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PC WORLD

MAY 1997

Exclusive Preview!
First 266-MHz Pentium II PC

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Buyer Beware!
Con Artists Take to the Net

Netscape's Communicator
In-Depth Preview of All-New Browser

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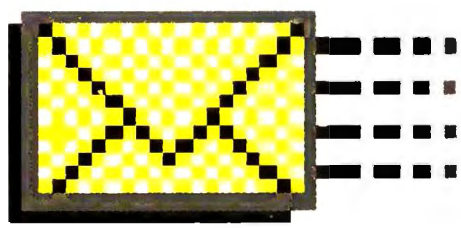
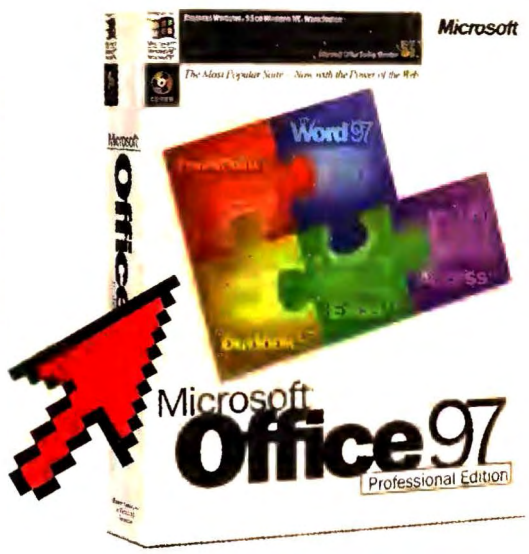


Microsoft Office 97/now/

Subject	Received
FW: Home Essentials	Fri 3/7/97

RE: Hey there!

Hey guys: I realize you're all looking forward to doing a major presentation at 8:00 A.M., but as it happens, the meeting time has been pushed back to 3:00. So sleep in an extra 17



it's going to be rea
to stay disorganized

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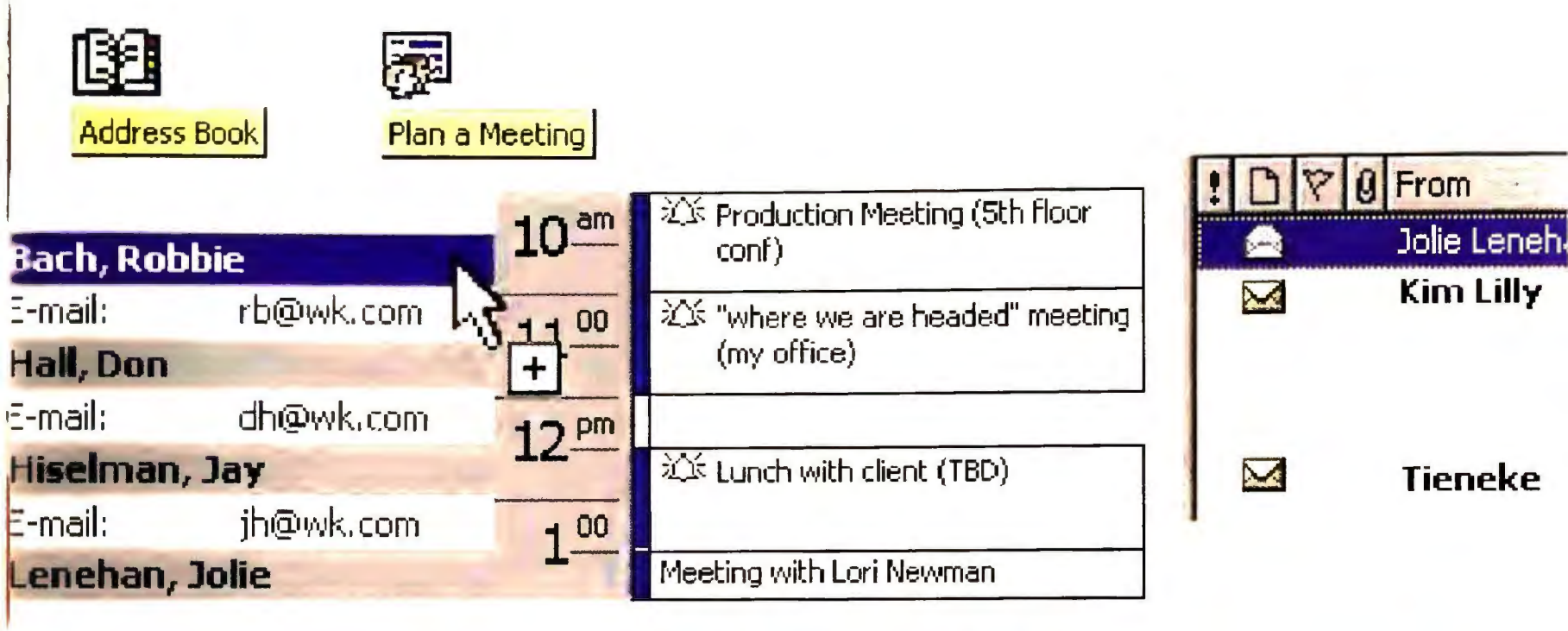

ly, really hard

Some people are inclined to neatly arrange, file, cross-reference and deploy strategic bits of information, like what's-his-name, the guy who sent you the e-mail about the thing on Tuesday... or Wednesday. Well, here's good news for the highly with-it and the chronically disorganized alike: the new Microsoft Outlook™ 97 desktop information manager. It's part of new Microsoft Office 97, and it's here to help you get organized (or, as the case may be, way more organized). Outlook puts your e-mail, electronic scheduling, "to-do" lists and contacts in one cozy interface. It helps you do smart things, like preview the first three lines of your e-mails to quickly separate news from junk. And you can easily share, link and move information; for instance, drag an e-mail onto the contacts icon and a new contact file is automatically created for you. Now, that's functionality. Want to know more? Block out a little time to visit our Web site.

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PC WORLD

MAY

VOLUME 15 ◆ NUMBER 5

106

COVER STORY

106 **THE BEST FREE STUFF ONLINE**

WEB RESOURCES

This price is always right. It's *PC World*'s annual guide to online deals, with 75 of the best free products, services, and information. Shop till you drop at shareware malls. Set up free Web pages and Internet addresses. Access no-cost investment stock quotes and headlines. Plus a whole lot more—start downloading!

108 **THE BEST FREE COMPUTER STUFF**
114 **THE BEST FREE BUSINESS STUFF**
120 **THE BEST FREE FUN STUFF**

109 **Dialing for Digital Dollars**
110 **Top 10 Must-Have Shareware and Freeware Utilities**
112 **Top 10 Unknown Shareware and Freeware Utilities**
119 **10 Things You Can Do for Free on the Net**

FEATURES

122 **NETSCAPE: THE GREAT COMMUNICATOR?**

PREVIEW Netscape's latest browser is a no-brainer upgrade, but the new Communicator also comes with collaboration and communications software, plus other tools for revamping your desktop. A sneak peek at the imminent upgrade of Internet Explorer shows Microsoft staking out the same territory. Is this the new battleground for control of your PC?

136 **WHICH CPU IS RIGHT FOR YOU?**

TRENDS Pentium, Pentium Pro, MMX, K6, M2—it can all seem so foreign, but picking the right PC starts with the processor. We sort out the dizzying selection of new CPUs and ponder price, performance, and upgrade possibilities to find the ideal system for you.

169

153

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

153 **PUT A PC IN YOUR POCKET**

REVIEW The latest palmtop PCs hold more than your appointments—some sport e-mail and voice mail, even pint-size word processors and Windows. *PC World*'s Harry McCracken and Michael S. Lasky give their thumbs-up and thumbs-down on eight new palmtops.

SPECIAL REPORT

THE WEB AND YOU

169 **CYBERSCAMS**

Con artists are invading the Net, touting no-risk business investments, bogus securities, and anonymous stock tips. Here's how to spot a scam—and keep from getting fleeced.

170 **A Quick Look at Internet Fraud**
173 **Do's and Don'ts**
180 **Online Protection**

COVER *Digital composition by Nick Fain*

ICONS: JEFFREY PELO

TOP OF THE NEWS

54 PENTIUM II IS FASTEST PC EVER

EXCLUSIVE Our first tests of prerelease 266-MHz Pentium II and 233-MHz AMD K6 PCs break *PC World* benchmark speed records. While the K6 prototype ran slightly slower, AMD-based systems will sell for $500 less than Pentium IIs.

58 $1000 DESKTOP PCS: GREAT BUYS FOR MODEST NEEDS

Vendors from AST to Compaq are selling dirt-cheap PCs powered just enough to handle basic business.

60 NET REGULATION: HOW MUCH IS ENOUGH?

Plans to regulate Web commerce and content favor voluntary restrictions. Are consumers adequately protected?

62 FIRST 56-KBPS MODEMS: FAST, CHEAP, BUT NOT FOR EVERYONE

56-kbps modems offer more speed at great prices, but watch out for upgrade pitfalls.

