long:

- **Less motion makes for smaller files; to obtain more static images use a tripod with the camera**
- **A clear audio track provides better sound and creates a smaller file; for a clean track use a separate microphone**
- **Zooms, fades, dissolves, and other transitions increase file size**
- **Animations eat less bytes than video**
- **A still image with voice over can often communicate as much information as a full-motion video; this technique yields a very small Videogram file**

solution is showing up in a growing number of business and personal applications. The standard system including software and an easy-to-install capture board starts under $300, with camera, microphone, and CU-SeeMe video-conferencing software available as options. A souped-up QuickVideo Pro System offers advanced editing options, allowing users to combine multiple clips with different playback resolutions, as well as adjust the file size—hence the quality—of their Videograms. Any 486DX2/66 and up PC running Windows 95 or 3.1x with 8MB RAM and 20MB free disk space can create and play Videograms. The recommended configuration calls for a Pentium PC with 16MB RAM and a 1GB hard drive. (Before being compressed by the Videogram software, AVI files take up plenty of space—so the more free disk space, the better).

By Gary Frank

Now playing at a PC near you.

Movieweb, a virtual Hollywood on the World Wide Web (http://movieweb.com), provides Netizens with everything they could possible want to know about the movies: film reviews, publicity shots, celebrity lore, links to the home pages of studios and stars, and trailers of selected new releases. When Movieweb first started, the service used QuickTime and Video for Windows for posting trailers to its site. Now, with Videograms "We get the same or better video quality, more fps (frames per second), and a much smaller file size," said Dave Riess, president of the Los Angeles company. "That saves us a lot of bandwidth and storage," he added.

Self-playing Videograms give Movieweb visitors instant access to Hollywood's latest releases.

The small, self-playing Videogram files make it fast and easy for Movieweb visitors to download and view trailers. "The capture and conversion are quite good," Riess noted. "The quality of the downloaded video files is excellent, especially when viewed at 160 x 120 pixels," he concluded.

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Viewsonic 15GS	0.28	1280x1024	30-69	429	ViewSonic 17GS	0.27	1280x1024	30-69	699	ViewSonic PT810	0.30AG	1600x1200	30-96	1899

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Register new file extensions ◆ Compress wallpaper files ◆ Manage memory in DOS

Dispatching Unneeded Registration Files

MANY APPLICATIONS leave debris on your hard drive that you don't really need. Obvious examples are help and readme files (copies of which you may want to keep for reference). Much more useless are the online registration files installed by many applications from Adobe Systems, including Acrobat, PageMaker, and Photoshop.

The installers of these applications conveniently let you register the software by modem in a few easy steps. They also let you print out a form of relevant information if you'd rather register by mail or fax. Whichever method you use, the installer leaves an entire folder of online registration files that serve no further use.

Adobe programs don't clean up after themselves, but it's safe and easy for you to do so. Start Windows Explorer (Windows 95 or Windows NT 4.0) or File Manager (Windows 3.*x* or Windows NT 3.*x*), and open the main folder in which you installed an Adobe application. Then dig through this folder looking for a folder with the registration files. The name and location of the folder is not consistent among Adobe applications (in PageMaker, for example, you have to look in the Rsrc folder in the PageMaker folder), but the guilty folder usually has a recognizable name like Register or Regfiles.

Once you find it, just select it, press **<Delete>**, and answer *Yes* to any prompts. If you're not sure you've found the right folder, move it to a floppy disk or another location until you can confirm that the application runs fine without it.

POINT YOUR PROGRAM TO THE RIGHT FOLDER

TO FIND THINGS fast on your computer, you need to keep your hard drive organized. For most people, that means keeping work files in one (or more) folders and applications in their own separate folders. Unfortunately, the first time you run an application and choose *File•Save*, the directory or folder you see in the dialog box is often the same one in which you installed your application. You can click your way to your work files, of course, but this gets old after a while. How you can you make Open and Save dialog boxes automatically open to the directory you use most often?

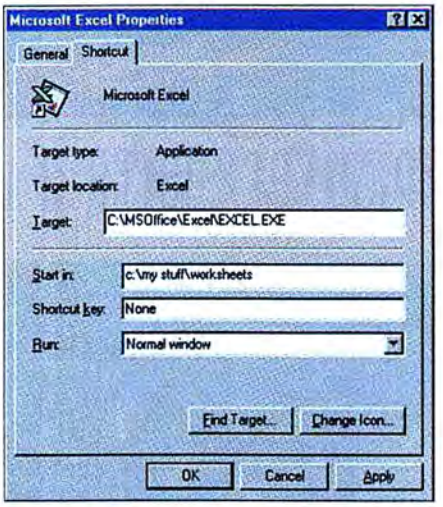

FIGURE 1: SAVE TIME DIGGING through folders by making your application's file dialog boxes open to the directory of your choice.

Simple. In Windows 3.*x*, switch to Program Manager, select the icon for your application, and choose *File•Properties* (or press **<Alt>-<Enter>**) to open the Program Item Properties dialog box. In the Working Directory box, type the path to the folder where you want to store the files you use with this application (for example, **c:\doc\letters**). Then click *OK*.

If you're using Windows 95, right-click the *Start* button and choose *Explore*. Dig through the Start Menu folders until you find the Shortcut icon for your application, the icon with the curved arrow. Right-click the icon, and choose *Properties* (or select it and press **<Alt>-<Enter>**) to open the Properties sheet for the application. Click the *Shortcut* tab. In the 'Start in' box, type the path to the folder where you store the files you use with this application. Then click *OK* (see **FIGURE 1**).

A few applications provide this feature for you. In that case, you may need to set the folder of your choice from within the program. For example, in Excel or Word, choose *Tools•Options*. In Excel, click the *General* tab, type the path to your spreadsheet files in the Default File Location box, and click *OK*. In Word, click the *File Locations* tab, double-click the *Documents* line, locate and select the folder for your Word files, and click *OK* and then *Close*.

The next time you start your application and choose *File•Open* or *File•Save As*, the dialog box will display your working directory without further fuss.

As to what folder you use for work files, that's up to you. You can organize files by the type of program that opens them, by file content, by date, or by any other criteria that suit you. If you don't store many work files on your computer, you might even save all of them in a single folder—such as the My Documents folder that Microsoft Office creates for you. But if the number of files grows very large, dividing the folder into multiple, logically named subfolders can help you find things faster.

FIND THE FINEST FONT FAST

WINDOWS 95 gives you a lot more tools for font selection than its predecessor did. Here are some tips for finding the TrueType font that you need.

Browse for fonts. Just open any Explorer window to the Fonts folder in the Windows folder. Double-click the name of the font to see samples of it at various sizes. To view multiple fonts, select several at once and choose *File•Open*, or right-click the selected files and choose *Open*. To cycle through the file of fonts, click *Done*, or right-click the Windows 95 Taskbar and choose *Cascade*, *Tile Horizontally*, or *Tile Vertically* from the resulting menu.

Keep printed samples. If you want to see what fonts look like in print (or show them to someone who can't see your ▶

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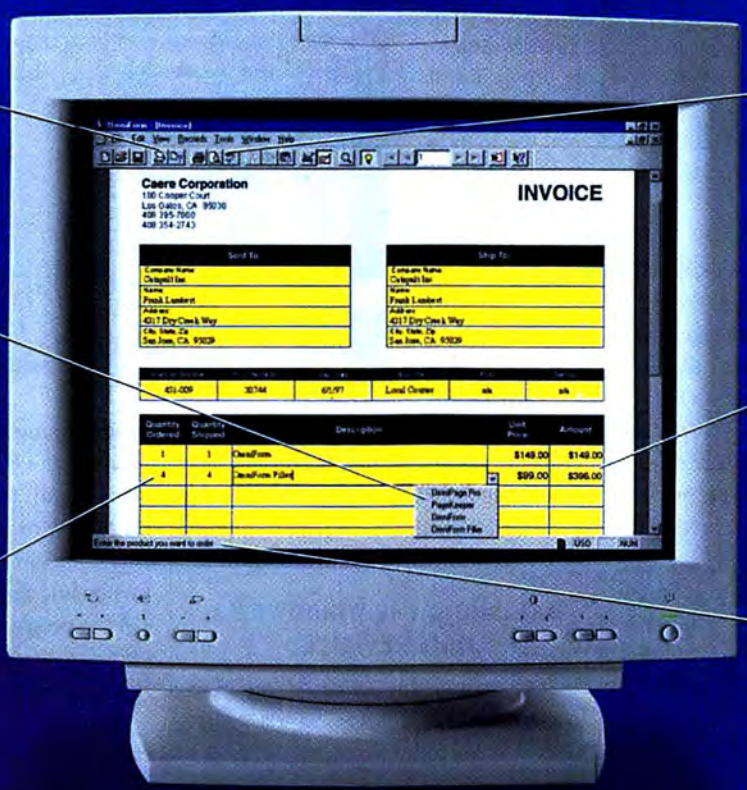

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Circle 91 on reader service card

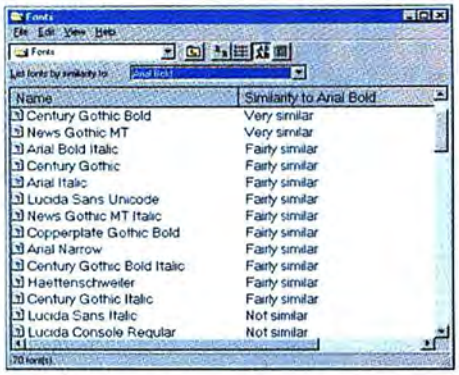

FIGURE 2: TRACK FONT SIMILARITIES with the Panose font-matching system.

screen), click *Print* in the font dialog box, confirm your printer settings in the Print dialog box, then click *OK*. To make a type sample book of your entire font collection, choose *Edit•Select All* in Windows Explorer, then *File•Print*. You'll still have to click *OK* in the Print dialog box for each font and *Done* in each font window, but you won't have to click *Print* in every window.

Track similarities. Windows 95 uses the *Panose* font-matching system to compare font similarities numerically—but for you the process is all point and click. In Windows Explorer, just choose *View•List fonts by similarity*, or click the *Similarity* button. Then select the font you're trying to match from the drop-down list above the font list. Windows sorts the list according to the degree of similarity to the selected font (see **FIGURE 2**)—very similar, fairly similar, or not similar. To reverse the order in which the fonts are listed, click the *Similarity to* column head. Fonts that don't contain the necessary comparison information are listed as having 'No PANOSE information available'. Admittedly, the descriptions of similarity are vague (maybe even lame), but if you have a lot of fonts, the ranking could save you time in looking for a suitable match.

CHOOSE YOUR FILE EXTENSION, PART II

DECEMBER 1996's *Windows Tips* explained how to register new file types to keep Windows apps such as Notepad and WordPad from overriding your file extensions and adding their own. That's fine if you routinely save your text files with different extensions (for example, MyCode.java).

What if you want to name a file with an offbeat extension like readme.1st every once in a while, but want the application to provide its default extension the rest of the time? Fortunately, Boyle Ke of Ontario, California, wrote in to explain it all.

The secret is to use quotation marks when you want your own file extension used. Just select *File•Save As*, enter the name of your file in quotation marks (for example, **"read.me"**), and click *Save* (as in **FIGURE 3**). The application will do your bidding, leaving your custom extension without adding one of its own.

BANISHING THE WINDOWS 3.X LOGO, REVISITED

SEVERAL READERS wrote in to suggest that typing **win :** (that is,**win** followed by a space and a colon) at the DOS prompt and pressing **<Enter>** is the easiest way to start Windows without displaying the Microsoft start-up logo (see "Hide that Old Logo," *Windows Tips*, December 1996).

Easy? Yes. Trouble-free? No.

Although this method of hiding the Windows start-up screen dates back to the dark ages of Windows version 2.*x*, it has been known to make Windows unstable on some computers. If you've been using this technique for some time without experiencing any problems, then suit yourself. But if you use it and have been chalking up those mysterious system crashes to overworked Microsoft engineers, you can rule out one possible cause by stopping this risky practice.

FIGURE 3: OVERRIDE DEFAULT EXTENSIONS by adding quotation marks to your file name.

A few people had problems with my recommendation for starting Windows—typing win, a space, pressing <F7>, then pressing <Enter>. If you you normally start Windows from a batch file (such as your autoexec.bat file), pressing <F7> in most text editors will not produce the desired result.

One solution is to use the other method I mentioned in the December issue: Type **win** followed by a space and the name of an application you would normally run anyway—for example, **clock.exe**.

But that raises still *another* problem: What if you don't want to launch a particular application every time you start Windows? A clever solution to this dilemma was sent in by Brent Durksen, via the Internet. He suggests that you just type **win progman.exe** into your batch file (or at a DOS prompt). This command starts up the Windows Program Manager (which would load anyway) without starting anything else. If you use a shell other than Program Manager, substitute the name of its executable file for progman.exe—for example, Norton Desktop users would enter the command **win ndw.exe**. ▶

WINDOWS TOOLBOX

Smaller Wallpaper Files

IF WALLPAPER FILES are sucking up too much space on your hard disk, check out Panorama 32, the automatic wallpaper changer that lets you use pictures saved in the highly compressed JPEG format instead of as .bmp files. You can customize the changing interval, search your system for images, and set a custom background color for each. Windows 95 and Windows NT versions of Panorama 32 are available for free on PC World Online and on other online services.

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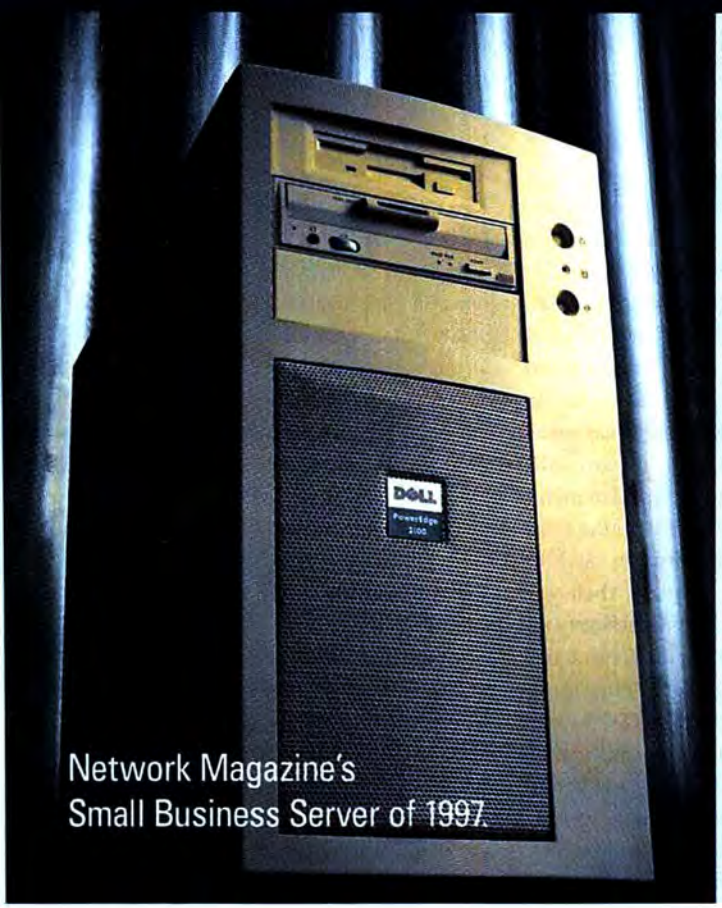

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All kidding aside, if you own a small business, the Dell PowerEdge 2100 really is a beautiful server. Just look at what *Network Magazine* had to say about it. "The Dell PowerEdge 2100 is designed specifically for small business environments and offers outstanding functionality, performance and customer support at the right price." Need more? The editors also went on to report that its advanced features like a 200MHz Pentium® Pro Processor, ultra-wide hard drives and a PCI Ultra/Wide SCSI-3 Controller will, in their words, "add at least a couple of years to the server's active lifecycle." And the fact that integrated server management and Intel®'s LANDesk® Manager software both come standard to give you an easy interface to the server's hardware monitoring functions. And now the PowerEdge 2100 is available with an expandable RAID controller, offering your business redundant data security. Plus there's next-business-day on-site service and a 24 x 7 toll-free support line with new "getting started" support. Speaking of getting started, shouldn't you?

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EIGHT TUNE-UP TIPS FOR DOS UNDER WINDOWS

IN OUR LAST exciting installment, we featured ten tried-and-true tune-up tips for the venerable Windows 3.*x*. But for many users, Windows is only half the battle. Here are some handy memory management tips to try when running DOS applications in Windows.

1. Check your settings. Click the *PIF Editor* icon in the Main program group, and open up the PIF file for your applications. Click *Advanced*, and make sure there are no checks next to 'Text', 'Low Graphics', and 'High Graphics' in the Monitor Ports section. In some cases, these settings may be needed for an application that is not displayed properly when you switch to full-screen mode (the settings have no effect on applications running in a window). If you can manage without them, you'll get better performance.

2. Do manual updates. File Manager can update its windows automatically when DOS applications work on files, but your DOS applications will run faster if that feature is turned off. In File Manager or Program Manager, choose *File•Run*, type **system.ini**, and press **<Enter>**. Locate the heading [386Enh] and make sure the line FileSysChange=off appears underneath it (and before any other bracketed heading). Save the file. Once you've disabled this feature, you can update the appropriate window in File Manager by pressing <F5>.

3. Work from memory. If you're still using DOS applications that need expanded memory, skip this tip. But if you have emerged from those dark times, you can give DOS applications the most memory by turning off Windows' ReservePageFrame setting. In File Manager or Program Manager, choose *File•Run*, type **system.ini**, and press **<Enter>**. Locate the heading [386Enh] and make sure the line ReservePageFrame=off is underneath it (but before any other bracketed heading).

4. Give DOS higher powers. Get more memory for your DOS applications in Windows by loading DOS into the high memory area (freeing up about 37K of conventional memory, your computer's first 640K of RAM). To do this, make sure your config.sys file starts with the line **device=c:\windows\himem.sys** (your path may vary) followed by a line that reads **dos=high**.