68 WAITING ON DVD-ROM? SIT TIGHT

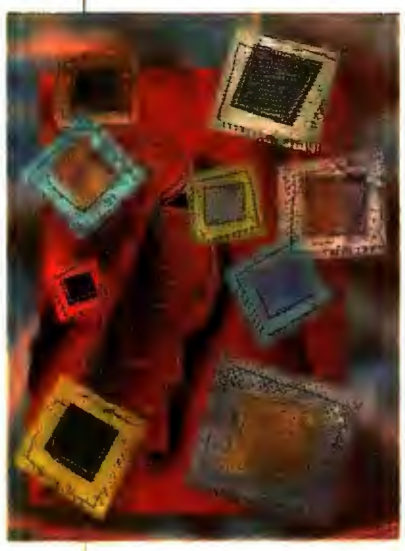
DVD is finally here, sporting a high price tag and a dearth of software.

NEW PRODUCTS

76 Toshiba Equium 5200D desktop
77 Intelifone telephony device
78 Dell Dimension M200a
78 SyQuest SyJet SCSI drives
80 ATI All-in-Wonder graphics board
80 Arcadia home monitors
82 ViaTV 100 videoconferencing system
82 Bigpicture video kit
86 Info Select 4.0 for Windows 95
86 SaddleBag, Zero Halliburton Attaché
88 MyMailManager
88 CoStar LabelWriter XL Plus
92 Epson Stylus Color ink jet printers
92 HP OfficeJet Pro 1150C
94 Infini-D 3.5 graphics tool
94 Scala MultiMedia MM200
96 Debt Analyzer finance program
96 DataSafe, PC-Crypto 1.0
98 InterJet 100 connectivity device
100 SL Waber UPStart Network 550

122

136



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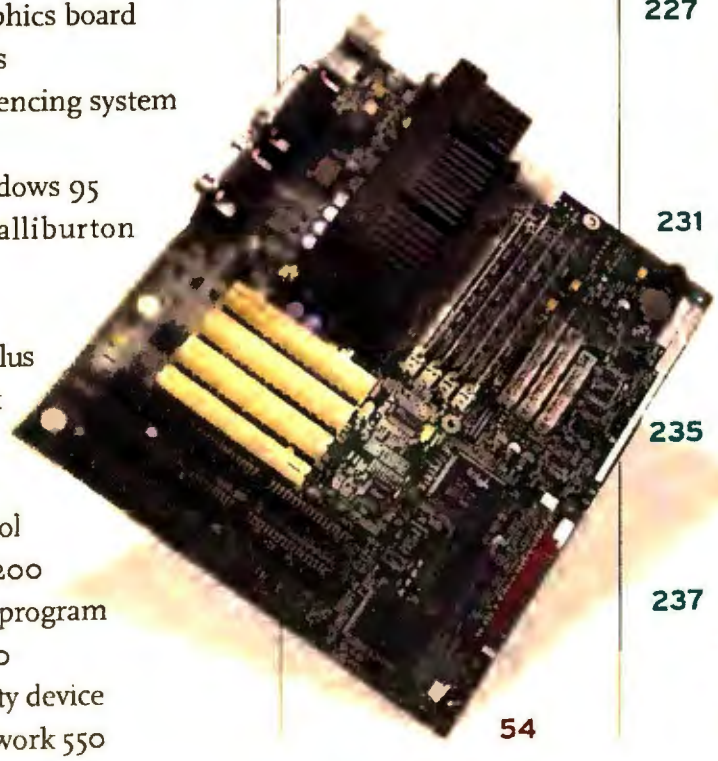

54

TOP 100

187 MMX TAKES OVER

TOP 100 MMX PCs, including the number one Dell Dimension XPS M200s and two loaded HP Pavilions, take over eight spots on the Power Desktops chart. Meanwhile, Cyrix comes on strong in the Budget Desktops chart with three new 6x86 PCs breaking into the Top 20.

190 POWER DESKTOPS

TOP 20 For business or home, the new Power Desktops run the gamut. IBM's PC 350 P200 carries many business features, and the HP Pavilion 7370V and 7350P have home gadgets like a photo-scanning drive.

206 BUDGET DESKTOPS

TOP 20 From a P-120 to a Pentium Pro 200, this month's chart includes a smorgasbord of PCs for a wide range of users. But the P-133 is still the sweet spot as P-133s from Dell, Micron, and Gateway take the top three.

216 NOTEBOOKS

TOP 20 Price drops shake up this Top 20: $2000 off Sceptre's Soundx Series 4000, $750 off HP's Omnibook 5500CS, and $600 off Dell's Latitude XPi P133ST.

224 WIN A PENTIUM-133 PC

CONSUMER FEEDBACK How satisfied are you with your PC? Fax in this survey for a chance to win a Micron Millennia LXA P133, a Top 20 PC this month.

227 WORKGROUP PRINTERS

TOP 10 IBM's Network Printer 12 rules the monochrome printer chart, and the HP DeskJet 1600CM is our top color pick.

231 20- AND 21-INCH MONITORS

TOP 10 Seven big new screens burst onto this month's chart. Leading the pack: the Mitsubishi Diamond Pro 91TXM.

235 GRAPHICS BOARDS

TOP 10 Matrox's $189 Mystique debuts at number two and works best for 3-D.

237 EXTERNAL AND PC CARD MODEMS

TOP 10 The Practical Peripherals PC288LCD V.34 and Motorola Montana 33.6 hold steady as the top modems.

HERE'S HOW

252 ANSWER LINE
Launch executables as easy as 1-2-3; let a Web agent handle your e-mail and newsgroups.

258 WINDOWS TIPS
Send your custom color desktop to other Win 95 users; tune up your Win 3.*x* PC.

266 SPREADSHEETS
Print data from two sheets on one page; plus the perfect Excel business book.

268 WORD PROCESSING
Dress up documents with Word 97's AutoShape; get to the Web from within Word Pro.

272 DATABASE TIPS
Publish Microsoft Access 97 data on the Internet.

274 INTERNET TIPS
Get your old PC to cruise the Web; log onto AOL through the Internet.

278 HARDWARE TIPS
Figure out why you crashed by identifying system errors.

280 MULTIMEDIA TIPS
Play those music CDs with ease; plus the best places to view QuickTime movies.

282 UPGRADE GUIDE
Add Windows NT to your Win 95 system, step-by-step.

252

31

47

@HOME

245 @HOME PRODUCTS
A photo printer that's a snap; a CD-ROM that's encyclopedic; a personal organizer for the home.

246 KEEPING UP
Web sites and services for consumers.

248 TOP 5 HOME PCS
Hewlett-Packard's new MMX Pavilions and Sony's PCV-70 rock this month's chart.

250 HOME OFFICE
Steve Bass goes SCSI and makes his wife's hard drive fly.

245

DEPARTMENTS

17 UP FRONT The free Web isn't going pay-per-view anytime soon.

23 LETTERS Readers sound off on virus killers, IBM Internet Connection.

31 CONSUMER WATCH Banking online.

43 PCW ADVOCATE AOL charges; check the fine print on "equivalent to new" parts.

47 REAL SOLUTIONS Stay up-to-date by broadcasting industry news on an intranet.

51 BUGS AND FIXES Quicken's new patches and bugs; set ActiveX security to "high."

318 FULL DISCLOSURE Hard disk intruders.

RESOURCES

14 HOW TO CONTACT PC WORLD

36 COMING UP

283 MAIL-ORDER SHOPPING GUIDE

298 PC WORLD CATALOG

308 READER SERVICE CARD

311 ADVERTISER INDEX

314 EDITORIAL PRODUCT INDEX

PCW ONLINE

OFFICE 97: THE TIPS

HOW-TO So you've plunged into the depths of Office 97? Before you drown, check out these tips and shortcuts for Word, Excel, Web elements, and more.
http://www.pcworld.com/may97/office

TAKING MMX FOR A SPIN

REVIEW You have the hardware, now get the software. Start with this—*PC World*'s first-ever review of games and multimedia titles optimized for the Pentium MMX processor.
http://www.pcworld.com/may97/mmx

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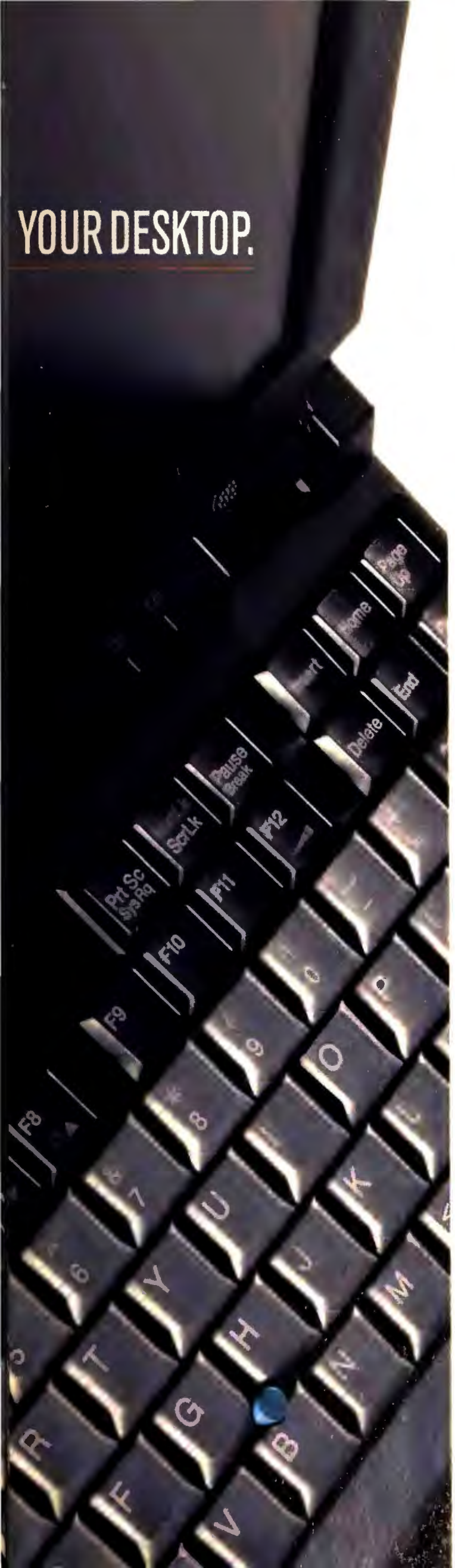

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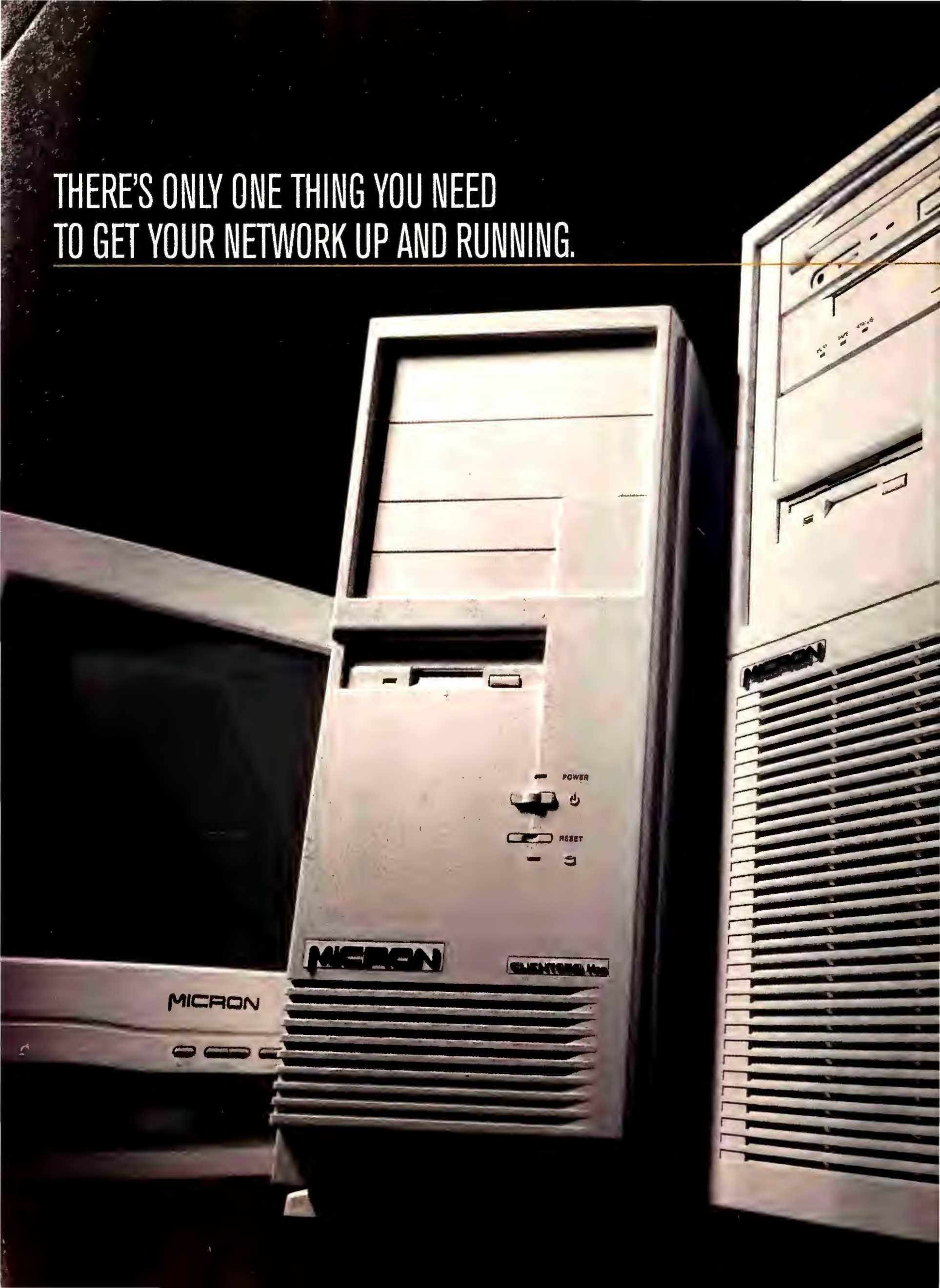

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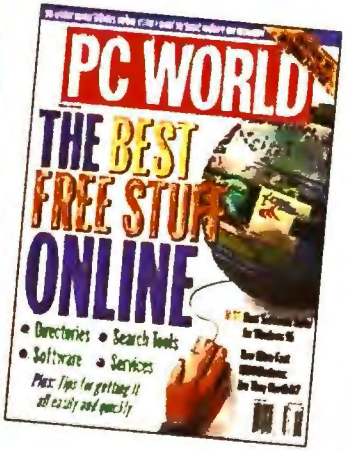

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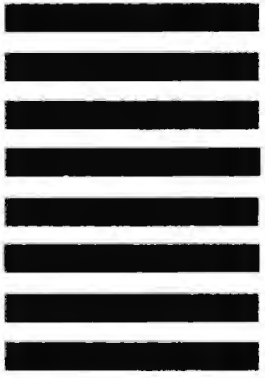

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The Death of the Free Web?

LAST YEAR, SEVERAL WEB SITES bucked the militant information-for-free mind-set of the Internet and began charging for content. Some sites—the Wall Street Journal Interactive Edition, for example—now charge an annual subscription fee. Others have adopted a tiered fee structure: You get free access to some content but pay for premium information and services. Still other sites are experimenting with technologies for micro cash transactions so they can collect fees—even just a few cents—for information and downloads.

Do these developments signal the death of the free Web? Hardly. Even though sites will continue to roll out more paid content and services, there'll still be more free content on the Web than you'd ever consume in a lifetime. Does this mean you'll soon pay for good content but have access to only the junk for free? Not a chance. In fact, when researching this month's cover story, "The Best Free Stuff Online," our editors found just the reverse to be true. As the sophistication of the Web increases, so does the amount of useful free information, products, and services—from huge shareware libraries and dozens of high-quality news sources to hundreds of interactive services. You'll find our guide to the best on page 106. For quick links to recommended sites, visit our Web site, PC World Online (http://www.pcworld.com).

Does all this mean you'll soon **pay for good content** but have access to only the **junk for free?** Not a chance.

NEW ON PC WORLD ONLINE

LEST WE APPEAR shamelessly self-promoting, our cover story mentions PC World Online only briefly. But during the last year, the breadth and quality of our site's content and services have improved dramatically. Some highlights of what you'll now find:

- **PC World Software Library.** The latest versions of more than 2500 shareware files, indexed by category. These include utilities; productivity applications; patches, fixes, and drivers for popular software and peripherals, including graphics cards and CD-ROM drives; and Windows help files and FAQs. The Internet category includes a full set of plug-ins and Java and ActiveX applets. A good place to start is the Essential Shareware list.
- **Daily News.** Product and technology stories posted throughout the day, filed by the editors of *PC World* and PC World Online and by affiliated International Data Group organizations, including *InfoWorld* and the international IDG News Service. Look for special on-site reports from trade shows, first looks at just-released products, and news analysis. A useful adjunct is the Daily News Alert, an e-mail newsletter listing the day's top stories, with URLs for fast access.
- **News Radio.** Daily audio broadcasts of top news items by Brian McWilliams, who in late February broke the story of a Web scam that bilked victims of more than $1 million in long-distance phone charges. McWilliams also interviews industry leaders and spotlights emerging technologies and trends.
- **Newsletters.** Free e-mail and HTML newsletters, most of which are delivered daily. Topics include Windows 95, Windows NT, Microsoft Internet Explorer, Netscape Navigator, Microsoft Office, Lotus SmartSuite, Bug Alert, and Shareware. More newsletters are slated for rollout later this year. To subscribe, go to http://www.pcworld.com/resources/tipaday.
- **Interactive Buyer's Guides.** A series of interactive applications for customizing *PC World*'s Top 20 and Top 10 charts and finding the products we've reviewed that best suit your needs. From the main Buyer's Guide page (http://www.pcworld.com/hardware/t2010), you can access interactive charts for desktop PCs, notebooks, printers, monitors, and graphics boards. All are available as Java applets, in Shockwave, and in HTML. A Product Finder lets you search the PC World Test Center database by product, brand name, and model. An Interactive Personal Top 10 guide for modems should be up by summer.
- **Features, reviews, and columns.** Online-only articles range from the 25 best shareware programs and job hunting online to game reviews with the latest demo versions of popular commercial and shareware games.

JOIN THE COUNCIL

AS ALWAYS, PC WORLD ONLINE publishes supplemental material for selected articles in the magazine, such as the ISP Finder that accompanied last year's guide to Internet service providers. The online icon indicates there's extra content.