5. Give everything higher powers. Load into upper memory any utilities and device drivers you can. This means adding a line like **device=c:\dos\emm386.exe noems** to your config.sys file. If you use any DOS applications that require expanded memory, change the term 'noems' in the command line to **ram** (otherwise, stick to 'noems' to save more memory). Then, you can replace device= with **devicehigh=** and load= with **loadhigh=** to run drivers and TSRs in upper memory, freeing more conventional memory for your DOS applications. Make sure the line comes after the one that loads himem.sys and before any devicehigh= lines (loadhigh= is typically used in your autoexec.bat file, which is executed after config.sys).

6. Exterminate useless rodents. If you don't run any DOS applications that require a mouse, you'll save a little conventional memory by removing any mouse drivers that are loaded in your autoexec.bat or config.sys files. Type **rem** plus a space before each line to disable it; this makes it easy to restore the drivers later.

7. Focus on one task at a time. DOS applications tend to run slower under Windows because they spend so much time checking to see if any other application needs the processor. To make your applications pay more attention to what they're doing, try this: Start the PIF Editor, open the appropriate PIF for your application, and click *Advanced*. In the Advanced Options dialog box, type **10000** in the Foreground Priority box (**FIGURE 4**). Then click *OK* and choose *File•Save*. This ensures that your application gets full attention when it's needed but lets the computer do other chores when your application is idle. To go even further and forbid all multitasking, check the *Exclusive* box in the Execution section of the main PIF window.

8. Give it all you've got. If you want your DOS application to get maximum available memory, start the PIF Editor and load the PIF for your application. Then edit the KB Desired value to **-1** (not very intuitive, is it?). Choose *File•Save*, and you're done.

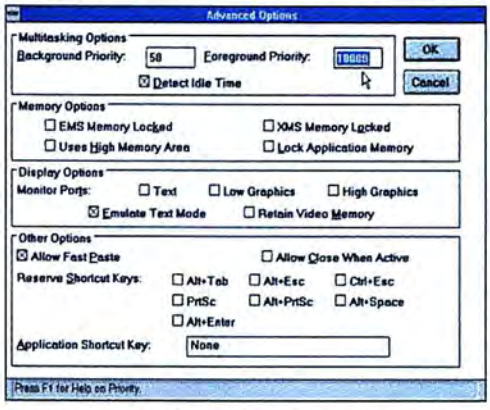


FIGURE 4: GET FASTER PERFORMANCE from DOS applications by giving them multitasking priority.

Delete Spare Parts

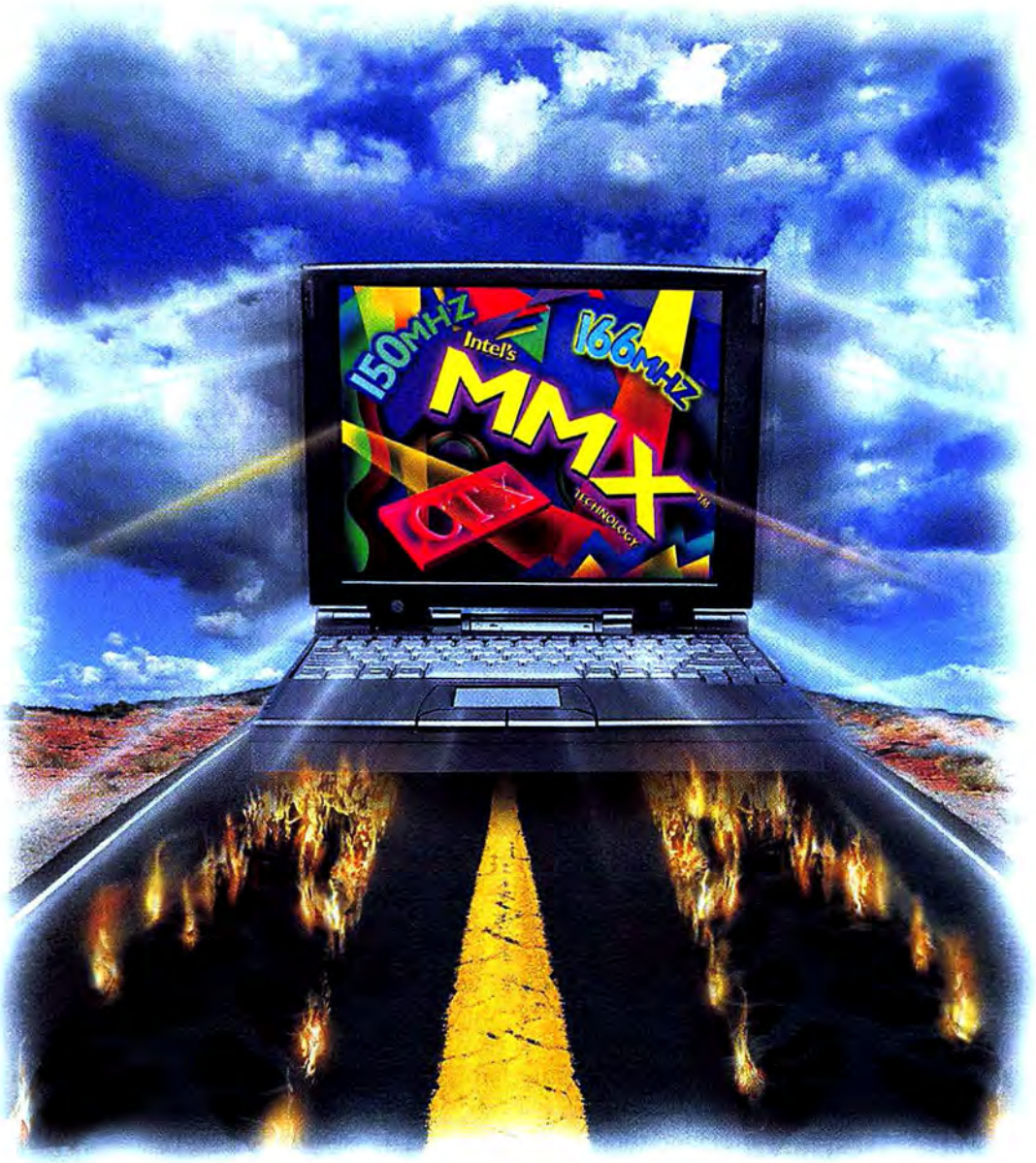
I FOUND A HUGE (12.5MB) file on my hard disk called 386spart.par. Can I safely delete it?

Ben Preston, Albuquerque, New Mexico

IF YOU'RE USING Windows 3.*x*, don't touch that file! It's your permanent swap file—the disk-based virtual memory Windows uses when you run out of memory. If the file is taking up too much space and you can get by on less virtual memory, double-click the *386 Enhanced* icon in the Control Panel, click *Virtual Memory*, click *Change*, and enter a lower size in the New Size box. Click *OK* and follow the prompts to restart your system.

On the other hand, if you upgraded to Windows 95 from Windows 3.*x*, Windows 95 could still be using the old 386spart.par file for its virtual memory. You can tell by checking the file's date. If the date hasn't changed since you upgraded, Windows 95 is undoubtedly using its own swap file, a hidden file named win386.swp, in the Windows folder. In that case, go ahead and delete 386spart.par.

Find files from this article at www.pcworld.com/software_lib and additional tips at www.pcworld.com/hereshow. Contributing Editor Scott Dunn is a principal author of the PC Bible, Second Edition *(Peachpit Press, 1995, 800/ 283-9444).* Windows Tips *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.* ■



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Circle 64 on reader service card

Put Your Calendar in an Excel Worksheet

I'VE HAD REQUESTS recently from readers asking how to set up a basic calendar in a spreadsheet. All it takes is a few formulas and a bit of fancy formatting. This month we'll create a calendar in Excel. Next month we'll show how to copy information from a spreadsheet database into your calendar.

Our example was constructed in Microsoft's Excel 97; however, Excel 5 and 95 use the same instructions.

1. Open a new worksheet, double-click the current sheet's tab, and name it **Calendar**. In cell A1, enter the first day of the month that you want your calendar to display—for example, **7/1/97**. Select *Format•Cells*, and in the Format Cells dialog box, click the *Number* tab, select *Custom* in the Category list, and enter **mmmm yyyy** in the Type edit box. Before closing the dialog box, click the *Font* tab and choose an appropriately large font for the calendar title, then click *OK*.

2. Select A1:G1 and click the *Center Across Columns* (or *Align Over Columns*) button on the Formatting toolbar.

3. Enter the numbers and the days of the week shown in rows 2 and 3.

4. In cell A4, type in this formula: **=if(weekday($A$1)>A2,"",$A$1+A2-weekday($A$1))**. Use the procedure described above to assign A4 the custom number format *d*, then copy A4 to B4:G4. This formula calculates the dates for the month, beginning on the appropriate day of the week.

5. In A6, enter **=G4+1**. In B6, enter **=A6+1** and copy it to C6:G6. Then copy A6:G6 to A8:G8 and A10:G10. Don't worry about the number formats yet; we'll set those in a moment.

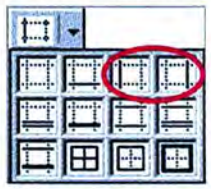
6. Since the month might end on any day in the last two weeks of the calendar (located in rows 12 and 14), we must create a formula-based range name: Select A1:G10, and choose *Insert•Name•Define*. Enter **LastDay** in the 'Names in Workbook' box. In the 'Refers to' box, enter the formula **=calendar!$A$1+day(date(year(calendar!$A$1),month(calendar!$A$1),+1,1)-1)**.

7. Select rows 12 and 14 and choose *Format•Cell*. Make sure the *Number* tab is selected, then click *Custom* in the Category list and enter **d** in the Type edit box.

8. Now, in cell A12, enter the formula **=if(A10+7>lastday,"",A10+7)**, and copy the formula to B12:G12.

9. In cell A14, enter **=if(A10+14>lastday,"",A12+7)** and copy it to B14:G14.

10. Now let's format the calendar. First, turn off the worksheet's grid lines: Select *Tools•Options*, make sure that the *View* tab is selected, uncheck *Gridlines* in the Windows Options section of the dialog box, and click *OK*. Next, select columns A through G, select *Format•Column•Width*, enter **16**, and click *OK*. Select row 4, select *Format•Cells*, click the *Font* tab, set the point size to *14*, and click *OK*. Select row 5, choose *Format•Cells*, click the *Alignment* tab, set the Vertical Alignment to *Top*, click the *Wrap Text* box, and click *OK*. With row 5 still selected, choose *Format•Row•Height*, enter **54**, and click *OK*. Select A3:G3, choose *Format•Cells*, click the *Border* tab, click *Outline*, and then click *OK*. Now click the *Borders* button on the Formatting toolbar and select a vertical alignment button from the resulting drop-down menu (which is shown here). Repeat the *Format•Cells•Border* command for A4:G5.



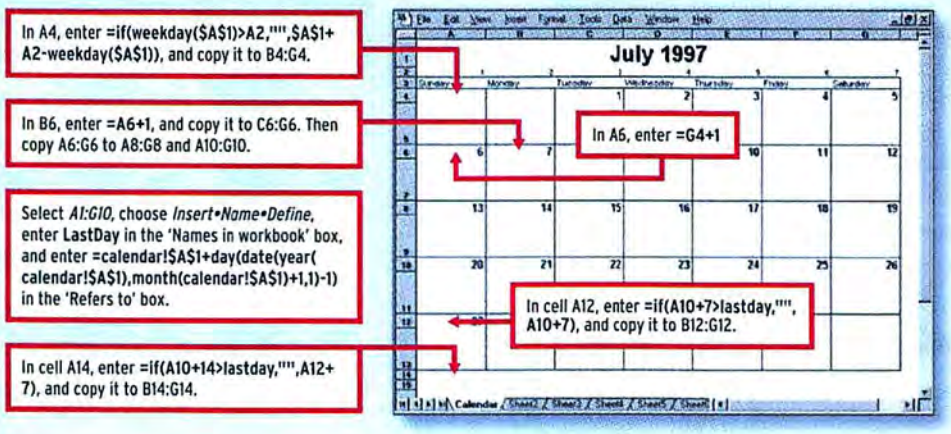
11. Finally, select rows 4 and 5, double-click the *Format Painter* tool, then in succession select rows 6, 8, 10, 12, and so on to complete the formatting. Click the *Format Painter* icon again to turn off the tool. As a finishing touch, you may want to hide the numbers in row 2: Select that row, then choose *Format•Row•Hide*.

12. Save your worksheet.

To create a calendar for a different month, just enter in cell A1 the date of the first day you want to display for the new month. If you want to make notations, enter them on the odd-numbered rows.

Find additional tips at http://www.pcworld.com/hereshow. Spreadsheets welcomes your tips and questions and pays $50 for published items. Contributing Editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina. See page 14 for contact information. ■

Formulas and Formatting Let You Create a Basic Calendar in Excel



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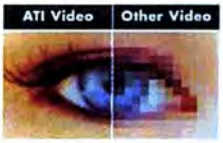

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Customize date formats ◆ Fix disasters in Word 97 ◆ Switch toolbars in WordPerfect 7

Get the Dates You Want

ALL OF TODAY'S word processors can insert dates automatically anywhere in your documents with a simple command. That's handy, but the date may not appear in the format you like, or it may update each time you open the document. Here's a guide to each program's date features.

Word 6.0, 7.0, and 97. To insert the current date at the cursor location, select *Insert•Date and Time*, then choose a format from the Available Formats list in the Date and Time dialog box. Check the *Update Automatically* box if you want the current date to appear each time you print the document. Otherwise, leave it unchecked.

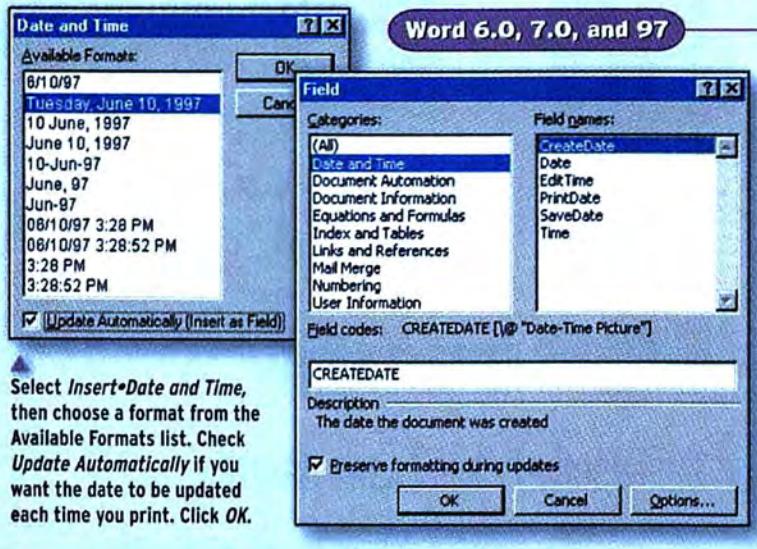
In Word 97, you can also change the default format for all inserted dates in the Date and Time dialog box. After selecting a format, click the *Default* button, then click *Yes* to confirm your selected format. This feature is not available in the earlier versions of Word.

Other date and time functions are also available in all versions of Word. To use these, select *Insert•Field*, and in the Field dialog box choose *Date and Time* in the Categories list, then select from the ▶

STEP BY STEP

Include Formatted Dates in Your Word, WordPerfect, and Word Pro Documents

Word 6.0, 7.0, and 97



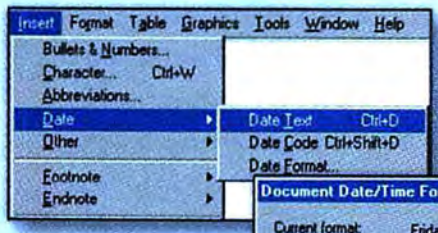
Select *Insert•Date and Time*, then choose a format from the Available Formats list. Check *Update Automatically* if you want the date to be updated each time you print. Click *OK*.

To insert a date field, select *Insert•Field*, choose *Date and Time* from the Categories list, then choose a field name. Click *OK*.

Word Pro 96 and 97

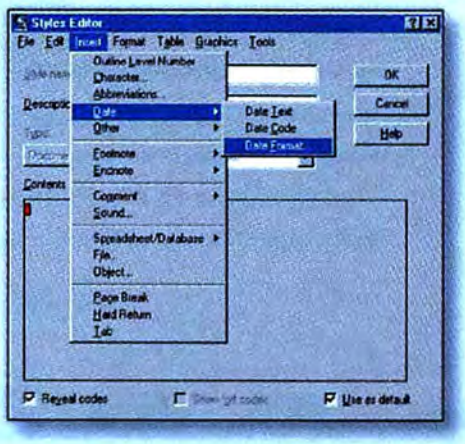
Select *Text•Insert Other•Date/Time*, select the *Date* button, choose a date type in the drop-down box to the right, then select a date format. Click *OK*.