Finally, our site recently launched the PC World Online Advisory Council. Registered members complete surveys in areas of interest so we can continue to hone content to suit readers' needs; all respondents are eligible for prizes. For more information, go to http://www.pcworld.com/resources/survey/advisory.html.

Cathryn Baskin is editor in chief of PC World. ■

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Con

◀ The Hard Facts from Industry Experts

RELIABILITY

Source: 10/96 Mobile Computing: page 71
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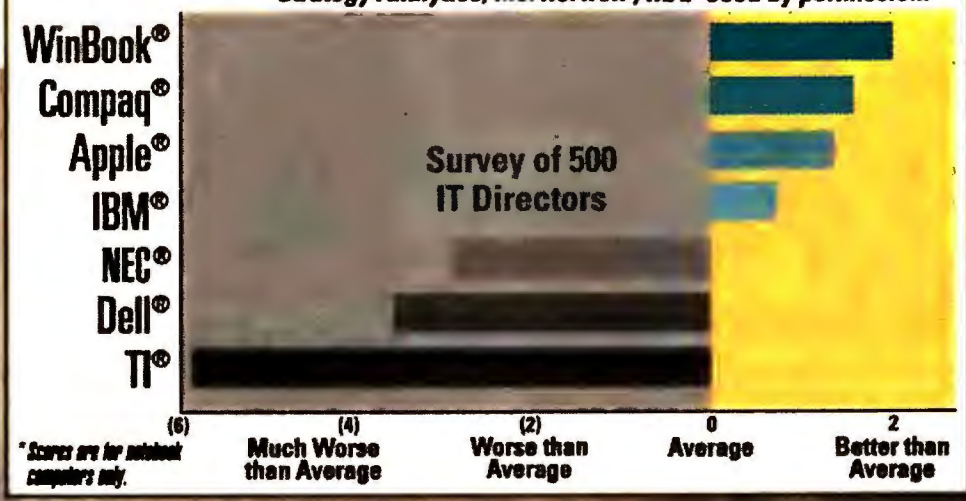
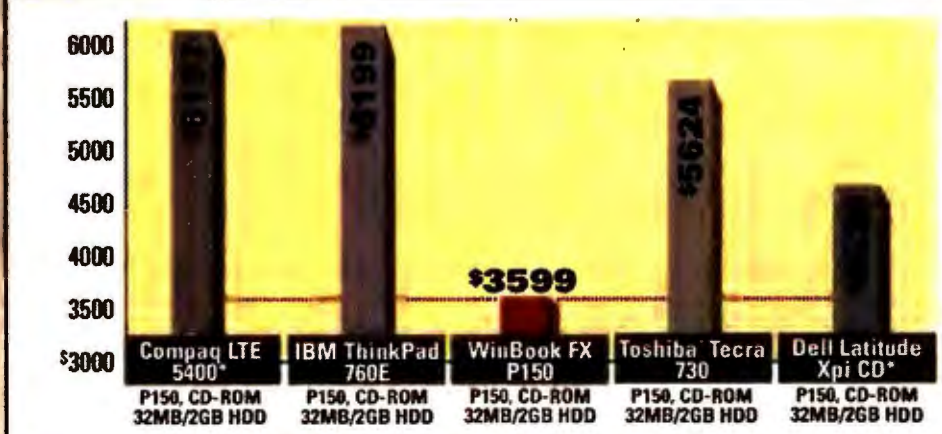


** Scores are for notebook computers only.*

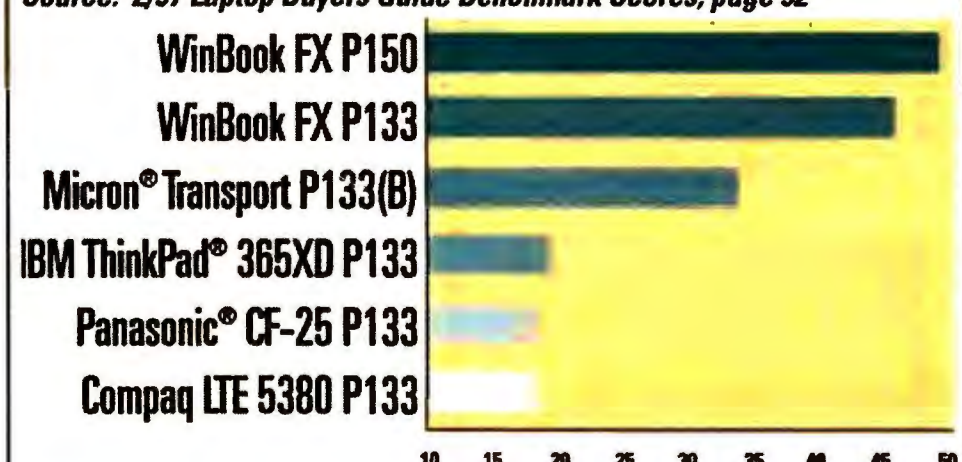
PRICE, P150s



Prices quoted over 1-800 lines as of 2/6/97 for similarly equipped models with 150MHz Intel® Pentium® Processors, TFT Active Matrix Color Display, CD-ROM drive, 2GB HDD, 32MB RAM, 28.8 fax-modem, and lithium ion battery from Dell Computer Corporation and PCs Compleat.
**Includes 33.6 PC Card Modem*

PERFORMANCE

Source: 2/97 Laptop Buyers Guide Benchmark Scores, page 92



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BYTE — April 1995, WinBook XP Best Value 486DX4 Notebook

Editors' Choice Awards — January 1996 PC Laptop Editor's Choice – WinBook XP, XP5

March 1996 Windows 5 of 5 Rating WinBook XP5

PC WORLD — December 1996 WinBook XP5 P100 16/810MB DSTN

Laptop Buyer's Guide February 1997, WinBook XP5 P120 16/1.3GB TFT

NSTL PC Digest 4-Star Rating
August 1996 WinBook FX P133

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- 16-bit Soundblaster Pro-compatible stereo audio
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447X avc–17"	150Hz	140Hz	110Hz	100Hz	85Hz	72Hz

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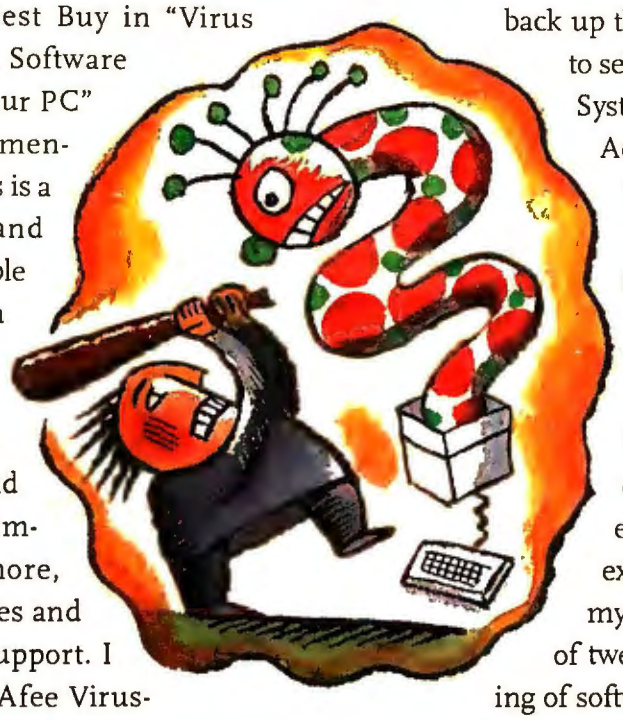
Circle 164 on reader service card

YOUR TAKE ON: Virus killers ◆ IBM's conflicting Connection ◆ TurboTax trouble

ANTIVIRUS ATTACK

PROBABLY NO SINGLE VIRUS scanner is right for everybody, but I do quibble with your choice of Dr Solomon's Anti-Virus Toolkit as the Best Buy in "Virus Killers, The Best Software for Protecting Your PC" [March]. As you mention, Dr Solomon's is a little pricey and updates are available only four times a year. I realize that you are concerned with good virus detection and removal, but as important, if not more, are regular updates and solid customer support. I can swear by McAfee VirusScan. Updates are free and monthly. When I had a problem, I called McAfee's toll-free technical support number, and within 5 minutes a technician was on the line, staying with me until the virus was eradicated. *That* is peace of mind.

Laurence J. Lowy, Fairfield, Connecticut



A YEAR AGO McAfee VirusScan informed me that I had the Monkey.B virus on my computer. As a result, I spent a week repartitioning and reformatting my hard drive and reloading my software. I then installed IBM AntiVirus in addition to VirusScan and found three files with Monkey.B again! Unfortunately, IBM could not remove Monkey.B. I searched the Internet for a way to remove it and came across the F-Prot Web site. After downloading a shareware copy of F-Prot, I was able to eradicate Monkey.B. So maybe the safest thing is not to rely on just one antivirus program.

Carl Steidel
Atlantic Highlands, New Jersey

KNOW YOUR BACKUP SOFTWARE

I READ "Better Safe Than Sorry" [February] with great interest; however, I believe you overlooked a major concern about tape drives—the backup software. I use Colorado Backup with my HP Colorado Jumbo 1400 tape drive, and under all but one condition, the Windows 95 Registry is not included in the backup. In order to back up the Registry, I have to select Colorado's Full System Backup file set. Additionally, when the Registry is restored, the program merges the tape backup copy with the current hard drive Registry. It will not overwrite Registry entries that already exist. This results in my having to do a lot of tweaking and reloading of software patches.