WordPerfect 6.1 and 7

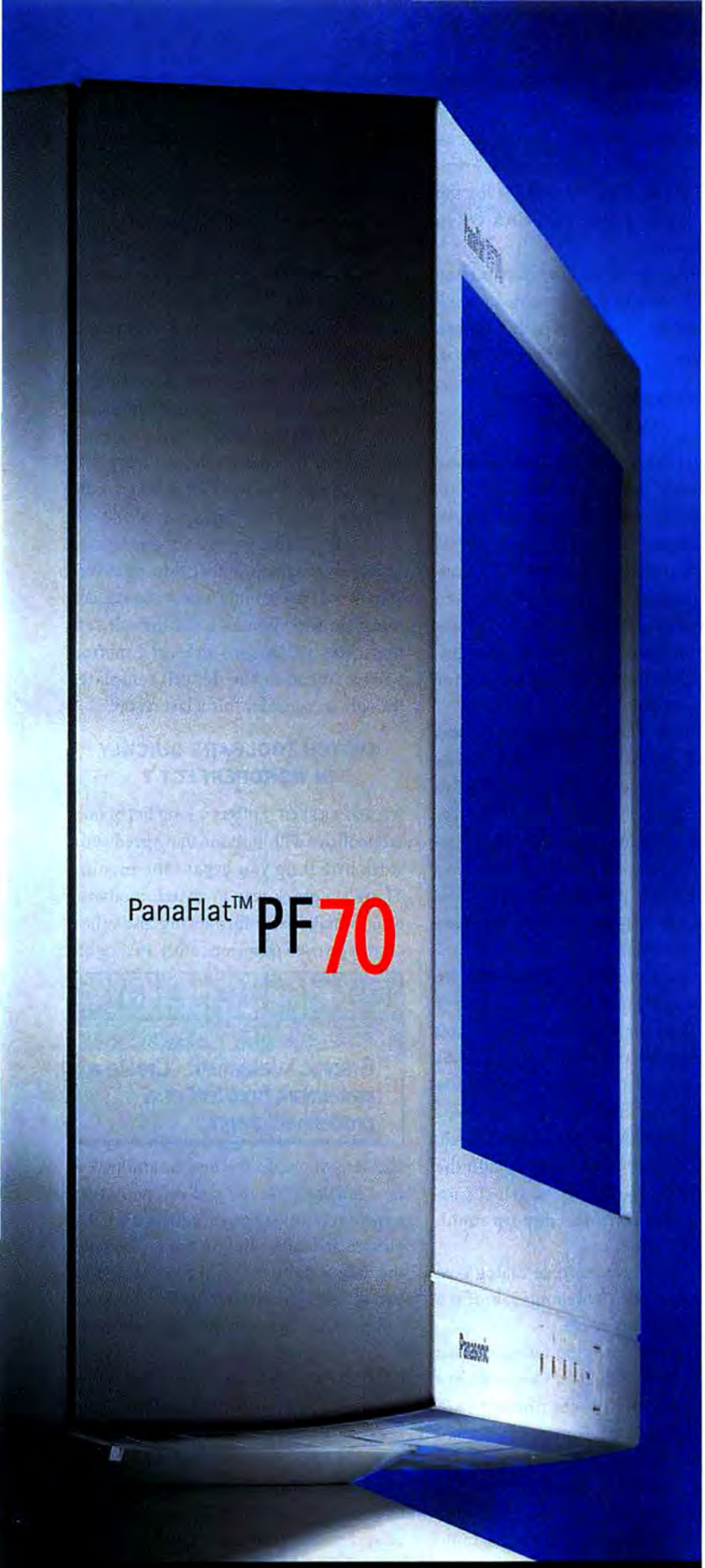


Select *Insert•Date*, then select *Date Text* (for a fixed date) or *Date Code* (for a date that is updated). You can also press <Ctrl>-D (for Date Text) or <Ctrl>-<Shift>-D (for Date Code).

If you want dates to appear in a certain format, before you insert a date, select *Insert•Date•Date Format* and choose from the Date/Time formats list. Click *OK*.



To specify a default date format, select *Format•Document•Initial Codes Style*. In the Styles Editor dialog box, select *Insert•Date•Date Format*, choose a format, then click *OK*. Back in the Styles Editor dialog box, check *Use as default*, then click *OK*.



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Nokia 447XAV	0.25	1600x1200	92 kHz	$968
EIZO FXC6	0.26	1600x1200	86 kHz	$960
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Field names list. When you click on a Field name, a description of its function appears in the dialog box.

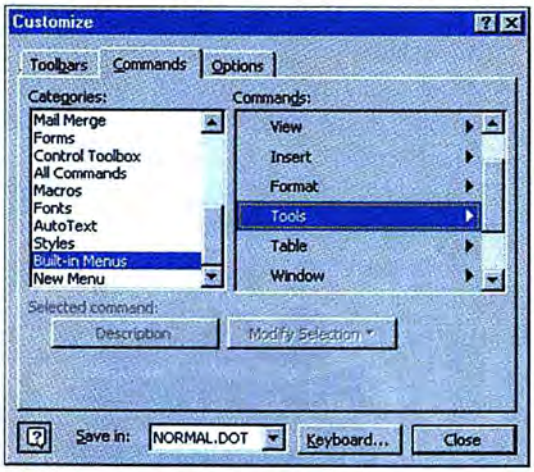
WordPerfect 6.1 and 7. To insert the current date at the cursor location, select *Insert•Date*, then select *Date Text* if you want a fixed date, or *Date Code* if you want the date to be updated every time a document is opened or saved. You can also use keyboard shortcuts to select these date types. Press **<Ctrl>-D** to choose Date Text or **<Ctrl>-<Shift>-D** to choose Date Code.

If you want your dates to have a particular format, select *Insert•Date•Date Format* before inserting the date. In the Document Date/Time Format dialog box, choose one of the formats in the Formats list, then click *OK*.

To make one date format the default for all your documents, select *Format•Document•Initial Codes Style*. In the Styles Editor dialog box's menus, select *Insert•Date•Date Format*, choose your preferred date format, then click *OK* to insert the formatting code into the Styles Editor dialog box. Check the *Use as default* box in the dialog box, then click *OK*.

Lotus Word Pro 96 and 97. To insert the current date and time at the cursor location, select *Text•Insert Other•Date/Time*. In the Insert Date/Time dialog box, select *Date*, then choose the type of date in the drop-down list to the right. To insert a date that will be updated whenever the document is opened, choose *Today's date (system)*. To insert a fixed date, choose *Today's date (static)*. Other options in this list offer additional flexibility. Next, choose one of the options in the Date format list. Finally, select a *List formats as* option for the month, day, and year, then click *OK* to insert the date.

Unfortunately, Word Pro offers no way to alter the default date format, so you'll have to use the dialog box each time you want to insert a date in a different format.



ADD OR REMOVE ITEMS FROM WORD 97's MENUS by selecting from the Customize dialog box.

FIX MENU DISASTERS IN WORD 97

WORD 97 LETS YOU add or remove main menu items on the menu toolbar; this increases your ability to customize Word's interface, but can lead to problems. While experimenting with this feature, I accidentally removed the Tools selection from the main menu and no longer had access to the commands in that menu—including the Customize command for changing menus.

To remove an item from the main menu, all you have to do is select *Tools•Customize*, then click the *Commands* tab in the Customize dialog box. With the dialog box on the screen, click the menu item you want to remove, drag it off the menu toolbar, and drop it somewhere else on the screen. It's so easy to do that mistakes are almost inevitable.

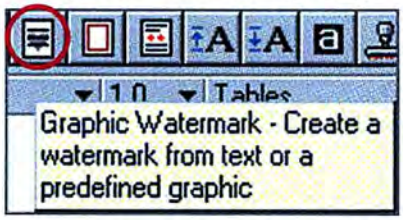
To restore a messed-up menu like the one that I got, you must resort to a bit of trickery. With the Tools option gone, you can't return to the Customize dialog box using menus. If you've accidentally removed some other menu item, these instructions will work just as well.

1. Right-click a blank area in the menu toolbar, then select *Customize* from the pop-up menu that appears.
2. In the Customize dialog box, select the *Commands* tab, if it's not already active.
3. Scroll down the Categories list and select *Built-in Menus*. Word's main menu commands will appear in the Commands list (see the figure at left).
4. Click the name of the command you want to restore in the Commands list, then drag it into position on the menu toolbar and drop it. As you drag, the mouse pointer becomes a small button with a plus sign. This step restores the main menu command, along with all the default commands in that menu.
5. Make sure the file name normal.dot appears in the 'Save in:' box, then click *Close* in the Customize dialog box to complete the fix and make it permanent.

If you somehow scramble Word's interface beyond repair, there's one other possible fix. With Word shut down, locate the normal.dot file, Word's default template, by selecting *Start•Find•Files or folders* or by using the Windows Explorer (normal.dot is usually in the Templates directory). Delete or rename the file. Next time you start Word, it will build a new normal.dot template with Word's basic default settings. You will lose any styles and macros you've stored in the default template, though, so consider this a last resort.

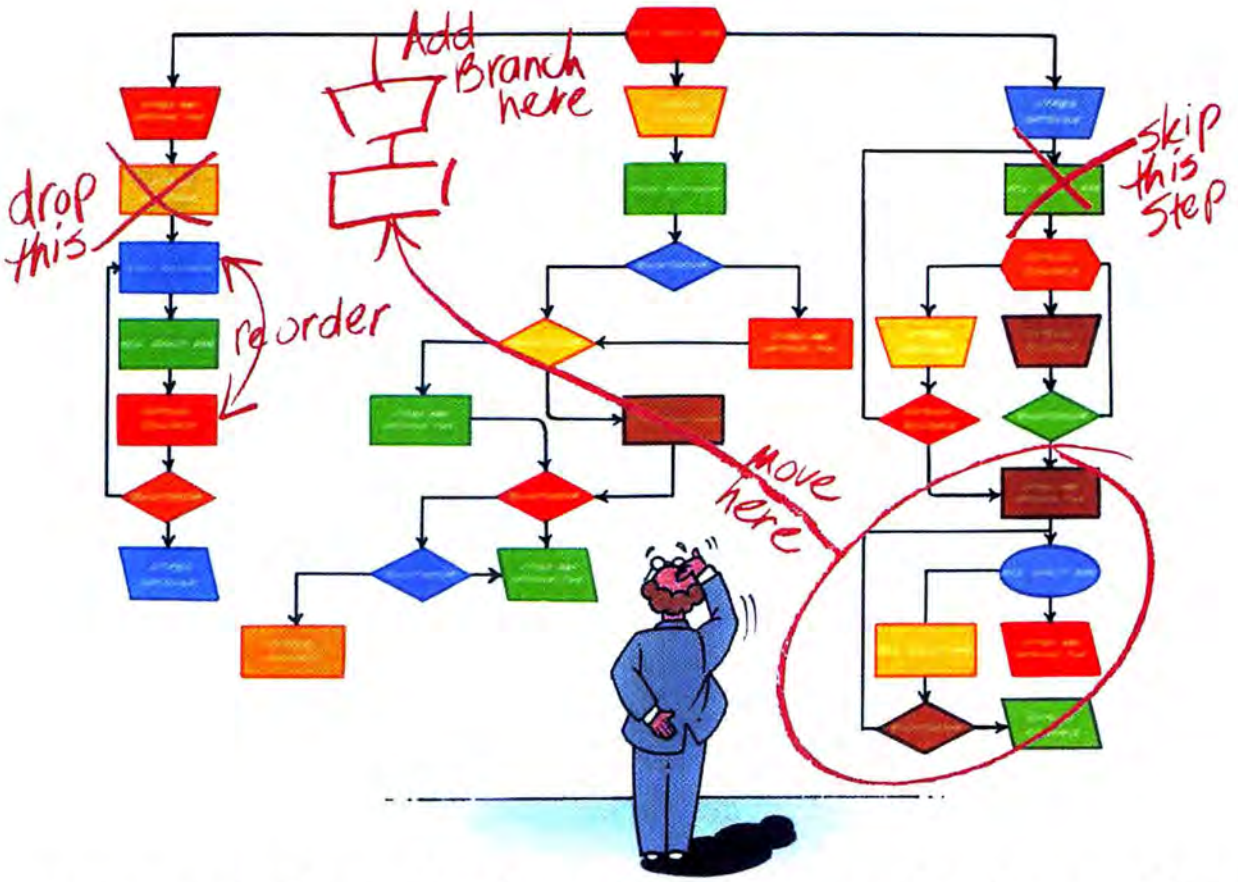
SWITCH TOOLBARS QUICKLY IN WORDPERFECT 7

WORDPERFECT 7 offers a long list of prefab toolbars with buttons that speed your work by letting you bypass the menus. There's a quick way to switch toolbars, too, to make your formatting and other chores go even more smoothly. Just right-



click anywhere on the toolbar and pick a new toolbar from the pop-up menu that appears. Hint: If you're not sure what a particular toolbar button does, just hold the mouse pointer over it for a second or two to see a description of that button's function, as shown in the figure above.

Find additional tips at www.pcworld.com/hereshow. Word Processing *welcomes your tips and questions and pays $50 for published items. Contributing Editor George Campbell contributed to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* *See page XX for contact information.* ■



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Create a Report With Access's Report Wizard

IN ACCESS 7 or Access 8, it's pretty easy to create a summary report with the Report Wizard. The trick is to figure out just what to do in each of the Wizard's steps. I'll walk you through an example that creates a report totaling expenses by categories. Expense amounts are stored in a table called Expense Details, and the names of the expense categories are stored in the Expense Categories table. To follow along, use Access's Expense template to create the tables in **FIGURE 1.**

Our report will show several pieces of summary information: the count of records for each expense category, the sum of the expenses for each category, and the sum of expenses as a percentage of the total report dollars.

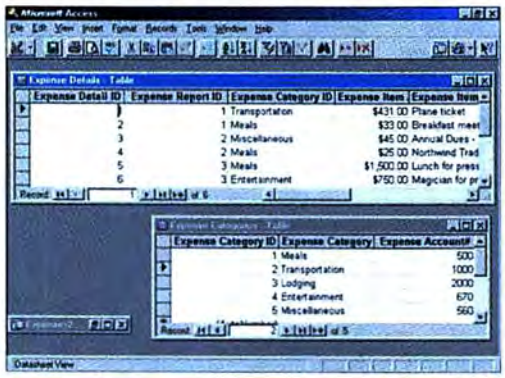

FIGURE 1: THE EXPENSE CATEGORY ID FIELD ties the Expense Details table to the Expense Categories table.

Click the *Reports* tab in the Database window and then click *New*. In the New Reports dialog box, click *Report Wizard*, select *Expense Details* in the drop-down list at the bottom of the dialog box, and click *OK*. Select the fields for your report in the first Wizard step. Select *Table: Expense Categories* in the Tables/Queries drop-down list and add *ExpenseCategory* to the Selected Fields list. Next, select *Table: Expense Details* in the Tables/Queries drop-down list, and add *ExpenseAmount* and *ExpenseDate* to the list. Click *Next*.

In step 2, the Wizard asks how you want to view the records in the report—that is, how you want the records grouped. For this example, select *by Expense Categories* because we want to show the number of records, the total sales, and the percentage of total sales for each category.

In step 3, the Report Wizard asks you for additional grouping fields. You can also determine how a field's values should be grouped. For example, instead of grouping a date field by individual dates, you can sort by year, quarter, month, and so on. There are different options for grouping other types of fields. To change the default grouping, click *Grouping Options* after you select additional grouping fields. Don't worry about setting up a group just to sort; you'll get a chance to choose sorting fields in the next dialog box. Since we don't show summary fields for any groups here other than ExpenseCategory, click *Next* without adding groups.

Step 4 is more involved. For the first sort field, select *ExpenseDate;* don't click *Next* just yet. Click the *Summary Options* button to open the Summary Options dialog box (**FIGURE 2**). As you can see, it has boxes for calculating the sum, average, minimum, or maximum value of any numeric field. There is no option for counting records because the Wizard automatically adds a summary field for this in each group. In our example, the Wizard shows the number of records for each expense category. Check the *Sum* box for the ExpenseItemAmount field, check *Calculate percent of total for sums*, click *OK*, then click *Next*.

In the following steps, select *Stepped* for the layout and *Formal* for the style. Enter the report title **Expenses by Category**, then select *View•Report Design* from the menus.

Now let's do some work on the report so that it looks like **FIGURE 3**. First, change the name of the summary field the Wizard placed to show record counts by category: Summary for 'Expense CategoryID' = 1 (3 detail records). Double-click the field to open its Property menu, then click the *Control Source* line and press **<Shift>-<F2>**. Change the contents in the Zoom window to **=Count(*) & " " & IIf(Count(*)=1,"detail record","detail records")**. This tells Access to show the number of records for the category, followed by the term 'detail record' or 'detail records'. Click *OK*.

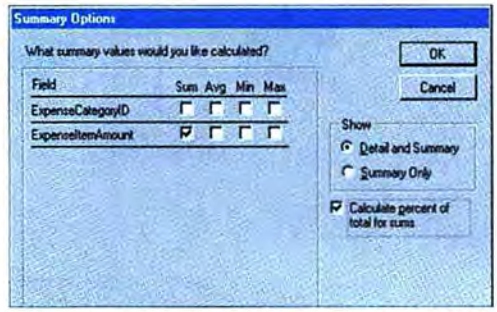

FIGURE 2: SELECT THE SUMMARY FIELDS you want included, or hide detail to see the big picture.

Next, let's rearrange the objects in the group footer. Drag the labels and text boxes up and resize them to look like Figure 3. Then drag the bottom border of the group footer up to save some white space on the printed page.

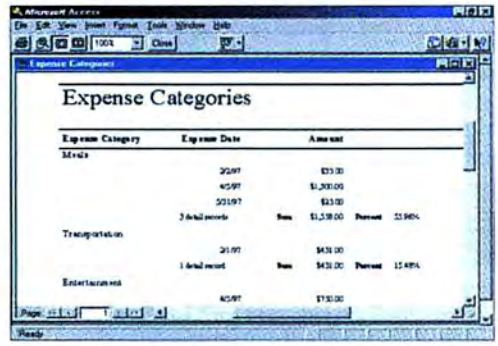

FIGURE 3: TO CREATE THIS REPORT, we tailored the Wizard's results in the report design window.

Database Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Celeste Robinson is coauthor of* Mastering Paradox 7 for Windows 95 *(Sybex, 1996, 800/227-2346).* *See page 14 for contact information.* ■

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IS THERE A WAY to download software and information from the Internet via e-mail? My Internet access is through Juno's e-mail-only service.

Nigel Lee Burns, Internet

MANY USERS OUTSIDE the United States can reach the Net only through e-mail. Still, they're able to snag software off FTP sites, retrieve FAQs (frequently asked questions) from Usenet newsgroups, capture text from Web pages, and participate in Internet discussions.

Recently we've been hearing from readers closer to home whose only access to the Net is via e-mail—through free e-mail services like Juno, or from public libraries. If your access to the Net is through a mailbox, here are some tricks for finding and snaring information.

To Get FAQ Files:

1. Send a message to mail-server@rtfm.mit.edu (FAQ files for all newsgroups are archived here). Leave the subject line blank and type the message **send usenet/news.answers**. This request will garner you a list of all the FAQ directories available through the Usenet discussion groups.
2. Find the directories that interest you, and post another message to the FAQ server requesting a list of files in those directories. The message **send usenet/news.answers/AudioFAQ** will get you a list of all the FAQ files in the AudioFAQ directory.
3. To get the FAQ file you need, send another e-mail message that contains the name of the file you want and its subdirectory—for example, **usenet/news.answers/AudioFAQ/AmbisonicFAQ**. (Remember that servers like this are UNIX-based, so the names of directories and files are often case-sensitive.)

To Find and Get Software:

1. Send an e-mail to an Archie mail server—a database system that contains indexes to over a thousand public servers and their files. The message to any one of several Archie servers (archie.mcgill.ca, archie.sura.net, archie.unl.edu, archie.ans.net, or archie.rutgers.edu) should have the following two lines:

set search sub
find *keyword*

For *keyword*, type your search term. The server will send you back an e-mail message listing the files and addresses of FTP sites where relevant software resides. Hint: Whenever possible, type the name of the software that you're trying to find as the search term.