Richard Stall, Richardson, Texas

TIPS APPRECIATED

FINALLY! Your article "Undocumented Secrets: 101 Tips for Windows 95, NT, and 3.*x*" [March] is one of the most complete lists I have ever seen. It makes a much better reference than the thousands of notes I have scattered around my desk.

Michael Graziano
Massapequa Park, New York

IBM INTERNET CONNECTION: HOT AND COLD

I HAVE NOTHING but praise for "Best Routes to the Net: Top Internet Service Providers" [February], which helped clear up many of my questions about Internet service providers. I agree with your Best Buy choices 100 percent. I have been a customer of IBM Internet Connection for about four months. Whenever I call its support line, the staff helps me resolve my problems in a timely and courteous manner. A few of my friends recently joined the same service after subscribing to a number of other ISPs, where they never had connections faster than 14.4. Now they are reaching IBM servers at 28.8 all the time, without any busy signals. Your article was right on the mark. I think IBM Internet Connection is the best Internet service provider out there, and its technical support is unparalleled.

Billy Wang, Internet

I TOOK YOUR ADVICE and signed up for IBM Internet Connection, which you rated A+. In the 40 days I have been online, the mail service has been atrocious. Almost every other day there is a significant problem with the mail server, and I am unable to download my mail. Every time I call, IBM acknowledges the problem. Their answer: "Sorry, we've had a ton of people calling to complain." Asked if this is a temporary problem, one IBM operator told me that it is "the ongoing saga." My grade for IBM: D.

Ronald Hoye, Chicago

BASED ON *PC World*'s strong recommendation in "Best Routes to the Net," I chose IBM Internet Connection as my ISP. The service and support were great for the first month. But recently, I have been unable to access my e-mail because the IBM mail server is down. I haven't been able to find out what the problem is or when service will be restored. Customer service doesn't have a clue. Is 24 hour e-mail availability too much to ask?

Mark Huber, Internet ▶

AND THE WINNER IS...

THE FOLLOWING READERS WON prize systems when their returned Reliability and Service surveys were selected at random:

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Jennifer Barr, Albuquerque, New Mexico
Brett Brottlund, Tehachapi, California
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LONE AOL DEFENDER

I HAVE TO ASK how you derived a grade of D for America Online? In "Best Routes to the Net," you mention AOL's poor browser, then state that Netscape Navigator and Internet Explorer are both supported by America Online. You then say that AOL is expensive. Perhaps the review was written prior to AOL's $19.95 flat rate-fee. You say it is slow—very possibly. At times, I have noticed slower downloads, but all the bells and whistles that America Online provides in addition to Internet access make it worth the wait.

John Krumm, Internet

TWEAKING THE BIOS

"PUT BIOS IN ITS PLACE" [*Hardware Tips,* February] brought a long-standing problem of mine to an end. I bought my computer in June of 1996 and realized months into it that the system was not performing as well as comparable systems. Per the tips in your article, I adjusted some of the BIOS settings, and *shazam!* the machine was performing as it should. Keep those tips coming.

Don Voorhees, Hermitage, Tennessee

TROUBLE WITH TURBOTAX

I WAS SURPRISED that your tax program review's only mention of electronic filing was that it costs $10 ["New Tax Software: Intuit's TurboTax Deluxe Takes Top Honors," February]. I bear witness to the fact that it can be a lot more expensive. I bought TurboTax Deluxe and was very pleased with the program until it came time to file the return. I was disconnected numerous times by the electronic reception center and finally called technical support. After many minutes on hold, three different advisors told me I should "just file by mail." For years I have filed my own taxes, without incurring $70 worth of phone calls in addition to the price of TurboTax Deluxe. I feel frustrated and ripped off, to say the least.

Hal Frank, Internet

SECRET INTRANET

I FOUND THE STORY "Build Your Own Secret Intranet" [March] very informative and right on target. As a technician working at a large company, I realized that our work team suffered from a lack of shared information. Implementing a Web site was a logical step forward. Now our Intranet serves as a great resource to us. Unfortunately, in big business you really need to be able to prove effectiveness at the time that you make your proposal. Since this requirement may seem unrealistic for a start-up Web site, many people hesitate even to make the proposal. My advice to those people is: Just do it. In my own experience, it is much easier to beg for forgiveness than to ask for permission. Thanks for the article.

Tim Claremont, Internet

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

CORRECTIONS AND CLARIFICATIONS

DUE TO AN ERROR in the March cover story, "Undocumented Secrets: 101 Tips for Windows 95, NT, and 3.x," the following Windows NT tips were incorrectly flagged as tips for Windows 3.*x:* tips number 38, 53, 54, 56, 71 through 74, 76, and 77.

In addition, tip 43, "Sure You Wanna Delete Me," was inaccurately identified as applicable to all three versions of Windows. It is exclusively a Windows 3.*x* tip.

Our March feature on Lotus SmartSuite 97 listed an incorrect phone number for Lotus. The correct number is 800/343-5414.

In "Microsoft Network, Take Two" (March), we incorrectly stated that MSN is the second largest commercial online service. In fact, MSN is the third largest such service. America Online is the largest commercial service, while CompuServe is the second largest.

In March *New Products,* we evaluated a prerelease version of PGPcookie.cutter and said the product would be available for Windows 95 and NT. However, by late February, only the NT version was available. PGP's plans were altered due to a delay in Microsoft's release of Winsock 2.

The text of April's Top 100 review of budget desktops described Kingdom Computers' support policies incorrectly. Kingdom provides one year of free on-site service and has a three-day service turnaround policy.

***PC World* regrets the errors.**

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intel inside

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Online Banking: A Survivor's Guide

When it works, electronic bill paying is a snap, but sometimes just mailing a check is easier.

ILLUSTRATION: AARON THOMAS ROTH

IT WAS JUST AFTER MIDNIGHT. I was on a cross-country trip, and this was the first opportunity I'd had in days to check my voice mail. Among the messages I retrieved was one from a representative of Wells Fargo's online banking service.

"Your transfer," she said, "has been denied."

I had no idea what transfer she was referring to, much less why the powers that be had found it objectionable. So I followed her recorded advice and called the toll-free number right away.

The online banking agent spotted the problem immediately. "You can't electronically transfer an amount over $5000," he explained. "You tried to transfer $10,000."

To the best of my knowledge, I had never tried to transfer $10,000. My mind raced back to the bills I had paid, using Intuit's Quicken personal finance program, the CheckFree electronic bill payment and banking service, and my Wells Fargo accounts. And then it hit me: In Quicken, I had tried to move $1000 from savings to checking. I must have typed an extra zero.

I explained this to the agent. "That happens a lot," he said, and transferred the $1000 for me. And that was that. Or so I thought. Actually this was to be just the start of my misadventures with online banking. But first, the good news.

Usually I've found paying bills, transferring money, and obtaining account updates electronically to be easy, convenient, reliable, and secure. In fact, after a year of electronic banking, I would not want to return to keeping a check register, writing checks and putting them in envelopes, licking the stamps, and mailing the payments.

Online banking, however, is still in its infancy. Like any baby, it can be unpredictable and temperamental and rob you of sleep. Here are some survival strategies for getting the most out of online banking and bill paying.

1. HOW TO GET THERE FROM HERE

IN THE SPRING of 1995, I signed up to be able to check my account balances and transfer funds via Wells Fargo's Web site. A few months later, security concerns led the bank to temporarily suspend transactions from its Web site, so I registered with CheckFree. Recently, however, I learned that CheckFree users with Wells Fargo accounts will soon be contracting for its services directly with Wells Fargo, but that CheckFree will still handle the actual check payments. Confused? I can't imagine why.

The bottom line is this: There are lots of ways to bank electronically—so many, in fact, that deciding among them can be befuddling. Here, in a nutshell, are your options:

Use a personal finance program, such as Quicken, Microsoft Money, or Managing Your Money. With one of these programs, you can transmit bill payments (over private, leased network lines) via your financial institution or through a service such as CheckFree. Some banks charge $5 to $6.50 per month to handle your electronic bill payments, while a few offer the service free. If your bank offers electronic access, you ▶

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can also transfer funds, download transaction records, and conduct other financial business. If you bank with an institution that isn't wired, you're limited to paying bills online via a third-party service such as CheckFree, which charges $9.95 per month.

Personally, I think banking and bill paying via personal finance software is the best option. I like all my financial data in one place so I can quickly generate budgets and reports, calculate loan payments, and search for tax deductions. The downside: These programs have a bewildering array of features most people will never use. Also, they cost (usually about $35), and you need to buy upgrades every year.

Visit your bank's Web site. More than 600 national and international banks have set up shop in cyberspace, allowing you to pay bills, transfer money, and view your most recent transactions, among other options. Check MyBank (http://www.mybank.com) for links to these banks. The majority of the online transactions are free, although usually you'll be charged a monthly fee of about $5 to pay bills.

As for security, banking over the Internet today is considered less risky than giving out your account number over a cellular or cordless phone (where electronic eavesdroppers can easily intercept it). Still, if you're concerned, stick with a service like CheckFree, which uses private networks and top-level security.

Move your money via an online service. Recently, America Online made a big push into online banking, signing up 28 banks including such heavy-hitting financial institutions as Citibank, First Union, and Chase Manhattan. Prodigy has been offering electronic banking for almost ten years and has 17 major institutions online. But AOL has big traffic jams, and Prodigy's interface is inelegant. Many of the advantages, disadvantages, and costs of banking via the Web apply here as well.

2. GET A PROOFREADER

IT'S VERY EASY to make a mistake when you bank by PC. Take my attempt to transfer $1000 electronically, for example. Had I gone into the bank and filled out a slip, I doubt that I would mistakenly have ▶

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written $10,000. Even if I had, the teller I presented the slip to would have seen that I didn't have the money in my account, and the error would have been caught before any damage was done. Similarly, if I had accidentally added an extra zero when trying to transfer the funds using the automated teller on the telephone, the system would have balked.

But after I unwittingly typed the amount as $10,000, Quicken informed me that the modem transmission had been successful. I assumed this meant the money had been transferred. But because the $1000 had *not* been transferred, all of the checks I had written against those funds were not covered. A week later, I discovered that Wells Fargo had imposed $43 in overdraft protection fees on my account. It took me hours to straighten out the resultant mess, but at least the bank agreed to strike the $43 charge.

Granted, this situation would probably not have gotten out of hand if I had been home when Wells called to notify me. And Quicken 5.0—a later version than the one I used—introduced messaging capability, which would have enabled the bank to e-mail me a notice that my transfer hadn't gone through.

The biggest lesson learned here: Always proofread your transactions before you send them. Quicken 6.0, the current Windows edition, makes this task a little easier by letting you review all your transactions in one window before they are zapped over the phone lines.

3. WANT IT FAST? GO POSTAL

IT'S IRONIC, but in some cases I've found that sending a check by mail—yes, that's right, via the *United States Postal Service*—is faster than paying online.

When you send a payment by modem from Quicken, Microsoft Money, or any other online banking setup, the information is transmitted to a data processing center. If the processing facility also cuts checks—as CheckFree's data centers in Austin, Texas; Columbus, Ohio; and Chicago do—a check may be printed and mailed on the spot, or the payment data may be transmitted to the contracted check-cutting service that's geograph- ▶

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ically closest to the payee. So it can take as many as four business days from the time you transmit a payment until a check is actually mailed. If your check is going to the local power company and you're trying to beat a deadline, it can be faster to drop a hand-written check in the mailbox.

According to CheckFree spokesperson Matt Lewis, CheckFree and other online banking providers are working to convince merchants and others to accept electronic payments rather than only printed checks. Once a company is set up to receive electronic remuneration, bill payments can travel from your modem to the payee within 24 hours. Currently, some 40 percent of the bills CheckFree processes for consumers are delivered electronically, says Lewis; by the end of 1997, that figure should rise to 50 percent. And that brings me to my last survival strategy:

4. WATCH YOUR FLOAT VANISH

RIGHT NOW, you can still float a check until payday by sending it through the mail or paying it via an online service. In the not-too-distant future, though, when more merchants accept electronic payments, your float time will be reduced to a matter of hours. But don't worry. Cold, hard cash might not last long, but credit cards spring eternal.

Do you have an online banking survival story or tip? Send it or any other comments to consumerwatch@pcworld.com. Contributing Editor James A. Martin is filling in this month for Roberta Furger.

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COMING UP

IN JUNE

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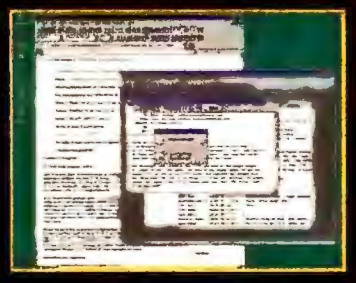

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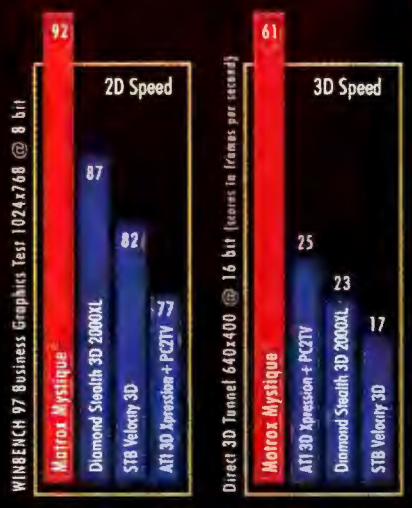

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"The fastest, most complete low cost 3D card you can buy. Period."
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Speed. Versatility. Upgradeability. The Matrox Mystique accelerator delivers more than ever with state-of-the-art acceleration for Windows, the fastest 3D and high quality video playback. And with the new option to upgrade to 8 MB or a complete line of professional quality video companion cards, your Pentium will be powered up for all your needs.

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* Estimated street price for 2 MB. All performance tests conducted by Matrox Graphics Inc. on a Gateway 200Mhz MMX system with 32 MB of SDRAM and 512K of cache. WinBench 97 Business Graphics conducted at 1024x768 @ 8bit with 75Hz 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 release 3.41, 3.03, 4.03.00.3105 and 1.24B respectively. Microsoft Tunnel test run at full screen 640 x 400 resolution with 16-bit color at default manufacturer refresh rate based on Gouraud shading, perspective correct textures, point sampled and z-buffer.

universe & video

MATROX

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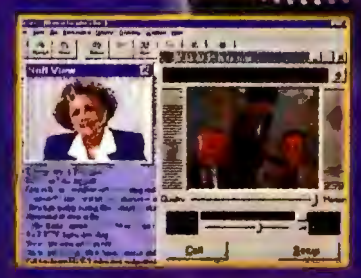

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* Estimated street price. ** Software bundle available only with retail product. Rainbow Runner products can only be used in conjunction with Matrox Mystique. 1.Watching TV on the PC requires Matrox Rainbow Runner, TV (sold [illegible]) or a VCR in addition to Matrox Rainbow Runner Studio.2.Video conferencing software included. 3. Price quoted is for 4 MB version. All prices accurate at time of printing. VDOnet is a registered trademark of the VDOnet corporation.

Circle 143 on reader service card

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76i/76m†	17" FST (15.7" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56i	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56m†	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI

† Built-in stereo amplifier and speakers. • Requires DDC compatible video card
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3 YEAR LIMITED WARRANTY

Circle 96 on reader service card

Unauthorized charges by AOL ◆ Toshiba's scanty service ◆ Dog eats DeLorme

HEY, I SAID, "NO WAY AOL"

IN AUGUST 1996 I started a trial membership with America Online's offer of 523 free hours for three months, and later accepted some free monthly memberships. I was tempted to sign on for the new flat rate of $19.95, but I was getting a busy signal when I logged on. So I canceled my account. AOL verbally assured me that I hadn't incurred any charges. But three days later, AOL charged my credit card $115.60 with no explanation. I want my money back.

John F. Draft
Lexington, Kentucky

Editor's response: Draft was not alone in his complaint against AOL. Thousands of frustrated users expressed their anger with the constant busy signals they got after AOL's "unlimited access" offer was launched. The multistate accord reached late in January forced AOL to provide a month's free service or a credit rebate to its customers according to the amount of time used online in December 1996 and/or January 1997. Call AOL at 800/827-6364 for details.

A spokesperson at AOL confirmed that Draft accepted the trial offers, but AOL claims that Draft is still responsible for hours that were not covered by a special offer. At press time, the issue was not resolved.

If you wish to cancel either a trial membership or your existing account, you have three options: Call AOL's Customer Service (800/827-6364); send a fax (801/622-7969); or write to P.O. Box 1600, Ogden, UT 84401. Provide your name, address, telephone number, and master screen name. If you decide to cancel after the trial period, you must notify AOL quickly or your account will be debited for the next month's charges.

ILLUSTRATION: MICHAEL WITTE

TOSHIBA, WHERE ARE YOU?

I BOUGHT A Toshiba CS105 notebook in August 1996 from Circuit City and had battery problems from the get-go. Despite draining the battery and recharging it 100 percent, it wouldn't keep its maximum charge. But I am really upset at Toshiba: The 800 number was constantly busy; I got through twice, and was on hold for 45 minutes. I never did talk to a human. Circuit City couldn't reach Toshiba either, and tried swapping the battery for a new one, to no avail. Help—I need service.

Reverend James D. Hager II
Lexington, South Carolina

Editor's response: In December and January we received more than two dozen complaints from readers about their experiences with Toshiba. They all boiled down to one thing: lack of service. Gary Mueller, senior vice president of knowledge assets and operations at Toshiba, agreed that the quality of technical support had deteriorated during 1996. "In addition to our own customer support staff, we were using a third-party provider to handle calls, which did not provide the service our customers needed."

In September 1996 Toshiba launched its InTouch Center in Irvine, California, to house the entire product support unit, dropping the third-party provider. However, we continue to get reader feedback that does not indicate a dramatic improvement in service. Mueller assures us that with recent staff additions and expanded support options, customers will have started to notice a difference in service by early spring 1997.