2. Once you have an FTP address, send an e-mail message to an FTP mail server, such as bitftp@pucc.princeton.edu, with lines that tell the server what you want it to do. For example:

open pcworld.com
chdir pub
dir
quit

This message tells the FTP mail server to log on to the pcworld.com FTP site, change to the public directory, and get a directory listing.

3. To get the file you want, send another e-mail message like this, which gives the server additional instructions:

open pcworld.com
chdir pub
binary
get w95drv.zip
quit

This message tells the FTP mail server to log on to pcworld.com, go to the public directory, switch into binary file transfer mode, download the file w95drv.zip, then log off, sending the file in a message.

To Get Text From a Web Page:

1. Send a message to a Web mail server, such as agora@info.lanic.utexas.edu, with a message like this:

send http://www.pcworld.com/

This message will get you the text from *PC World*'s main Web page.

To get a list of all the mail servers on the Internet, send the following message to mail-server@pit-manager.mit.edu:

send usenet/comp.sources.wanted/How_to_find_sources_(READ_THIS_BEFORE_POSTING)

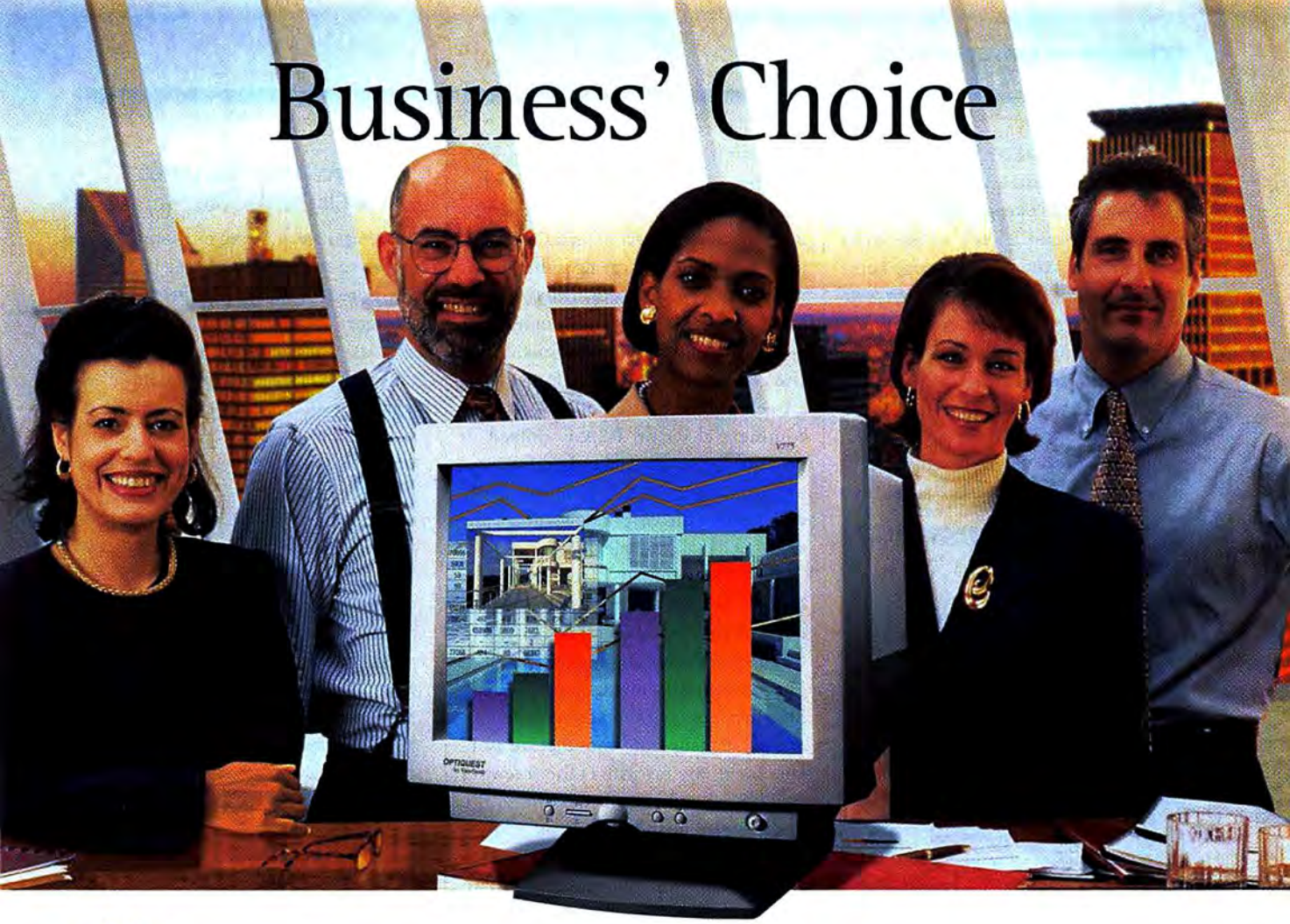
You can also read *Dr. Bob's Painless Guide to the Internet & Amazing Things You Can Do With E-Mail* by Bob Rankin ($12.95, No Starch Press, 1996, 800/420-7240) for more e-mail hunting tips.

GET YOUR FREE E-MAIL HERE

SEVERAL SERVICES OFFER free Internet e-mail (see **FIGURE 1** below and "Free E-Mail, but Ads Galore" on page 288). The oldest of them all, Juno, offers subscribers free software and an e-mail–only Internet link. The others require that you already have an Internet service and a Web browser. These services are convenient if you access the Net through a public place like a library or a coffee shop. They're also handy if you have an Internet account at work but would like to pick up your private e-mail outside the office.

FIGURE 1: NETADDRESS LETS YOU SEND AND RECEIVE e-mail if you already have some sort of Internet access.

But the drawbacks of these free e-mail services are numerous. In addition to the ads you may receive with each piece of e-mail, receipt and delivery can be slow. Some of the services permit you to receive only a limited number of messages each week, and some may store waiting mail on the service for only a week, then delete it. Also, while these services say they respect the privacy of subscribers' mail, you may want some safeguards. For more on that, see the next item. ▶



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Max. Resolution	1,600 x 1,280	1,600 x 1,280	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,024 x 768
Horiz. Scan Freq.	30-86kHz	30-85kHz	30-69kHz	30-70kHz	30-65kHz	30-70kHz	31.5/37.5/48.4kHz
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Circle 246 on reader service card

LOOSE-LIPPED? ENCRYPT!

IF YOU WANT to know what life would be like if we couldn't keep e-mail and computer files private, a letter on the Pretty Good Privacy Web site (www.pgp.com/phil/phil-letters.cgi) offers sobering testimony. The writer works for a human rights agency in the Balkans whose offices have been raided numerous times by police searching for evidence of subversive activity. Without encryption, the writer says, "we would not be able to function and protect our clients." He says he spent 13 days in prison for refusing to reveal the agency's passwords.

FIGURE 2: SEND AND RECEIVE encrypted e-mail and files easily with PGPmail.

You don't have to be a freedom fighter in a war-torn country to value encryption. If you have correspondence or data that demands strict privacy, you should consider encrypting it, especially if you plan to bounce it across the Net as e-mail. Most people forget that the Internet is a public place and that mail ricochets through a number of computers before reaching its recipient. Any of those computers can be vulnerable to prying eyes.

The most popular encryption software is Phil Zimmermann's Pretty Good Privacy, which uses the Rivest-Shamir-Adleman cryptographic scheme. RSA is based on the difficulty of factoring large numbers and is as close to unbreakable as a code can get. Pretty Good Privacy also lets you add digital signatures, so the receiver of one of your messages can verify that you sent it (see "Secrets of Encryption: A Glossary of Buzzwords").

Over the years, controversy has dogged RSA, but it seems to be subsiding. RSA Data Security, a company started by the three MIT mathematicians who invented the RSA code, claims to own the patent (although mathematical algorithms technically can't be patented). The company has licensed RSA for use in a number of e-mail and network applications. It has also granted MIT permission to distribute a free implementation of RSA to noncommercial users. RSA is poised to become the security standard for electronic commerce on the Net and probably will become the corporate standard for securing e-mail and telephony.

You can download a free version of Pretty Good Privacy from web.mit.edu/network/pgp.html or from PC World Online (www.pcworld.com/software_lib/). The program lacks menus and can be baffling to use, so you should also download one of the many front ends that are available for it. My favorite is the freeware Aegis Shell, which offers key and file management features.

You can download Aegis Shell 2.1 from www.aegisrc.com:80/products/frmain.htm, or look for it on PC World Online. A slicked-up shareware version was in beta as this went to press—it's also downloadable from the Aegis site.

If you're in business, consider Pretty Good Software's ViaCrypt, a full-featured encryption program, for $129.

Another easy way to incorporate RSA cryptography in your life is with PGPmail for Windows (see **FIGURE 2**). It can work with e-mail programs like Eudora or your browser to provide fast encryption and decryption of messages. You can download PGPmail from www.pgp.com or from PC World Online.

Secrets of Encryption: A Glossary of Buzzwords

Digital signature. A string of characters attached to an encoded message that allows the recipient to verify the authenticity of the message. The character string is a calculation based on the sender's secret key and the contents of the message. To authenticate a message, the recipient checks it with the sender's public key.

Encryption. The process of encoding a document so others can't read it.

Keys. In the RSA scheme, you use a public key and a private key to create a unique code. You give the public key to others so they can encode documents to send you. You keep the private key secret and use it to decode messages you receive.

PGP. Pretty Good Privacy, popular encryption software based on the RSA scheme.

RSA. The Rivest-Shamir-Adleman public key cryptographic scheme, one of the most effective encryption methods.

• ViaCrypt $129 list, PGPmail for Windows $149.95; Pretty Good Software; 800/536-2664, 602/944-0773; www.pgp.com

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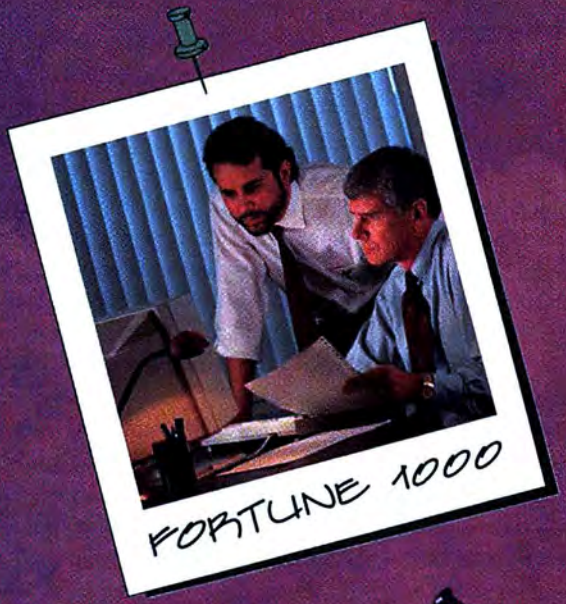

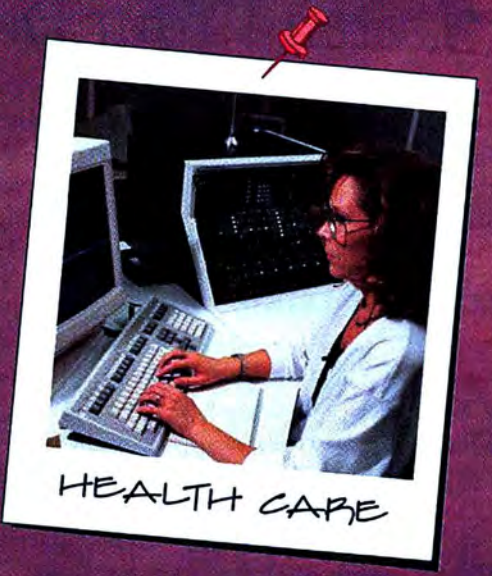

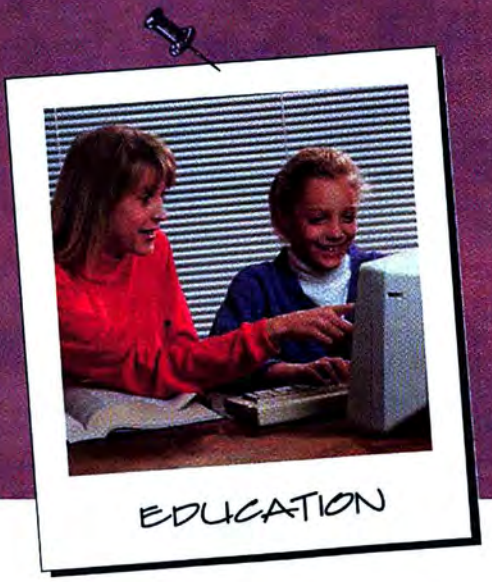

PC World, January 1997
Top 20 Systems Review

- *DTK QUIN-55M/Pentium® Processor 200MHz #20 Power Desktop*
- *DTK QUIN-55M/Pentium® Processor 133MHz #9 Budget Desktop*

Computer Reseller News
Test Center, 3/24/97

"DTK's QUIN-55M/PM200 finished as king of the hill when it came to the WinTune 95 non-MMX [™ technology] benchmark suite. In the MMX [™ technology] tests, the DTK offering tied for second place."

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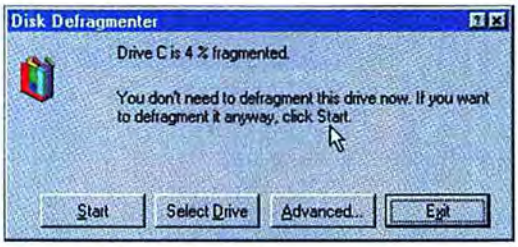
Circle 84 on reader service card

Defend Your Data!

EVERYONE DESERVES A second chance. And even if you've accidentally deleted a file or lost data to a dying hard disk, you usually can get another shot—if you've done a little work ahead of time.

AN OUNCE OF PREVENTION

Back up your data. If you really need to protect your data, back it up! If you don't have a tape backup device or network drive at your fingertips, at least make sure your Windows 95 Startup disk is handy. And back up your most important files to a floppy at least once a week. In Explorer you can sort long lists of files by date, so the most recent ones are easy to find.



RUN WINDOWS 95'S DISK DEFRAGMENTER regularly to get a better shot at recovering files.

Run ScanDisk. ScanDisk examines your hard disk for logical inconsistencies and damaged surfaces. You'll find it in Windows 95 on the Programs•Accessories•System Tools menu. Run it every two or three weeks just to be safe.

The most common ScanDisk error message warns you of lost clusters. You'll be asked whether to save them to a file or delete them. Delete them.

Clusters are just chunks of storage space on the hard disk where files are kept. Each file takes up at least one cluster, but large files will use groups of clusters known as chains. This error message means that a lost cluster has slipped through the cracks of Windows 95's bookkeeping system—the File Allocation Table—that keeps track of which files are in which clusters. If you worry that lost clusters *do* hold valuable information—rarely the case—then save them to a file.

A less frequent problem is cross-linked clusters. Here the FAT shows a single cluster being shared by multiple files. The fix is easy, sort of. Just make copies of the affected files and delete the originals. Unfortunately, ScanDisk won't tell you which files are cross-linked. To find that out, you'll need a utility like Disk Edit in Symantec's Norton Utilities.

Run Disk Defragmenter frequently. One file might not be stored in adjacent clusters. Disk Defragmenter, also found on the Programs•Accessories•System Tools menu, rearranges the data on your hard disk so that each file is stored in a set of contiguous clusters. This is *very* important for data recovery, since success is more likely when the damaged file's clusters are adjacent to each other.

Get Norton Utilities. If you're serious about data recovery, Norton Utilities 2.0 is a must. Its indispensable Image utility backs up critical hard disk data like boot records and FATs. It also includes a handy unerase program; a good disk diagnostic program, Disk Doctor; and the best data recovery tool around, Disk Edit.

A POUND OF CURE

RECOVERING LOST data from a hard disk requires one important element: luck. Without it, expect to spend lots of time and quite possibly tons of money.

Unerasing a file. The good news is that when Windows 95 deletes a file, it only changes one letter in the file's name; the actual data is untouched. The bad news is that if the clusters holding that data aren't contiguous, programs like Norton's Unerase or DOS's UNDELETE may not find all the data. Your data can also be written over by a new file before you undelete it.

Windows 95 doesn't come with an undelete utility. Apparently Microsoft felt that once you empty the Recycle Bin, you don't deserve another chance.

I think you do. If you don't have Norton's Unerase or something similar, look for an old copy of UNDELETE.EXE that came with pre–Windows 95 DOS. It will work with Windows 95, but Win 95 needs to secure the hard disk properly before it can let UNDELETE have its way with the disk. Here's what to do:

Restart Windows 95 in MS-DOS mode, and from the DOS prompt type **lock C:** (or whatever drive letter you're using). Now UNDELETE will work. When you're done unerasing files, type **unlock C:** to return Windows 95 to normal.

Recovering data from a damaged hard disk. First, try to determine how badly the drive is damaged. Boot from a floppy and try to read the drive. If you can, you should be able to copy important files to safety. Your first priority should always be to save your data, not fix the drive. A 'sector not found' message indicates that the disk may soon be useless.

On the other hand, key disk configuration information, like the master boot record (the very first sector of the disk, where vital partition and boot-up information is stored) or FAT, may have been corrupted by a virus or a power surge.

If you think you've got a boot sector virus, *don't* use the Fdisk /mbr command. This rewrites the master boot record and is often suggested as a cure for a hard disk with a boot sector virus—and it works. But some viruses move vital configuration data to different parts of the disk, rather than destroy it. Kill the virus, and you won't know where to look for your data.

To restore the boot record or the FAT yourself means resorting to surgery with a tool like Disk Edit. Unfortunately, Symantec provides no documentation for Disk Edit in Norton Utilities 2.0. Your best bet is to find the docs for an older copy of Norton Utilities or an after-market manual.

• Norton Utilities 2.0 $79 street; Symantec; 800/441-7234; www.symantec.com

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PC-to-TV Made Easy

WHAT'S THE EASIEST way to display multimedia presentations on a TV set and record them on a VCR?