Hager's problem was never resolved. He sold his CS105 to buy a remanufactured Toshiba Satellite Pro 420CDS notebook, which is working fine. Note the new toll-free numbers for Toshiba support: 800/999-4273 (notebook); 800/400-4172 (desktop).

DELORME WINS TWICE

I LOVE USING DeLorme's AAA Map n' Go software for planning family trips. One day my 2-year-old daughter scratched the CD-ROM. I phoned DeLorme, and they surprised me by immediately authorizing shipment of a new copy, free of charge. The delivery person left the new CD-ROM on my back porch—and my dog ate the package! I called DeLorme, and they shipped out another free copy. Now, that's what I call customer service.

Robert Apodaca, Huntsville, Alabama

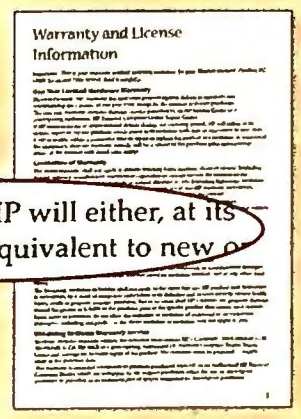
Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is a staff editor for* PC World. ■

THE FINE PRINT

KEEP AN EYE ON YOUR WARRANTY

ONE YEAR LIMITED hardware warranty on parts: What does that really mean? The small print on this Hewlett-Packard warranty statement for the Pavilion 5000 and 7000 series reveals some important information you might not be aware of.

Hewlett-Packard will repair or replace parts—most likely monitors, floppy drives, CD-ROM drives, hard drives, and motherboards—with new or in some cases "equivalent to new" parts. These refurbished components have already been used and returned. They are tested and subsequently warranted as new.


Warranty and License Information

warranty period, HP will either, at its
ective with new or equivalent to new o

Hewlett-Packard is not the only computer manufacturer to use reconditioned parts—however, the types of components used and the testing procedures vary from company to company. For more details see "Used Parts in Your New PC, Take 2," *Consumer Watch*, October 1996.

The Mac OS. It *does*. It *will*. *you can.*

At Apple, we started with one simple goal: to make it easier to do the things you want to do. Over the years, the Macintosh® operating system has helped millions of people do just that, by providing a simple, intuitive approach that makes all aspects of computing easier. But even more impressive than what a Macintosh can help you do today is what it will help you do tomorrow.

It does more than ever.

The Mac you buy today won't be obsolete tomorrow. Because Rhapsody will be compatible with all currently shipping Mac OS systems.

So what does the future of the Mac® OS look like? For a glimpse, check out our newly released Mac OS 7.6. It's faster than ever before—so you can start your Mac, launch applications, save files and print up to 40% faster.

Connecting to the Internet is easier too. With the latest version of the Apple® Internet Connection Kit (it includes Netscape Navigator™ 3.0 and other Internet tools), you're one step away from accessing the Net. Or, if you prefer, you can use AOL or our own Apple Cyberdog™—they're included with Mac OS 7.6 along with TCP/IP and PPP.

Mac OS also has the latest version of Apple QuickTime,® the industry standard for multimedia creation and delivery. And it makes upgrading easier: with one CD-ROM and a streamlined installation process.

Intrigued? Then you'll love what comes next. Because we're hard at work on the next version of the Mac OS, code-named Tempo. Right from the start you'll notice a new look, with beveled buttons, icon drop shadows and other 3-D enhancements to the desktop. Tempo will dramatically improve system responsiveness by incorporating multitasking, multi-threaded functionality and native PowerPC™ capabilities directly in the OS. So you can run multiple applications more smoothly, and launch new applications while files are copying in the background. Tempo extends our Internet capabilities with easy

The Mac OS Report. One in a Series.

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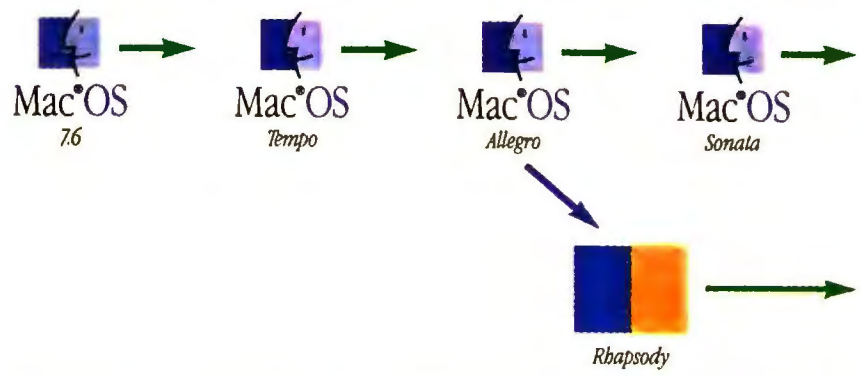

Apple's complementary operating systems—Mac OS and Rhapsody—allow you to choose the system that best meets your needs. They also allow you to decide when it's time to make the transition.

setup, personal web sharing and built-in Java™. And it will help you be more organized, by reducing on-screen clutter with spring-loaded folders and pop-up windows for frequently used items.

Of course, Tempo also paves the way for further updates to the Mac OS. Because there's much more to come.

It will be the NeXT thing.

When we began defining a new software architecture that would take us into the future, we had two clear objectives: to enhance our traditional strengths, and to create an operating system that would leapfrog the competition, setting standards into the next century.

Enter NeXT.® By acquiring NeXT Software and adopting their kernel-based architecture, Apple can offer advanced system services such as true multitasking, protected memory and symmetrical multiprocessing. We have also strengthened our position in client-server and Internet/Intranet markets. And NeXT's object-oriented development environment and powerful tools such as WebObjects™ and Enterprise Objects Framework™ give us clear advantages in the creation of new solutions.

Merging NeXT and the Mac OS will create a next-generation OS that will give our competitors something new to catch up to. It will be an OS that helps developers create breakthrough applications by allowing greater experimentation and efficient reuse of code. It will include the best of our graphics technologies, such as ColorSync® and QuickDraw® GX. And we plan to adopt the Adobe® PostScript® imaging model as well. It will fully support the QuickTime Media Layer. It will provide industrial-strength reliability, performance and ease of use. And it will be an ideal platform for publishing, multimedia and Internet applications yet to come.

What is the name of this new OS? Its code name is Rhapsody.

It will be an Apple thing.

Rhapsody will leave other operating systems in the dust. But not Apple customers. To start with, Rhapsody will enhance the general look and feel of today's Mac OS interface. It will support all currently shipping Mac OS-based systems. It will run the vast majority of existing Mac OS applications by hosting the complete Mac OS on the Rhapsody kernel.

In short, Rhapsody will run your existing applications and utilities, read your files, recognize your current fonts and extensions and play your movies and sounds. Rhapsody will deliver the kind of technology you expect from Apple. The kind of technology that appeals to anyone who requires the highest performance for publishing, Internet and multimedia authoring, and scientific and technical work. The kind of technology that appeals to people who like to, well, get things done.

You can.

What does all this mean? It means you can do everything you're used to doing now, plus a few things you might not yet imagine. It means you can buy a Mac today and not worry about its compatibility with Rhapsody tomorrow. It means Rhapsody won't just be a new way to use a *Macintosh*—it will define an entirely new way to use *computers*. You can learn more by visiting us at www.macos.apple.com or by calling 800-538-9696 for information by fax.

Mac® OS

The world's most intuitive and easy-to-use operating system will remain just that. With regular system updates and enhancements, the Mac OS will take you well into the future.

The acquisition of NeXT provides Apple with additional strengths in performance, reliability, network management and rapid application development.

Mac OS 7.6 extends Apple's leadership in graphics and multimedia by bringing together the latest versions of Apple QuickTime technologies, collectively known as the QuickTime Media Layer.

Adobe PostScript

Apple intends to adopt the Adobe® PostScript® imaging model for Rhapsody and transfer the best of our existing graphic technologies, including ColorSync and QuickDraw GX.