Niraj Bhatt, Internet

I WANT TO run games and multimedia CD-ROMs on a big-screen TV. Any suggestions on low-cost video scan converters?

Dennis Rials, Dallas

THE LATEST developments in multimedia technology—including MMX, Video CD, DVD, and MPEG—have renewed interest in PC/TV applications. And there's a growing list of affordable products for connecting a PC to a TV or VCR.

The simplest solution is an external PC-to-TV converter box, which will cost about $100 and up. Most low-end converters work with VGA display adapters and produce 256 colors at 640 by 480 resolution on any NTSC-standard TV set. To run programs that produce up to 16.8 million colors at 800 by 600 (or higher) resolution, you may need to spend around $400.

Most converter boxes are compact, lightweight, and easy to set up, which makes them handy for professionals who use portable PCs for mobile presentations and training. You simply connect a 15-pin VGA cable from the PC's graphics board to the box, connect a second cable from the box to a TV's or VCR's video-input plug, and plug the box into a power outlet (typically via an AC adapter). Most converter boxes let you connect your VGA monitor at the same time.

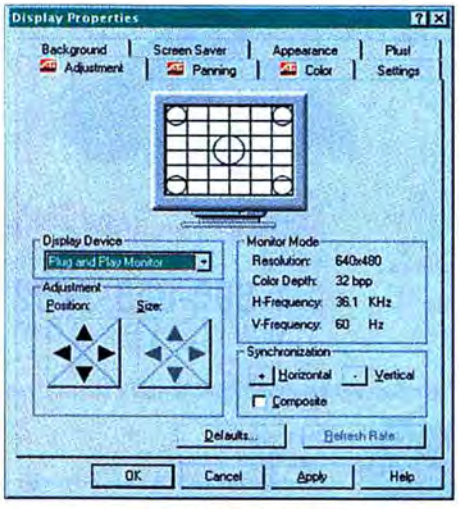

FIGURE 1: VIEW MULTIMEDIA ON A BIG TV with a board such as ATI's 3D Expression+ PC2TV.

These PC/TV converters lack audio connectors. You'll need an audio cable that runs directly from a PC's audio-output plug (via a sound card or built-in sound connectors) to the audio-input plug of a TV, VCR, or stereo system.

Once everything is hooked up and turned on, you can adjust the image until it looks right on the TV screen. Some converters have controls on the box for such things as color and brightness, while others use software for all image tweaking. The best boxes also let you set the image for full edge-to-edge viewing.

Manufacturers of PC/TV scan converters include AITech (www.aitech.com), Antec (www.antec-inc.com), Focus Enhancements (www.focusinfo.com), and VideoLogic (www.videologic.com).

A second way to display your PC applications on a regular TV is to use a graphics board with built-in video-output capability. These boards cost about $190 and up, depending on the memory, graphics modes, and added functions they offer. Boards like these are a logical choice for game and multimedia buffs, and they're also useful for businesses that want an easy PC/TV setup in the conference room.

Setup with a PC/TV graphics board is simple. You just connect one video cable (composite or S-Video) and one audio cable (running from a separate sound card or built-in audio output) between your PC and the TV or VCR. The boards also come with software that lets you tweak the converted TV image directly from the keyboard (see **FIGURE 1**).

Manufacturers of graphics boards that have these built-in (or add-on) PC/TV capabilities include AITech, Antec, ATI Technologies (www.atitech.ca), Matrox (www.matrox.com), and Miro Computer Products (www.miro.com).

One more solution: If you're in the market for a multimedia notebook, check out Gateway 2000, Micron, Sony, and Toshiba for MMX-powered portables that feature built-in video-output connectors (NTSC or S-Video). Though pricey, these PCs make it a snap to quickly plug in to any TV and showcase your presentations or battle The Dark Side in Rebellion.

MMX: LET THE GAMES BEGIN

MMX-DESIGNED GAMES and applications are now slowly appearing—and if you haven't seen any, you're in for a treat.

Check out Ubi Soft's POD, a head-banging racing game notable for its high frame rates and Dolby Surround Sound (www.ubisoft.com). Also look for Eraser-

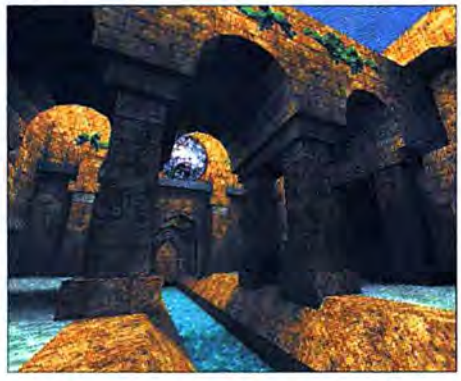

FIGURE 2: MMX-ENHANCED TITLES include Unreal, Epic MegaGames' stunning action game.

Turnabout (www.ipilots.com) and Virtual On (www.sega.com/segapc). Unreal (www.gtinteractive.com) offers breathtaking 3-D environments and CD-quality audio (see **FIGURE 2**).

Two other titles destined for hit status are Space Station Simulator (www.maris.com) and Visual Home Deluxe (www.btw.com). What's really impressive is their instantaneous response time as you walk seamlessly through the simulated environments. For information on MMX-geared software, go to Intel's MMX titles page (mmx.com/mmx/software/).

online *Find additional tips at www.pcworld.com/hereshow.* Multimedia Tips *welcomes your questions and tips and pays $50 for published items. Richard Jantz is a computer consultant and freelance writer in Kensington, California.* *See page 14 for contact information.* ■

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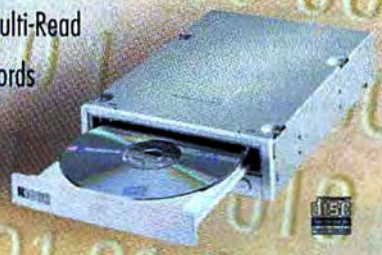

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Circle 198 on reader service card

Add a Card for SCSI Peripherals

IT'S PRONOUNCED "SCUZZY," but SCSI, the Small Computer System Interface, is anything but. Instead, it's the leading standard for connecting high-performance PC peripherals, offering several advantages over the more common EIDE interface.

A single SCSI add-in card can run virtually any combination of up to seven peripherals. SCSI peripherals, especially hard disks, are usually faster than their EIDE counterparts. And both the add-in card and peripherals are intelligent enough to do their own data processing, which lightens the workload on your CPU.

The downside is that SCSI cards and peripherals are more expensive than EIDE devices. And they've earned their reputation for being hard to install, so read the manuals carefully. Here's an overview of installing SCSI cards. For more details, check out PC World Online (www.pcworld.com/hereshow).

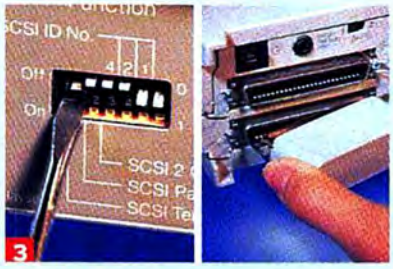
Stan Miastkowski is a PC World *contributing editor.*

1

Get the card. You'll see many types of SCSI cards. A simple $50-to-$100 ISA SCSI card will support any peripheral except a hard drive. To connect a hard drive, get a $150-to-$200 card that supports hard drives with its own BIOS. And if your PC has PCI slots, get a PCI SCSI card ($200 and up) for top performance.

2

Check the IDs. The SCSI card and each peripheral you connect to it needs a unique ID number ranging from 0 to 7. SCSI cards usually come from the factory set as ID 7. Numbers don't have to be sequential. If you'll be booting from a SCSI hard disk, it's best to set the disk's ID at 0 or 1. External peripherals' IDs are usually set with a switch on the back of the case; internal peripheral IDs are set with jumpers.



3

Terminate the ends. Think of the cable that connects a SCSI card and peripheral as a pipe that has to be capped at both ends to hold water. In SCSI nomenclature, each cap—usually a switch, plug, or jumper—is called a *terminator.* Note that if you have internal and external peripherals, the card is in the middle and should not be terminated.

4

Install card and cables (Windows 95). Remove the PC cover and plug in the SCSI card. Install any internal peripherals, and connect a ribbon cable from the peripherals to the SCSI card. If you have external peripherals, connect the cable from the nearest one to the SCSI card, then attach any additional ones to each other via cables.

5

Install card and cables (Windows 3.*x*). Install hardware as in Step 4—*after* you've selected proper settings. A SCSI card requires its own interrupt, I/O port, and (sometimes) DMA channel. Some SCSI cards are set up with jumpers or DIP switches, some via the BIOS, and some with utility software—read the card's manual carefully.

6

Install software drivers. Windows 95 should automatically install software required for the card. Windows 3.*x* doesn't require additional software. Hard drives need no additional software, but most other SCSI peripherals require device-specific drivers, and often they need an Advanced SCSI Programming Interface driver for the card as well. ■

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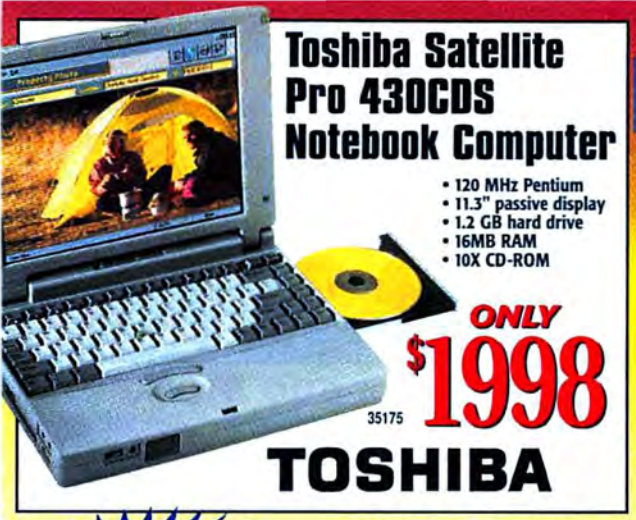

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530T	133MHz	11.3" Active	16MB/1.3GB	6X	2999 *
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Model	Size	View	Resolution	Price
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7130	133MHz	16MB/1.6GB	8X	1299
7160	166MHz	16MB/1.9GB	8X	1599
7161	166MHz MMX	32MB/2.4GB	12X	1999
7200	200MHz	16MB/3.0GB	8X	2199
7201	200MHz MMX	32MB/3.0GB	12X	2199

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7320	166MHz MMX	16MB/2.1GB	16X	1599
7360	200MHz MMX	32MB/3.8GB	16X	2299

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Model	Description	Part #	Price
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Toshiba			
7160	P166, 16MB, 1.9GB, 8X	DT7160U-06AB	$999 †
Packard Bell			
D141	P133, 24MB, 1.7GB, 6X	845007	$999
Compaq			
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3.3V EDO	Call	Call	Call	Call	Call
5.0V EDO	Call	Call	Call	Call	Call
5.0V FPM	Call	Call	Call	Call	Call
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3.3V ECC, EDO	Call	Call	Call	Call	Call
3.3V ECC, FPM	Call	Call	Call	Call	Call
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Panasonic 4440, 5410	–	–	59	–	–	–	109	–	–	–	–	–
Panasonic 6500	–	–	14	29	–	–	79	–	–	–	–	–
Sharp 9400, 9420, 9600, 9700E	–	–	49	69	–	–	119	–	–	–	–	–
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Canon Innova Book 250, 360, 475	134	NEC Versa S	99
Compaq Contura 3/25, 4/25	109	Sharp 3010, 3020, 3050, 3060, 3150	129
Compaq Aero 4/33, 4/10, 4/20, 4/30	109	Sharp 8700, 8800, 8900	129
Compaq LTe 5000 Series	139	TI Extensa 450, 455, 513, 515	139
Epson Action Note 850, 860	119	TI Extensa 550, 555, 560, 570	149
Epson Action Note 880, 886, 880, 910	119	TI Extensa 600, 605, 653	169
IBM Thinkpad 355, 360	119	Toshiba 400, 405, 410, 415, 420, 425, 430 (NiMH)	219
IBM Thinkpad 365 C, ED, XD	129	Toshiba 100, 105, 110, 115, 200, 205	109
IBM Thinkpad 700	179	Toshiba 2100 Series	99
IBM Thinkpad 750, 755	179	Toshiba 2400, 2450, 1900, 1960	129
IBM Thinkpad 756 CD, CE, CV, CX	179	Toshiba 4700, 4800, 4850, 4900	109
NEC Versa 2400, 2405, 2430, 2433	159	Toshiba T4500, T4600	159

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	PRICE
Tecra 500/P550	*8Meg 16Meg 32Meg 40Meg 72Meg*	*79/119/209.399.599/1749*
Tecra 730 (SDRAM)	*8Meg 16Meg 32Meg*	*79/129/243*
Tecra 710, 720	*8Meg 16Meg 32Meg 64Meg 72Meg*	*79/129/229.649/1694*
Tecra 730 CDT, 730X CDT, 740 CDT	*8Meg 16Meg 32Meg 64Meg*	*Call*
T2000/S540-C2000X, T1800, 1850, C	8Meg	94.30
T2100, 2105, 2150, 2155, 2110, 2115	4Meg 8Meg 16Meg 24Meg	39/59/129/189
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	39.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	79.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg 32Meg	129/243
T3400CT, T2400, T3600	4Meg 8Meg 16Meg 24Meg	56/79/149/199
T100, 105, 110, 115, 205, 210	*8Meg 16Meg 32Meg*	*79/129/229*
T400, 405, 410, 415, 420, 430	*8Meg 16Meg 32Meg*	*79/129/229*
T400CS, 400CDT, T100, 105 Edo	*8Meg 16Meg 32Meg*	*79/129/229*
T600, 610, CT Edo, 660	8Meg 16Meg 32Meg	79/129/229

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	PRICE
ACERNote 730C, 735C, 760C, 760CX, 780CX	2Meg 4Meg 8Meg	29/59/89
ACERNote 763, 765, 782, 784, 786	4Meg 8Meg 16Meg	49/69/129
ACERNote Light 290, 352, 355	4Meg 8Meg 16Meg	49/69/129
ACERNote Light 356, 358, 359, 361 (parts) ido	4Meg 8Meg 16Meg	49/69/129
ACERNote Nuovo 911, 972	***8Meg 16Meg 32Meg***	***69/125/229***
ACERNote Pro 950, 954, 955, 957, 959 (parts)	4Meg 8Meg 16Meg	59/79/129
Ambra SN Series	4Meg 8Meg 16 Meg	49/79/159
Aurora N-75, N-100	4Meg 8Meg	49/79/159
AST Ascentia 800N, 810N, 900N	***8Meg 16Meg 32Meg 40Meg***	***79/119/229/275***
AST Ascentia P30, P50	***8Meg 16Meg 32Meg 40Meg***	***79/129/249/275***
AST Ascentia 910, 930, 950	***8Meg 16Meg 32Meg 40Meg Kit***	***79/129/249/359***
AST Ascentia 900N, 800N, 810, 910	8Meg 16Meg	79/119
AST Ascentia 950	8Meg 16Meg	79/129
AST Bravo & Explorer	***4Meg 16Meg***	***79/149***
AT&T Globalyst 130, 200, 250	4Meg 8Meg 16Meg	49/79/129
Austin DX4, DX2, SX2, SX Series	4Meg 8Meg 16Meg	69/189
Austin Edge CD P 133 edo	***8Meg 16Meg***	***89/149***
Austin Edge Duet (pairs) ido	***16Meg 32Meg***	***179/279***
Austin Edge P 133	***4Meg 8Meg 16Meg 32Meg***	***49/79/129/179***
Canon 110C (parts)	4Meg 8Meg 16Meg	59/79/119
Canon Innova Book 150, 175	4Meg 16Meg	59/139
Canon Innova Book 200, S	4Meg 8Meg 16Meg 32Meg	59.89/129/189
Canon Innova Book 350CD, 360, 475	***8Meg 16Meg***	***59/129***
Canon Innova Book 480, 490 edo	***8Meg 16Meg***	***89/149***
CTX EZ Book 500, 600, 700 Port, Series	***4Meg 8Meg 16Meg***	***59/89/139***
DEC Hiñote	4Meg 8Meg 16Meg	59/89/139
DEC Hiñote Ultra, Ultra II	***4Meg 8Meg 16Meg***	***49.89/119***
DEC Hiñote VP 320, 325, 330, 335, 545	***4Meg 8Meg 16Meg 32Meg***	***59/89/129/189***
DEC Hiñote VP 3100, 3120	***8Meg 16Meg 32Meg 64Meg***	***79.139/219/699***
DEC Hiñote VP, Cxs, LXS, CTS, LTS	***8Meg 16Meg 32Meg***	***79.139/299***
Dell Latitude LM (parts)	***4Meg 8Meg 16Meg***	***59/79/129***
Dell Latitude 433 C, CX	4Meg 16Meg	99/149
Dell Latitude LX, M	4Meg 8Meg 16Meg	59/89/139
Dell Latitude XP, XPI	4Meg 8Meg 16Meg	59/79/139
Epson Action Note 850, 850c, 860c, 860cx	4Meg 8Meg 16Meg	59/79/139
Epson Action Note 880, 886, 890, 910	4Meg 8Meg 16Meg 32Meg	49/79/139/199
Epson Action Note 4/25, 4/33C, 433 450 (2-50, 4050)	4Meg 8Meg	69/99
Fujitsu Lifebook 500, 600 Series edo	***8Meg 16Meg 32Meg***	***69/139/269***
Fujitsu Monte Carlo, Montego, Milan	***8Meg 16Meg 32Meg***	***69/139/269***
Gateway 2000 Colorbook 4/33	4Meg 16Meg	89/179
Gateway 2000 Nomad 425 DXL/SXL	4Meg 8Meg 16Meg	89/179
Gateway 2000 486 Handbook or Liberty	4Meg 8Meg 16Meg	49/139
Gateway 2300 Solo Series	4Meg 8Meg 16Meg	69/89/139
Gateway Solo Series 2100, 2200 edo	8Meg 16Meg	89/179
Hitachi C Series	***8Meg 16Meg 32Meg***	***79/129/229***
Hitachi E-Series, MX Series	***8Meg 16Meg 32Meg***	***79/139/269***
Hitachi M Series	***8Meg 16Meg 32Meg***	***79/139/269***
HP Omnibook 533, 600	4Meg 8Meg 12Meg	49/69/99
HP Omnibook 800	8Meg 16Meg 32Meg	79/119/209
HP Omnibook 4000	4Meg 8Meg 16Meg	59/89/139
HP Omnibook 5000, 5500	8Meg 16Meg 32Meg	69/119/219
Leading Edge Versa 2000	16Meg	139
Micron Transport Premium (parts)	8Meg 16Meg	89/149
Midwest Micro Elite or Soundbook	4Meg 8Meg 16Meg	69/99/149
Midwest Micro Elite or Soundbook Plus or Sedix + HP	4Meg 8Meg 16Meg	69/99/149
Midwest Micro Elite or Soundbook XP	4Meg 8Meg 16Meg	69/99/149
NEC Ultralite Versa, E, V, MP	4 Meg 8Meg 16Meg 20Meg 32Meg	49/69/129/179/229
NEC Versa S, Versa 2000C, D, 2200C	4Meg 8Meg 16Meg	49/79/119
NEC Versa 4000, 4050, 4080, 4200	4Meg 8Meg 16Meg 32Meg	59/79.139/299
NEC Versa 6000, 6050, 6030	***8Meg 16Meg 32Meg 64Meg***	***69/139/229/Call***
NEC Versa 6200MX edo	***8Meg 16Meg 32Meg 64Meg***	***69/139/229/Call***
Olivetti Echos P75, P133S (parts)	8Meg 16Meg	59.89/149
Packard Bell Statesman	2Meg 8Meg	29/79
Panasonic CF-V21P, CF-580	4Meg 16Meg	49/139
Panasonic CF-V41	4Meg 8Meg 16Meg 32Meg	49/69/139/269
Sager Midarn, all models	***4Meg 8Meg 16Meg

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Elektroson Gear Multimedia for PC -Supports OS/2, Windows 3.1, 95, NT -Also supports Macintosh (GEAR)	$69
Creative Digital Research CDR HYCD for PC -Supports Windows 3.1, 95, NT -Creates hybrid CDs for PC/Mac/Unix (CDRHYWIN)	$379

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SCSI	**$85**	**$40**	**$54**
WIDE SCSI	**$129**	**$64**	**$75**

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• OPTICALS •

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230MB	Fujitsu IDE	$299
230MB	Smart Storage Solutions SCSI	$325
640MB	Smart Storage Solutions SCSI	$429
640MB	Fujitsu (230MB backwards compatible)	$439
2.6Gig	Smart Storage Solutions	$1649
2.6Gig	Maxoptix	$1669
4.6Gig	Smart Storage Solutions	$1449
52Gig	Sony 20 slot Juke box w/ 2.6 Gig drive	$4599

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External SCSI with 1 disk/Ext Parallel with 1 disk $148/$148

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Internal SCSI with 1 disk/Ext SCSI with 1 disk $379/$469

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Hewlett Packard	2X Write 6X Read	$459
Sony	2X Write 8X Read	$Call
Smart Storage Solutions	4X Write 4X Read	$739

• CD ROM DRIVES •

SCSI

Brand	Spin	Model	Speed	Int	Ext
Plextor	12X	PX12TS	105ms	$219	$309
PLextor	12X	PX12CS	105ms	$279	$369
Toshiba	12X	XM5701B	115ms	$159	$249
Toshiba	15X	XM3801B	99ms	$225	$315
NEC	16X	CDR1610	100ms	$199	$289
ATAPI IDE				**Int**	**Int kit**
Mitsumi	8X	CRMCFX800	150ms	$99	$129
Lite On	12X	LTN126A	155ms	$105	$135
Acer	12X	AC612A	125ms	$105	$135
Toshiba	12X	XM5702B	115ms	$115	$145
Mitsumi	12X	CRMCFX12X	150ms	$110	$140
Lite On	16X	LTN262A	120ms	$120	$150
Mitsumi	16X	CRMCFX16X	120ms	$135	$165
Acer	16X	AC706A	120ms	$125	$155
NEC	16X	CDR1600	100ms	$140	$170
Acer	18X	AC616A	120ms	$150	$180

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Sound Blaster 16 PnP $99 AWE64Pnp $180

IDE CD ROM CHANGER

NEC	6X	CDR4X6	4 Disk	165ms	$99
NEC	8X	CDR4X8	4 Disk	165ms	$139
Panasonic	10X	SQTC510N	5 Disk	130ms	$249

SCSI CD ROM CHANGERS

Nakamichi	8X	MJ48S	4 Disk	150ms	$219
Nakamichi	8X	MJ48SX	4 Disk	150ms	$309
Pioneer	4X	DRM624X	6 Disk	150ms	$399

• TAPE DRIVES •

QIC MINICARTRIDGE
Includes DOS/Win backup software and 1 free tape.

800MB	Seagate	TST800R	$119
3.2Gig	Seagate	TST3200RFT	$179

PRINTER PORT MINICARTRIDGE
Includes DOS/Win backup software.

800MB	Seagate	TST800RPT	$149
3.2Gig	Seagate	TST3200RP	$215

IDE or SCSI TRAVAN
Includes DOS/Win backup software and 1 free tape.

4-8GB	Seagate	TST8000(A)	$339

SCSI 4mm DAT

2GB	Hewlett Packard	C1534AI	$599
2-4GB	Seagate	C4324RP	$639
2-4GB	Hewlett Packard	C1536AI	$649
4-8GB	Sony	SDT5000AI	$809
4-8GB	Seagate	C4326NP (DDS2)	$759
4-8GB	**Sony 90MB/min**	**SDT7000AI**	**$899**
12-24GB	Sony DDS3	SDT9000AI	$1179
12-24GB	HP DDS3	C1554AI	$1429
32-64GB	Sony TSL7000 8 tape autoloader		$2199
48-96GB	Seagate C4586NP 12 tape autoloader		$2199
72-144GB	HP C5648A 6 tape loader		$3099

SCSI 8mm DAT

3.5-7GB	ExaByte	EXB8205XL	$1209
7-14GB	ExaByte	ELIANT820	$1589
7-14GB	ExaByte	EXB8700LT	$749
20-40GB	ExaByte	EXB8900	$4399
70-140GB	ExaByte EXB10H 10 tape autoloader EXT		$4239

BACKUP SOFTWARE (SAVE $10 with tape drive purchase)

NovaStor's NovaBack CD contains software for DOS, Win 3.1, Win 95, OS/2, Warp, and Macintosh $79

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Seagate Arcada for Windows NT (call for netware version) workstation/single server/enterprise $239/499/869

TAPEDISK, allows DAT drive to be used as hard drive under DOS/Win 3.1, Win 95 $189

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• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
1200MB	10ms	5400	Fujitsu	M1636T	3	$179
1200MB	14ms	4103	JTS	JTS1200	3	$179
1275MB	12ms	4500	Seagate	ST31276A	3	$189
1280MB	11ms	4500	Quantum	TM31280A	3	$185
1281MB	11ms	5200	Western Digital	WDAC11200	3	$195
1624MB	10ms	5200	Western Digital	WDAC21600	3	$199
1670MB	11ms	4480	Maxtor	M81750A	3	$205
1700MB	**10ms**	**5400**	**Fujitsu**	**M1623T**	**3**	**$194**
1700MB	12ms	4500	Seagate	ST31720A	3	$199
2000MB	14ms	4103	JTS	JTS2000	3	$219
2100MB	9ms	5400	Fujitsu	M1624T	3	$218
2111MB	12ms	5200	Western Digital	WDAC22100	3	$225
2132MB	12.5ms	4500	Seagate	ST32132A	3	$219
2151MB	10ms	5400	Quantum	FB32160A	3	$235
2168MB	10.5ms	4500	Quantum	TM32160A	3	$220
2187MB	12ms	4480	Maxtor	M82187A	3	$219
2500MB	**9ms**	**5400**	**Fujitsu**	**M1638T**	**3**	**$220**
2550MB	15ms	3600	Quantum	BF2500A	3	$220
2550MB	10.5ms	4500	Quantum	TM32550A	3	$245
2559MB	11ms	5200	Western Digital	WDAC32500	3	$239
2560MB	11ms	5400	Seagate	ST52520A	3	$225
2560MB	10ms	5400	Maxtor	M82560A	3	$239
3166MB	12ms	5200	Western Digital	WDAC33100	3	$270
3228MB	10ms	5400	Quantum	FB33240A	3	$309
3245MB	12ms	4500	Seagate	ST33240A	3	$282
3254MB	10.5ms	4500	Quantum	TM33200A	3	$279
3500MB	12ms	4480	Maxtor	M83500A	3	$299
3840MB	**10.5ms**	**4500**	**Quantum**	**TM33840A**	**3**	**$309**
4000MB	12ms	5200	Western Digital	WDAC34000	3	$355
4310MB	10ms	5400	Quantum	FB34320A	3	$375
4326MB	12ms	4500	Seagate	ST34340A	3	$Call
4335MB	14ms	3600	Quantum	BF4335A	3	$259
5120MB	10ms	5400	Maxtor	M85120A	3	$409
6448MB	10ms	5400	Quantum	FB36480A	3	$539
6450MB	9.5ms	5400	Seagate	ST56450A	3	$Call
6510MB	14ms	3600	Quantum	BF6510A	3	$379

• SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	$279	$349
1280MB	12ms	4500	Quantum	TM31280S	3	$239	$309
2110MB	10.5ms	4500	Quantum	TM32110S	3	$305	$375
2150MB	11ms	5400	Seagate	ST52160N	5	$359	$429
2150MB	8ms	7200	Seagate	ST32171N	5	$549	$619
2151MB	10ms	5400	Quantum	FB32160S	3	$339	$409
3228MB	10ms	5400	Quantum	FB33240S	3	$389	$459
3254MB	10.5ms	4500	Quantum	TM33200S	3	$355	$425
4100MB	**7.9ms**	**7200**	**Micropolis**	**MC4341**	**5**	**$699**	**$769**
4310MB	10ms	5400	Quantum	FB34320S	3	$479	$549
4350MB	8ms	7200	Seagate	ST34371N	5	$839	$909
4400MB	8ms	7200	Fujitsu	M2954S	5	$739	$809
4550MB	8ms	7200	Quantum	XP34550S	5	$809	$879
4550MB	8.8ms	7200	Seagate	ST34572N	5	$Call	$Call
4550MB	7.9ms	7200	Micropolis	MC4345	5	$825	$895
4550MB	7.9ms	7200	Micropolis	MC4345AV	5	$909	$979
6448MB	10ms	5400	Quantum	FB36480S	3	$599	$669
9091MB	**8.5ms**	**7200**	**Micropolis**	**MC3391**	**5**	**$1345**	**$1415**
9091MB	8.5ms	7200	Micropolis	MC3391AV	5	$1459	$1529
9100MB	9ms	7200	Seagate	ST19171N	5	$1749	$1819
9100MB	8ms	7200	Quantum	XP39100S	5	$1379	$1449
9100MB	10ms	7200	Fujitsu	M2949S	5	$1269	$1339
23.3GB	13ms	5400	Seagate	ST423451N	5	$3809	$3909
WIDE SCSI							
1050MB	9ms	5400	Seagate	ST31055W	5	$359	$489
2150MB	8ms	7200	Seagate	ST32171W	5	$600	$730
4294MB	**8ms**	**7200**	**Micropolis**	**MC3243W**	**5**	**$769**	**$899**
4294MB	8ms	7200	Micropolis	MC3243WAV	5	$789	$919
4350MB	8ms	7200	Seagate	ST34371W	5	$900	$1030
4400MB	8ms	7200	Fujitsu	M2954W	5	$789	$919
4550MB	8.8ms	7200	Seagate	ST34572W	5	$Call	$Call
4550MB	7.9ms	7200	Micropolis	MC4345W	5	$875	$1005
4550MB	7.9ms	7200	Micropolis	MC4345WAV	5	$959	$1089
4550MB	7.5ms	10,000	Seagate	ST34501W	5	$1100	$1230
4550MB	8ms	7200	Quantum	XP34550W	5	$859	$989
9091MB	**8.5ms**	**7200**	**Micropolis**	**MC3391W**	**5**	**$1455**	**$1585**
9091MB	8.5ms	7200	Micropolis	MC3391WAV	5	$1569	$1699
9100MB	8ms	7200	Quantum	XP39100W	5	$1369	$1499
9100MB	8ms	7200	Fujitsu	M2949W	5	$1309	$1439
9100MB	8ms	7200	Seagate	ST19171W	5	$1799	$1929
9100MB	8ms	10,000	Seagate	ST19101W	5	$3599	$3739
23.3GB	13ms	5400	Seagate	ST423451W	5	$3859	$4059

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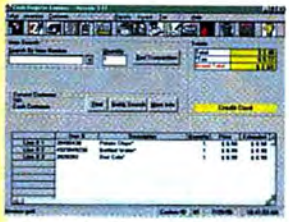

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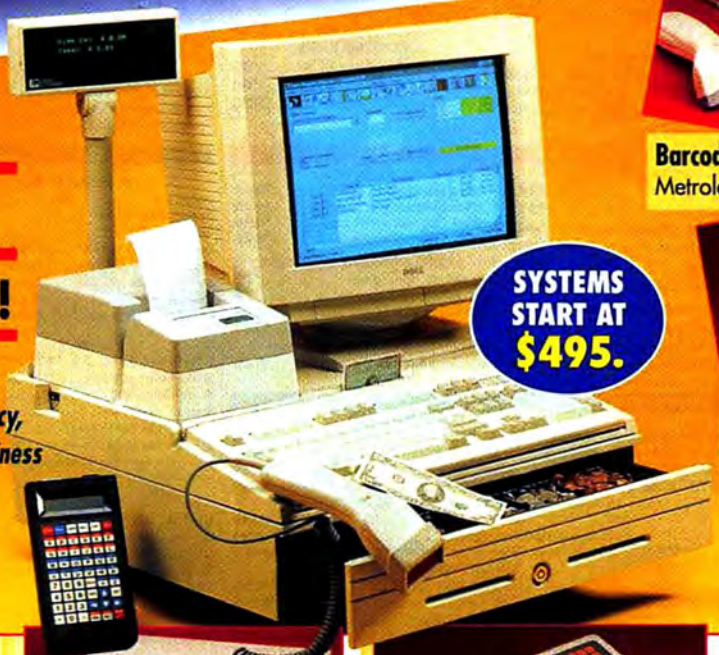

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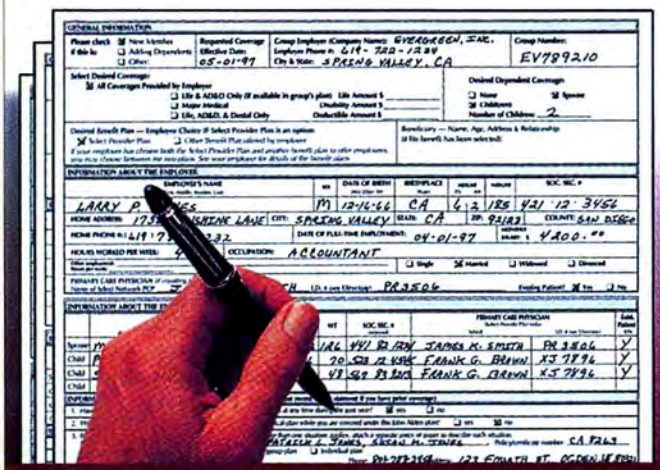

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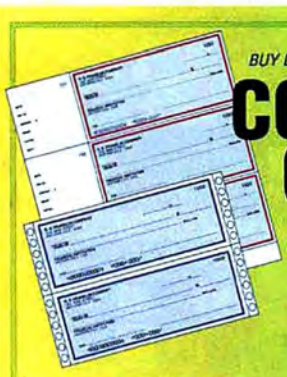

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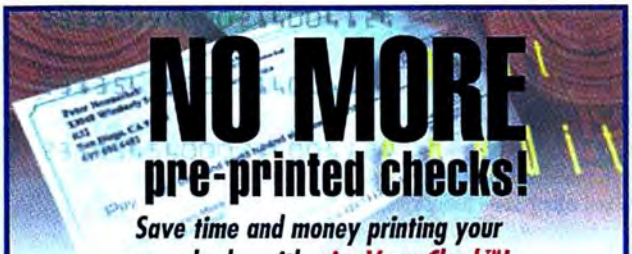

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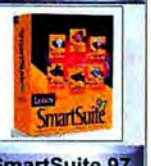

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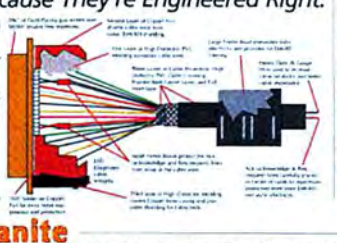

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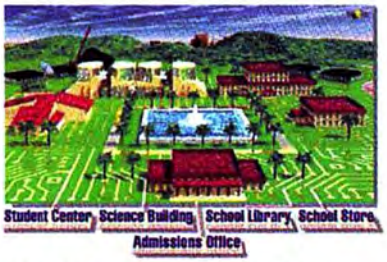

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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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952 Notebook computers
953 Windows 95 software
954 Monitors and video boards
955 Accounting software
956 Graphics software
957 Network/sharing products
958 Printers
959 Multimedia products
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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Advertiser Index A-Z

Get more information–circle the appropriate number on the reader service card.

Reader service number		Page
-	Acer America	85
-	Acer Components	37
-	Acer Components	39
3	ADI Systems Inc.	54
32	Adobe Systems Inc.	143
16	Advanced Micro Devices	30-31
19	AIMS Labs Inc.	254
38	Alaris Inc.	263-265
202	allClear	281
9	ALR	245
-	Anthro Corporation	28
45	APC	40-41
17	APC	147
20	ArtMedia USA-Pacific Technology	93A
21	ATI Technologies	171
5	ATI Technologies	275
-	AverMedia	291
91	Caere Corporation	269
-	Canon Computer Systems	2-3
-	Cardinal	267
61	Compaq Computer Corporation	70-71
47	Compaq Computer Corporation	116-117
-	Compaq Computer Corporation	163
44	Computer Discount Warehouse	132-133
46	Computer Discount Warehouse	307
68	Computer Discount Warehouse	308-309
70	Corel Corporation	4-5
54	Creative Labs Inc.	127
59	Creative Labs Inc.	129
69	Creative Labs Inc.	131
56	Crucial Technology	87

PC World is a publication of International Data Group, the world's leading information technology media, research and exposition company. International Data Group publishes over 275 computer publications in over 75 countries. Sixty million people read one or more International Data Group publications each month. 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Reader service number		Page
64	CTX Int'l	273
74	Cybermax	32-33
81	Dataviz, Inc.	242
-	Dell	C5-C8
-	Dell	140-141
-	Dell	174-175
-	Dell	191
-	Dell	271
-	Dell	284-285
37	DeLorme	95
-	Dodge Stratus	219
84	DTK	289
-	EarthLink	283
-	EPS Technologies	192 A-F
-	Epson America, Inc.	29
-	Epson America, Inc.	148-149
107	Everex Systems, Inc.	93B
-	EXABYTE/Eagle Division	325
100	Fujitsu Computer Products of America	230-231
89	Fujitsu Computer Products of America	295
94	Fujitsu PC Corp.	56-57
-	Gateway 2000	73-80
-	Gateway 2000	81
-	Gateway 2000	233-234
125	Hansol Multitech Inc.	115
99	Hewlett-Packard	24
-	Hewlett-Packard	25
-	Hewlett-Packard	90-91
-	Hewlett-Packard	229
110	Hyundai Electronics America	221
-	IBM Corporation	112-113
-	IBM Corporation	114
-	Imation	89
-	Imation	145
116	Intergraph Systems	95A-B
-	Iomega Corporation	97
-	Iomega Corporation	110
-	Iomega Corporation	111
-	Jeep Cherokee	124-125
170	KDS	209
115	Keystone Learning Systems	276
128	Kingston Technology	227
127	Kyocera Electronics, Inc.	12-13
-	LA TRADE	302
96	LG Electronics U.S.A., Inc.	44
132	Lincoln Navigator	161
-	Lotus	139
143	Matrox Graphics, Inc.	46-47
147	MegaHaus Hard Drives	303
142	MGI Software Corp.	252
231	Micro Warehouse	306
149	Micron Electronics	9
145	Micron Electronics	10-11
-	Micron Electronics	179-184
160	Micron Electronics	212-213
-	Microsoft Office	196-197
169	Midwest Computer Works	304
155	Mitsubishi Electronics America	198
180	NEC	C2-P1
158	NEC Electronics	246-247
163	NEC Printer	277
201	NEC Servers	42-43
-	Netcom	238
126	Nimantics	52-53
164	Nokia	22
161	Nomai	203
-	NRI Schools	259
121	Oldsmobile Silhouette	15
162	Olivetti	251
171	Palm Computing	173
166	Panasonic	279
195	PC America	305
165	PC Connection	296-297
-	PC Expo 1997	326
172	PC World Online	327
129	PCs Compleat	298-301
212	PKWARE	36
196	PowerQuest	253
191	PowerQuest	255
152	Princeton Graphic System	20-21
184	ProGen Systems	51
193	Qualcomm	118
-	Quantex	101-106
185	Quarterdeck Office Systems	65
190	Quarterdeck Office Systems	67
189	Quarterdeck Office Systems	69
204	Ricoh Corporation	93
198	Ricoh DMS	293
194	Rose Electronics	122
197	Sampo	86
-	Samsung Electronics America	177
207	Shinho	168
211	Smith Micro	48
-	Sony Electronics	98-99
-	SPSS	50
208	State of The Art	16
210	STB Systems	236
-	Symantec Small Business	108-109
232	Syncronys	38
124	Tektronix Inc.	240
222	Televideo Inc.	266
229	Tiger Direct	258
228	Toshiba America	150-151
243	Traveling Software	189
240	Twinhead Corporation	249
250	UMAX Technologies	211
255	V Communications, Inc.	257
260	Value Web	256
247	Viewsonic	26-27
246	Viewsonic	287
-	Visio	164
187	Visioneer	34
254	Winbook	18-19

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

HARDWARE

Boards/Cards/Chips

16	Advanced Micro Devices	30-31
21	ATI Technologies	171
5	ATI Technologies	275
54	Creative Labs Inc.	127
59	Creative Labs Inc.	129
69	Creative Labs Inc.	131
56	Crucial Technology	87
-	Dell	284-285
128	Kingston Technology	227
143	Matrox Graphics, Inc.	46-47
158	NEC Electronics	246-247
210	STB Systems	236

Communication

-	Cardinal	267

Desktop Computers

9	ALR	245
74	Cybermax	32-33
-	Dell	C5-C8
-	Dell	140-141
-	Dell	174-175
-	Dell	191
-	Dell	271
84	DTK	289
-	EPS Technologies	192 A-F
-	Gateway 2000	73-80
-	Gateway 2000	81
-	Gateway 2000	233-234
-	Hewlett-Packard	90-91
116	Intergraph Systems	95A-B
231	Micro Warehouse	306
-	Micron Electronics	179-184
160	Micron Electronics	212-213
184	ProGen Systems	51
-	Quantex	101-106

Desktop Publishing

47	Compaq Computer Corporation	116-117

File Servers

160	Micron Electronics	212-213
201	NEC Servers	42-43

Laptop/Notebook

-	Acer America	85
61	Compaq Computer Corporation	70-71
-	Compaq Computer Corporation	163
64	CTX Int'l	273
-	EPS Technologies	192 A-F
107	Everex Systems, Inc.	93B
94	Fujitsu PC Corp.	56-57
-	Gateway 2000	73-80
-	Gateway 2000	81
-	Gateway 2000	233-234
-	IBM Corporation	112-113
-	IBM Corporation	114
-	Micron Electronics	179-184
145	Micron Electronics	10-11
180	NEC	C2-P1
126	Nimantics	52-53
162	Olivetti	251
171	Palm Computing	173
228	Toshiba America	150-151
240	Twinhead Corporation	249
254	Winbook	18-19

Local Area Networks

194	Rose Electronics	122

Monitors/Displays

-	Acer Components	37
-	Acer Components	39
3	ADI Systems Inc.	54
20	ArtMedia USA-Pacific Technology	93A
125	Hansol Multitech Inc.	115
110	Hyundai Electronics America	221
170	KDS	209
96	LG Electronics U.S.A., Inc.	44
155	Mitsubishi Electronics America	198
164	Nokia	22
166	Panasonic	279
152	Princeton Graphic System	20-21
197	Sampo	86
-	Samsung Electronics America	177
207	Shinho	168
-	Sony Electronics	98-99
222	Televideo Inc.	266
247	Viewsonic	26-27
246	Viewsonic	287

Multimedia

142	MGI Software Corp.	252

Other

-	AverMedia	291

Reader service number		Page
	Peripherals/Sharing Devices	
194	Rose Electronics	122
243	Traveling Software	189
	Power/Protection	
45	APC	40-41
17	APC	147
	Printers/Plotters	
-	Canon Computer Systems	2-3
-	Epson America, Inc.	148-149
100	Fujitsu Computer Products of America	230-231
99	Hewlett-Packard	24
-	Hewlett-Packard	25
127	Kyocera Electronics, Inc.	12-13
163	NEC Printer	277
204	Ricoh Corporation	93
124	Tektronix Inc.	240
	Scanners/Digitizers	
-	Epson America, Inc.	29
250	UMAX Technologies	211
187	Visioneer	34
	Storage/Backup Devices	
-	EXABYTE/Eagle Division	325
-	Imation	89
-	Imation	145
-	Iomega Corporation	97
-	Iomega Corporation	110
-	Iomega Corporation	111
147	MegaHaus Hard Drives	303
161	Nomai	203
198	Ricoh DMS	293

SOFTWARE

	Accounting/Financial	
208	State of The Art	16
	Communications/Fax/Modems	
193	Qualcomm	118
190	Quarterdeck Office Systems	67
211	Smith Micro	48
260	Value Web	256
	Dataconversion	
81	Dataviz, Inc.	242
	Desktop Mapping	
37	DeLorme	95
	Desktop Publishing	
32	Adobe Systems Inc.	143
	Graphics	
202	allClear	281
-	Visio	164
	Management	
195	PC America	305
	Multimedia	
197	Sampo	86
	Operating Systems	
255	V Communications, Inc.	257
	Optical Character Recognition	
89	Fujitsu Computer Products of America	295
	Software Suites	
70	Corel Corporation	4-5
-	Lotus	139
-	Microsoft Office	196-197
	Spreadsheets/Templates/Forms	
202	allClear	281
91	Caere Corporation	269
	Statistics	
-	SPSS	50
	Utilities	
212	PKWARE	36
196	PowerQuest	253
191	PowerQuest	255
185	Quarterdeck Office Systems	65
189	Quarterdeck Office Systems	69
-	Symantec Small Business	108-109
232	Syncronys	38
255	V Communications, Inc.	257
	Video	
19	AIMS Labs Inc.	254
38	Alaris Inc.	263-265
115	Keystone Learning Systems	276
211	Smith Micro	48
	Web Authoring Tools	
260	Value Web	256
	Windows	
212	PKWARE	36
	Word Processing/Aids	
70	Corel Corporation	4-5

MISCELLANEOUS

	Automobiles	
-	Dodge Stratus	219
-	Jeep Cherokee	124-125
132	Lincoln Navigator	161
121	Oldsmobile Silhouette	15
	Mail Order	
44	Computer Discount Warehouse	132-133
46	Computer Discount Warehouse	307
68	Computer Discount Warehouse	308-309
116	Intergraph Systems	95A-B
-	LA TRADE	302
147	MegaHaus Hard Drives	303
169	Midwest Computer Works	304
-	NRI Schools	259
165	PC Connection	296-297
129	PCs Compleat	298-301
229	Tiger Direct	258
	Online Services	
-	EarthLink	283
-	Netcom	238
172	PC World Online	327
	Other	
-	Anthro Corporation	28
	Supplies	
99	Hewlett-Packard	24
-	Hewlett-Packard	25
-	Hewlett-Packard	229
	Trade Shows	
-	PC Expo 1997	326
	Training	
115	Keystone Learning Systems	276
-	NRI Schools	259

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

	Anti-Virus	
768	Dr Solomon's Anti-Virus	107
769	PC-cillin II, TouchStone Software	107
770	VirusScan 3.0, McAfee	107
	Backup/Storage	
741	Backup Exec 2.0, Seagate Software	84
735	Cheyenne Backup for Windows, Computer Associates	250
736	Ditto Easy 3200, Iomega	250
737	HP T4000s	250
	CD-Recordable Drives	
750	Olympus America CD-R2x6	68
751	Philips Electronics EasyWriter 2600	68
763	Ricoh MP6200S	72
752	Smart and Friendly CD-R 2006	68
753	Sony Spressa	68
754	Yamaha Systems CDR400	68
	Contact Manager	
772	Maximizer 97is	112
	Desktop Computers	
688	ACMA P Pro-200 Z Power Series	204
686	CLR Infinity P-200 MMX	204
705	CLR Infinity	214
649	Compaq Presario 2100	248
699	CyberMax Cyrix Max C3 P166+	214
691	Dell Dimension M200a	214
690	Dell Dimension P133v	214
775	Dell Dimension XPS H266s	60
646	Dell Dimension XPS M166s	248
672	Dell Dimension XPS M200s	204
673	Dell Dimension XPS Pro200n	204
693	Dell Optiplex GS+	214
680	Dell OptiPlex GX Pro 200	204
674	Dell Optiplex Gxi 5200M	204
704	Diamond Mid Tower P166	214
706	Diamond Technologies P133	214
701	DirectWave Blue Thunder P133 MVP Pro	214
695	Gateway 2000 G6-180	214
776	Gateway 2000 G6-266M	60
676	Gateway 2000 G6-200	204
694	Gateway 2000 P5-133	214
679	Gateway 2000 P5-200	204
647	Hewlett Packard Pavilion 5320	248
650	Hewlett Packard Pavilion 7350P	248
648	Hewlett Packard Pavilion 7370V	248
681	HP Pavilion 7370V	204
696	HP Pavillion 5320	214
678	HP Vectra VA 6/200 MT	204
698	HP Vectra VE 5/133	214
738	HP Vectra VL, Vectra XA	82
777	HP Vectra VL 6/266	60
-	IBM PC 350 P-166	214
-	IBM PC 350 P-200	204
-	IBM PC 365	204
778	Intergraph TD-225	60
697	Kingdom P166+ Home & Office	214
677	Micron Home MPC P200	204
692	Micron Millennia LXA P166	214
675	Micron Millennia Pro2 200 B	204
685	Multiwave P-200 MMX	204
682	Netis N6200PCI	204

Reader service number		Page
779	Polywell Poly K6200Mx	60
780	Polywell Poly K6266Mx	60
702	Polywell Poly 500 QX	214
708	Quantex QP5/200 SM-3	214
700	Quantex QP6/200 SM-1	214
687	Quantex QP6/200 SM-4	204
781	Quantex QP6/266SM-4X	60
683	Royal 3D-MMX	204
703	Royal Computer P133 Triton II,	214
689	Sony VAIO PCV-120	204
684	Sys Technology Performance Pro 200	204
782	Sys Technology Performance Pro 266	60
707	USA Flex Family Special	214
	Desktop Publishing	
767	i publish, Design Intelligence	100
766	Print Shop Presswriter, Broderbund Software	100
	Digital Camera	
747	Canon PowerShot 350	94
748	Kodak DC120 Zoom	94
	Email Applications	
771	LotusMail 4.5, Lotus Corp.	110
	Encryption	
651	ViaCrypt, PGP Mail for Windows, Pretty Good Privacy, Inc.	288
	Graphics Boards	
642	ATI 3D Xpression+ PC2TV	239
644	Diamond Stealth 3D 2000XL	239
638	Diamond Stealth 3D 3000XL	239
645	Hercules Dynamite 128/Video	239
746	Hercules Stingray 128/3D	92
641	Matrox Millennium	239
637	Matrox Mystique	239
640	STB Lightspeed 128	239
639	STB Velocity 3D	239
636	Terminator 3D / DX	239
643	VideoLogic GrafixStar 600	239
	Hard Drive Kit	
745	FirePort 40 Hard Drive Kit, Diamond Multimedia	92
	Internet Management Software	
622	Sequel Net Access Manager	50
	Kids	
635	Fin Fin on Teo the Magic Planet, Fujitsu Interactive	244
632	Genius Kids Designer, KYE International Corp.	244
	Modems	
661	Hayes Optima 33.6 V.34+Fax	241
658	Megahertz XJ4336	241
655	Motorola ISG Premier 33.6	241
657	Motorola Montana 33.6	241
652	Practical Peripherals PC288LCD V.34	241
659	Practical Peripherals ProClass 336 V.34 Data/Fax Modem with EZ-Port	241
660	TDK CyberExpress 3000	241
653	U.S. Robotics Courier V.Everything 56k	241
656	U.S. Robotics Sportster 56k Faxmodem	241
654	Zoom V.34X PLUS	241
	Monitors	
671	CLR VisionPro 15	237
742	Cornerstone Color 45/101sf	88
662	Dell UltraScan 800HS	237
663	Hitachi SuperScan Pro 500	237
667	MAG InnoVision DX15T	237
664	Nokia 449xa Multigraph	237
669	Panasonic PanaMedia PM 15	237
668	Panasonic PanaSync/Pro P15	237
665	Samsung SyncMaster 15GLi	237
670	Sony CPD-100VS	237
666	ViewSonic 15GS	237
	Noise Reducing Headphones	
749	NoiseBuster Extreme, Noise Cancellation Technologies	94
	Notebook Computer	
722	AcerNote Light Multimedia 373	222
716	AcerNote Nuovo	222
721	Compaq Armada 1130T	222
718	Compaq Presario 1080	222
726	CTX EzBook 720CS	222
709	Dell Latitude LM-M-166ST	222
710	Dell Latitude XPi P133ST	222
740	Digital HiNote VP 575	84
727	Gateway 2000 Solo 2100 S5-120	222
717	Gateway 2000 Solo 2100 S5-150	222
719	HP Omnibook 5500CS	222
715	HP OmniBook 800CT	222
-	IBM ThinkPad 380	84
728	Mega Image Megabook 880	222
713	Micron Millennia TransPort MRX	222
725	Samsung Sens Pro 500	222
723	Toshiba Satellite Pro 420CDS	222
712	Transmonde Vibrant ANR-P	222
714	WinBook FX	222
711	WinBook LM	222
720	Winbook XP5 Pro P120	222
724	Winbook XP5 Pro P150	222
	Palmtop PC	
764	HP 320 LX	96
	PC-TV Tuner	
631	TVGenie, AVer	243
	Print Server	
743	HP JetDirect 150X,	88
	Printer	
610	Brother HL-720	235
616	Canon BJC-4200 Photo	235
	Epson Stylus Color 600	235
-	Epson Stylus Color 800	235
744	Hewlett-Packard DeskJet 672C	88
615	HP DeskJet 694C	235
617	HP DeskJet 820Cse	235
611	HP LaserJet 5L Xtra	235
612	NEC SuperScript 660plus	235
613	NEC SuperScript 860	235
614	Panasonic KX-P6500	235
	Reference	
630	Body Voyage: A Three Dimensional Tour of the Human Body, Time Warner Electronic Publishing	243
633	Encyclopedia of Science 2.0, DK Multimedia	244
	Refurbished PCs	
739	Recompute Business Pro P-90, Pentium-90	83
	Remote Access Software	
755	Procomm RapidRemote for Windows 95, Quarterdeck Corp.	94
	Review: Internet Phones/Videoconference	
732	Color QuickCam, QuickCam (B&W), Connectix	176
604	Conference (Netscape Communicator), Netscape	166
605	CoolTalk (Navigator 3.0), Netscape	166
-	CU-SeeMe, Cornell University	176
731	Enhanced CU-SeeMe for Windows, White Pine Software, Inc.	176
601	FreeTel Personal Edition V 1.01,	166
-	IBM IC Phone 2.0,	166
602	Intel Internet Video Phone 1.0,	166
697	Internet Phone 4.5, Vocaltec	166
733	Jabra-Net EPP-4000-A, Jabra Corp.	178
729	Net2Phone, IDT Corporation	169
730	NetiPhone,	169
603	NetMeeting 2.0 (beta), Microsoft	166
734	Supra Monaural Headset, Headset Switcher Adapter, Plantronics	178
608	TeleVox 2.5, VoxWare	166
606	WebPhone Full 3.0, NetSpeak	166
	Servers	
626	AST Manhattan D6200	121
623	Compaq ProLiant 800*	121
625	Dell PowerEdge 2100/200	121
624	HP NetServer LD Pro	121
627	Micron Vetix EL 1000	121
765	Windrenalin Syncronys Software	96
	Software Bundle	
629	Microsoft Home Essentials 97	243
	Universal Inboxes	
756	01 Communique Communicate Pro	66
757	CompuServe	66
758	Global Village Communications Focal Point 5.5	66
759	iPost Universal Box, IRDG	66
760	JFAX Personal Telecom	66
761	SphereLink Communications TraveLink	66
762	Symantec WinFax Pro 8.0	66
	Utilities	
634	Post-It Notes, 3M Corp.	244
628	Symantec's Norton Utilities 2.0	290
	Web Authoring	
773	Adobe PageMill	113
	Webcasting	
774	Webcast Personal, Astound	114

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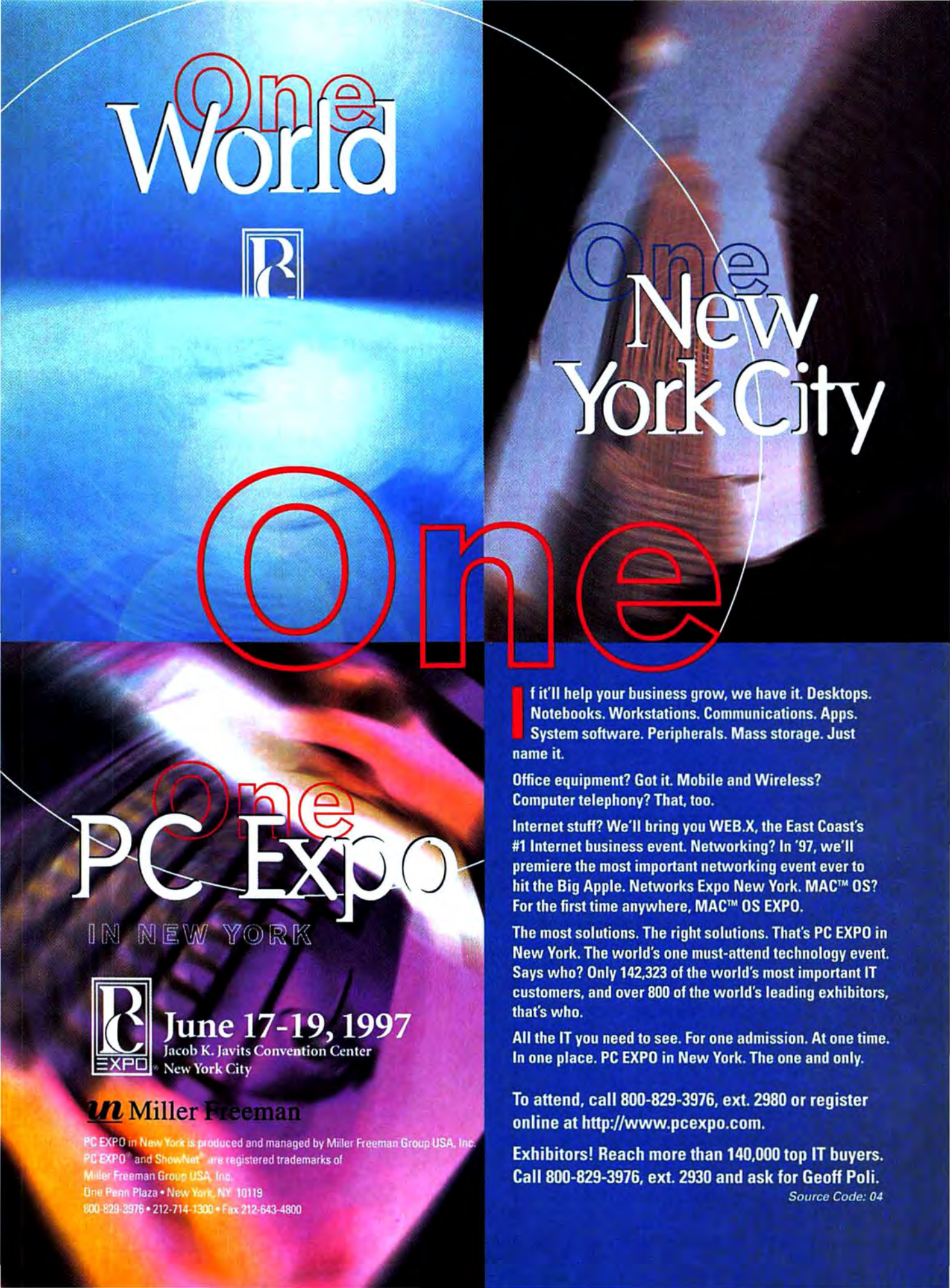
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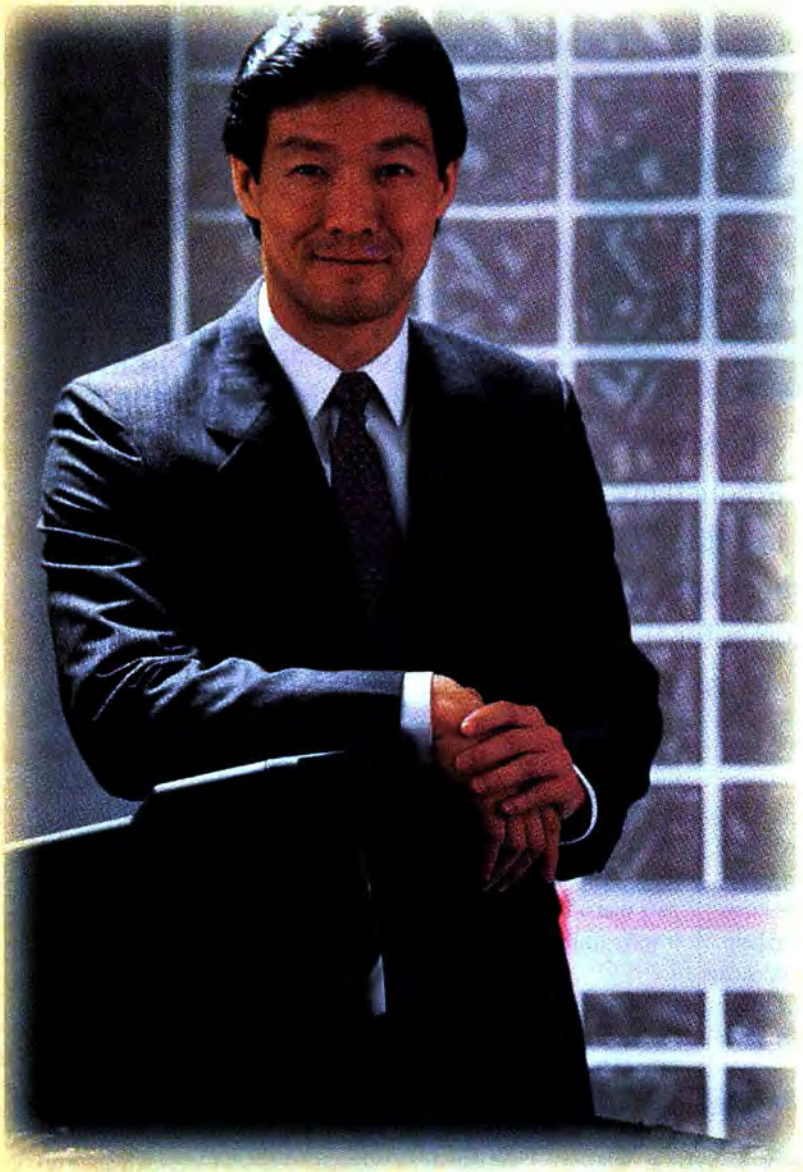

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IT'S ONE SMALL BLIP FOR MAN, a giant heap of uselessness for mankind. The hours wasted at computers each year are astronomical. Multiply the time it takes to boot a PC by 60 million users, and you're looking at 1000 lost years of work—*per day.*

At least that's how Raj Reddy, dean of the School of Computer Science at Carnegie Mellon University, figures it. According to a report in the *Wall Street Journal*, the lost time may be worth some $25 billion a year. However, this calculation assumes an average annual salary of $100,000, and it ignores the fact that during boot time you can perform many useful tasks, such as waiting on hold for customer support.

True, boot-up times are shrinking—slowly. Some PCs' sleep modes let the machines wake up in a relative hurry, but thanks to "memory leakage" and other side effects of running programs, you must reboot sooner or later. Microsoft has announced an initiative called OnNow, specifically intended to help machines start in a flash. But OnNow requires—you guessed it—operating system enhancements and specially designed hardware, so we'll have to hang on a bit longer before we stop waiting.

But even then, the waits won't be over. An ongoing survey by the Manes Productivity Institute has already fingered dozens of other computer time-wasters every bit as unproductive.

The Manes Productivity Institute has fingered dozens of computer time-wasters.

SHUTDOWN SLOWDOWN

EXHIBIT A: The wait for the "It is now safe to shut down your computer" screen. Some PCs are smart enough to turn themselves off after performing the shutdown ritual, but none know how to close down DOS or Windows 3.1 programs without help.

And the wait for applications to load grows longer with each new release. Especially infuriating are apps that hog your PC so thoroughly when they start up that you can't switch to another task—even on systems allegedly capable of multitasking.

Installing something? Bet on a near-total loss of productivity while you do it, since you're warned not to do anything else simultaneously (though clipping your toenails is usually permissible). Add in time for cleaning up icons that push their way into your Startup directory, and the man-, woman-, and mouse-years begin to mount.

The Internet? Browsers take 10 minutes short of forever to load. Waiting for the modem to sync up with an Internet provider amounts to maybe half a minute per connection, and the first failed attempt may be only one of many.

DEAD-END REFERENCES

ONCE ONLINE, the wheel-spinning continues. The number of hours spent waiting for irrelevant Web graphics to appear is so huge that the Institute has gone back to recheck its math. Then there's the time spent following search engines' leads to nonexistent Web pages, not to mention delays due to Internet congestion. The wasted years turn into centuries.

Decoding mysterious mail attachments can whittle away what little time you have left. Then factor in the effort it takes to create responses asking that attachments be sent again as plain text, not to mention dealing with files that can't be read by older versions of applications!

And that's not all. The Institute's surveys indicate that creating unnecessary PowerPoint presentations (in other words, all of them) depletes thousands of employee-years per day. And that doesn't even count the hours lost by the doomed souls forced to sit through the slides.

Delays between the time you click an application's print button and the time paper emerges from the printer are being surveyed as I write. So are the hours spent on hard drive housekeeping and transferring files between desktop and notebook computers. Some good news: Initial studies suggest that almost no time is wasted creating data backups, mainly because nobody actually takes the time to do it.

Please note that our preliminary figures add up to more time than computer users could possibly have. Our researchers suspect that a large component of the discrepancy will turn out to involve multitasking two time-wasters at once.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and co-author of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).* ■

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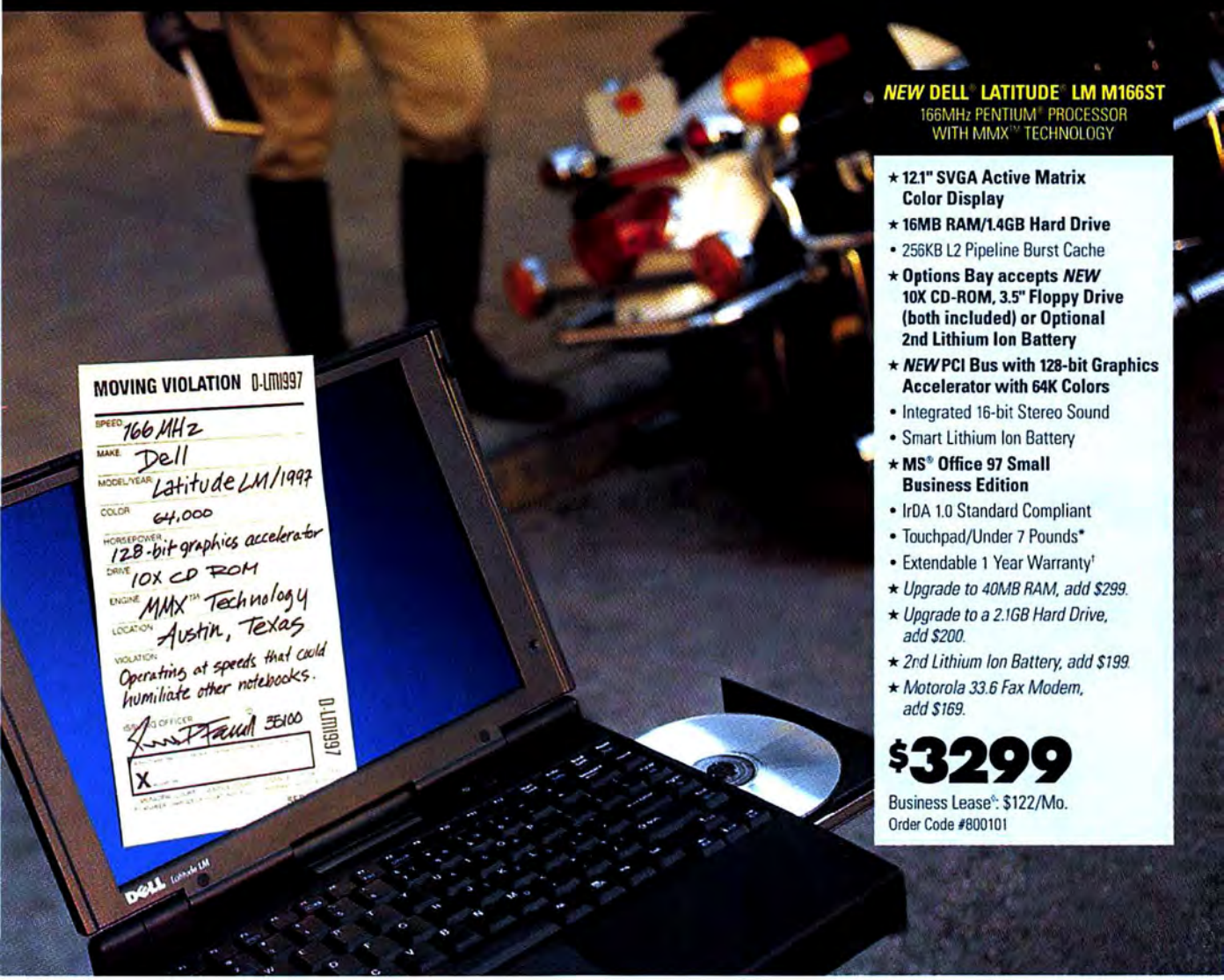

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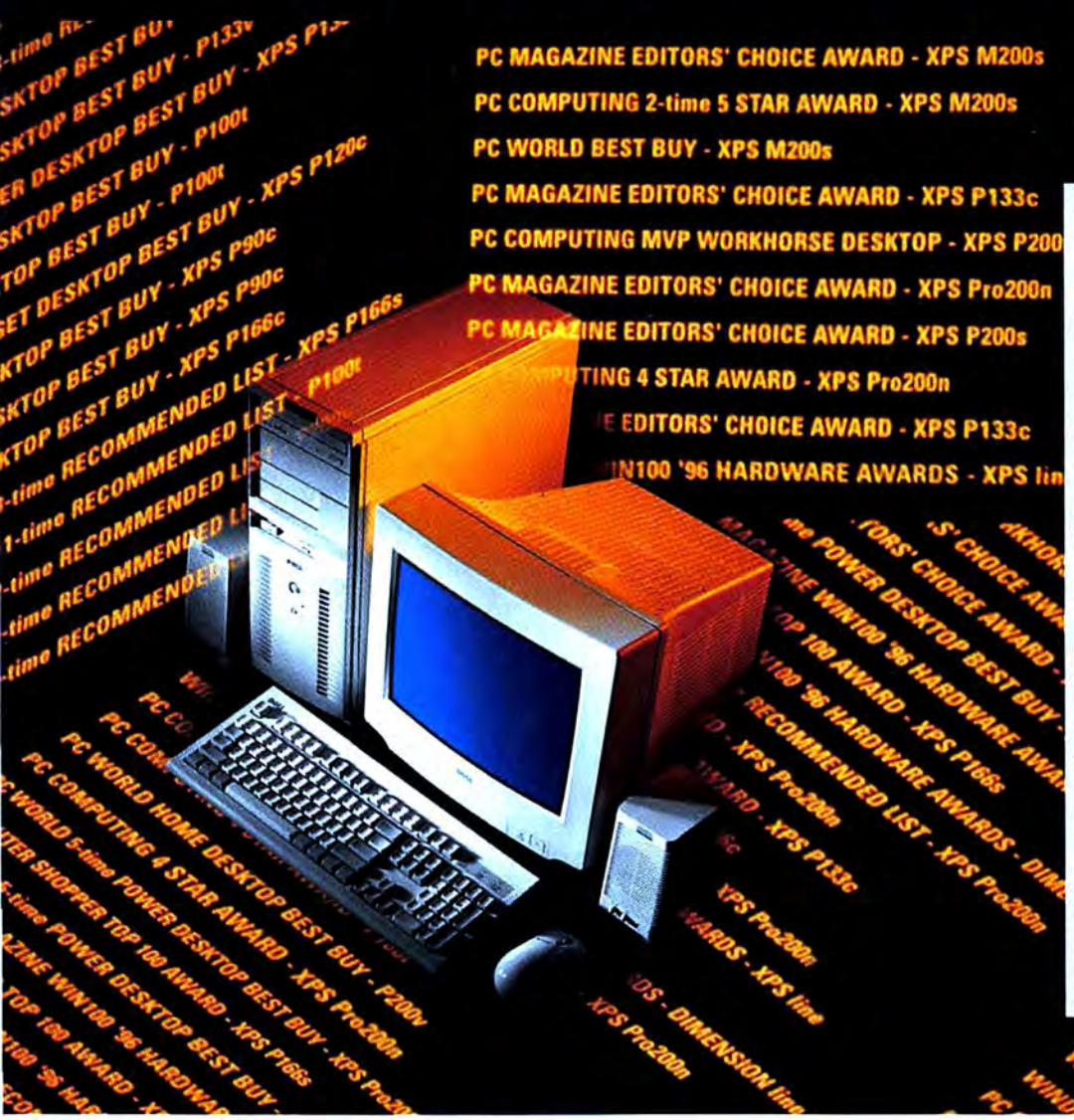

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