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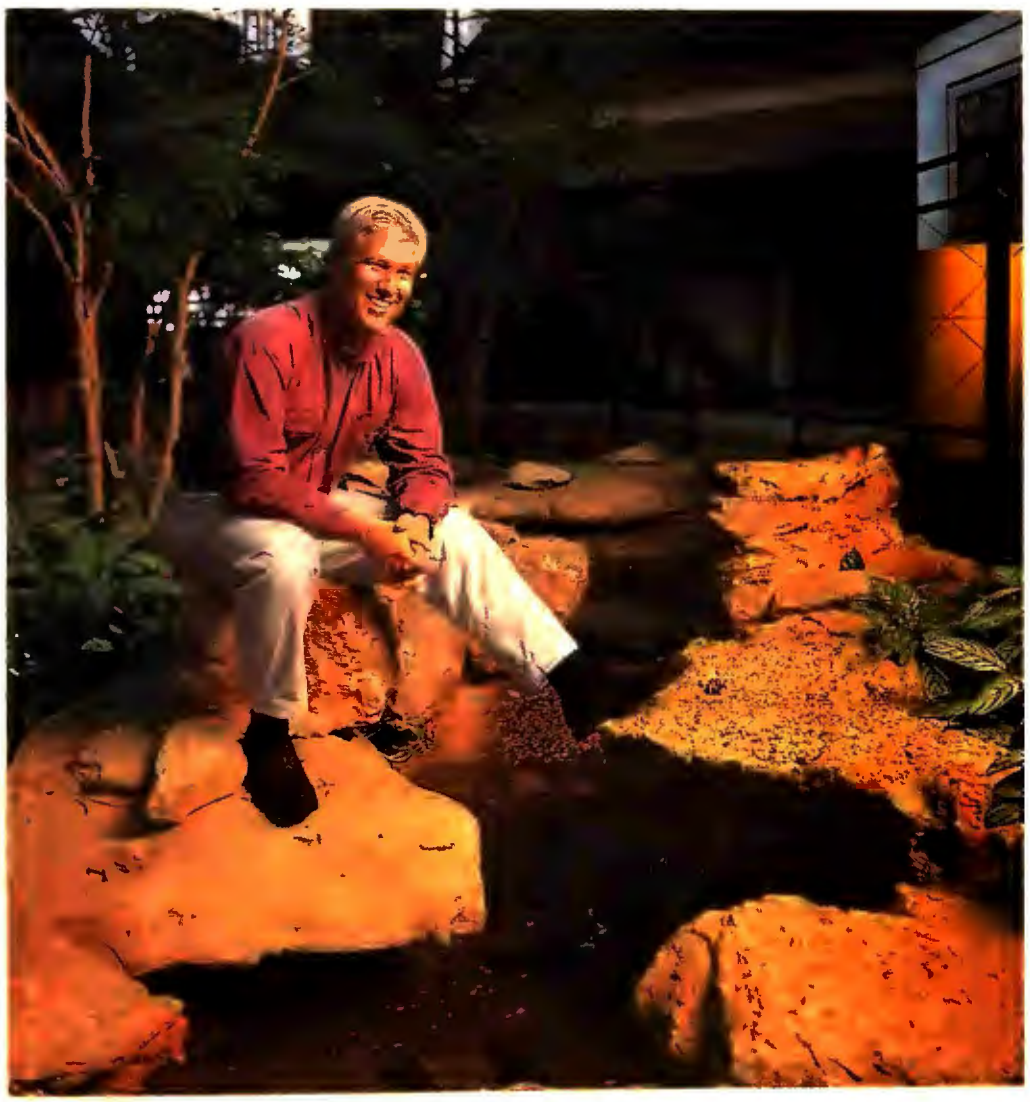
Circle 184 on reader service card

Make Screen Savers Time Savers

How do you keep employees up to date on the latest industry news? Patrick Flynn of Fruit of the Loom broadcasts it to their computer screens.



PHOTOGRAPH: JOHN CHIASSON

THE PROBLEM Newsletters, interoffice memos, e-mail, voice mail: These are the ways most people in the business world get their information today. But printed materials often languish unread in overflowing in-boxes, and voice mail and e-mail must be retrieved. Patrick Flynn, the vice president of systems development for undergarment maker Fruit of the Loom in Bowling Green, Kentucky, has found another way to get the word out to people in his company: Intranet broadcasting. —*Editor*

WHEN YOU'RE IN a hotly competitive industry—one that changes daily—and you have 35,000 employees around the world, keeping everyone informed is a huge task. In the past, we've used newsletters and memos to spread the word about company news and events. But paper documents take time to create and distribute. And too often, by the time an employee found time to read the document, it was no longer relevant. Voice mail and e-mail are faster, but employees have to actively retrieve those messages—still a time-delayed process.

In short, information we needed to disseminate quickly and widely was taking too long to make the rounds. And in the nineties, one thing you can't afford to waste is time.

THE SOLUTION: INTRANET BROADCASTING

ABOUT TWO YEARS AGO, my colleagues in systems development and I were given a mandate to speed up as many processes—market research, product development, product delivery—as we could. We were told to use the latest technology, even though at the time Fruit of the Loom was a company where only a few employees even used PCs. In some ways this was an advantage. We didn't have to consider the costs of upgrading a lot of old equipment.

We began by installing and networking Windows PCs, then we created a corporate intranet site to give employees access to company information. But that wasn't enough. Many employees were too busy to access the intranet regularly. So we started looking for a way to make sure people got the information we were trying to distribute. That's when we discovered the PointCast Network, and PointCast's I-Server.

Using "push" technology, the PointCast Network broadcasts news stories—the latest headlines, stock quotes, business updates, sports scores, and weather reports—to anyone who has PointCast's client software, which is downloadable for free from the Internet. If you have a continuous connection to the Net, the headlines and stories are automatically broadcast to your computer. If you have dial-up access to the Net, the updates download when you go online.

In addition, news can appear on your screen when your computer is idle. The PointCast software includes a screen saver that puts the latest headlines on your monitor. When you want more information, click on a headline and it takes you to an article that's been down- ▶

loaded to your PC. Your hard drive doesn't fill up, though. You tell the software how much hard drive space it can use, and it overwrites old stories when it needs space.

By blasting sports scores and stock reports to computer screens, we lured a lot of employees into relying on their computers for information. That was the first step. The second was to use PointCast to send out information about Fruit of the Loom. With PointCast's I-Server software, which runs on a Windows NT server (so as not to slow down the entire network), we now have our own internal, company-wide channel on the PointCast Network. The server goes onto the Internet, downloads all the PointCast Network updates from CNN and other content providers, then broadcasts those to the PCs on our network. But along with that, we're now able to broadcast our own news and reports from within our firewall-protected intranet. Whenever someone has information to share—whether an update on the company picnic or a message from the company president—they can send it to our Web team, and they'll zap it to the desktop of every employee with a PC.

We've only been broadcasting information over our intranet for a few months, but we've seen some big benefits. Our line of active wear is an $800-million-plus business, and there's a lot of money to be made or lost based on available inventories. Now we push the latest inventory information to the active wear sales team's PCs, so they always know what's in stock.

While speed is everything, market presence is also important, and intranet broadcasting helps us there, too. We've given many of our major wholesalers PCs preconfigured with sales automation software. We've also installed the PointCast client software on their PCs, so we can transmit information to our wholesalers throughout the day. It's an important but inexpensive way to maintain a high profile with our customers.

As for the company newsletter, it's better than ever. In the past, our newsletters were pretty gray—lots of text, only a few black-and-white pictures. Since we've been distributing newsletters over the intranet, they're livelier and more timely: We've added color because publishing digital color pictures electronically is so cheap.

Granted, I'm sure that not everyone is reading every newsletter they get. But I know that it caught their attention for at least a few seconds—and that's more than you can say for an in-basket.

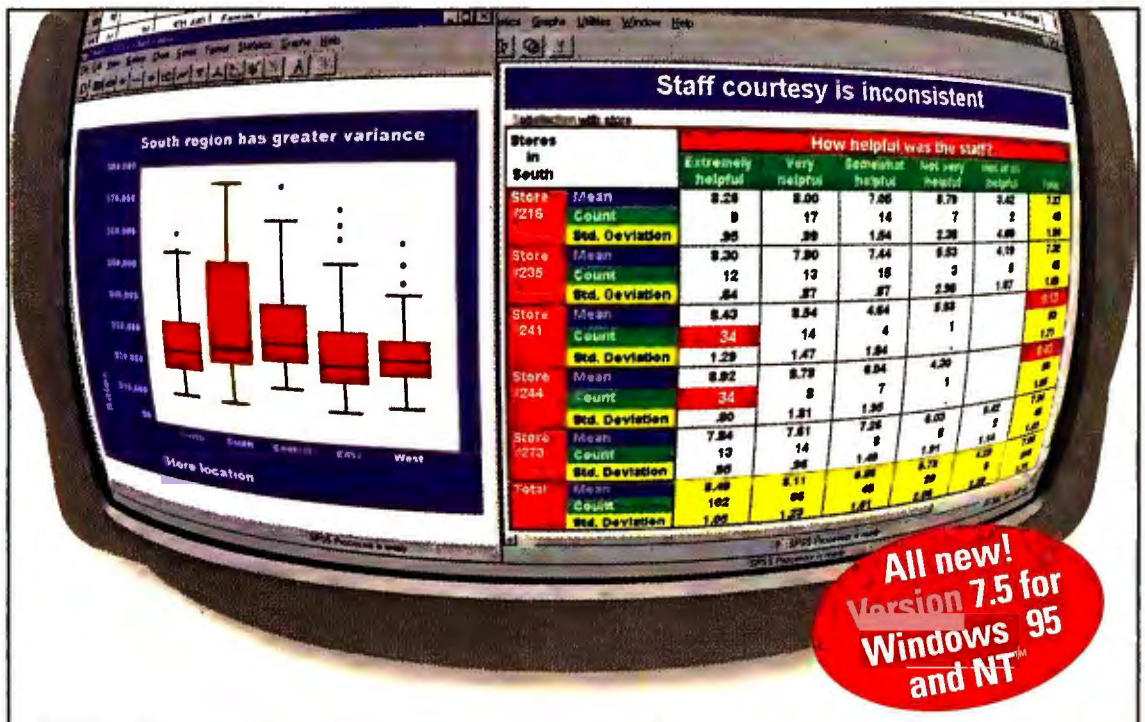
—Edited by James A. Martin

• PointCast I-Server $995; PointCast client software free; PointCast; 408/253-0894; http://www.pointcast.com

READER SERVICE NO. 664

For more information on broadcasting products, see "Web Performance Enhancers" (March).

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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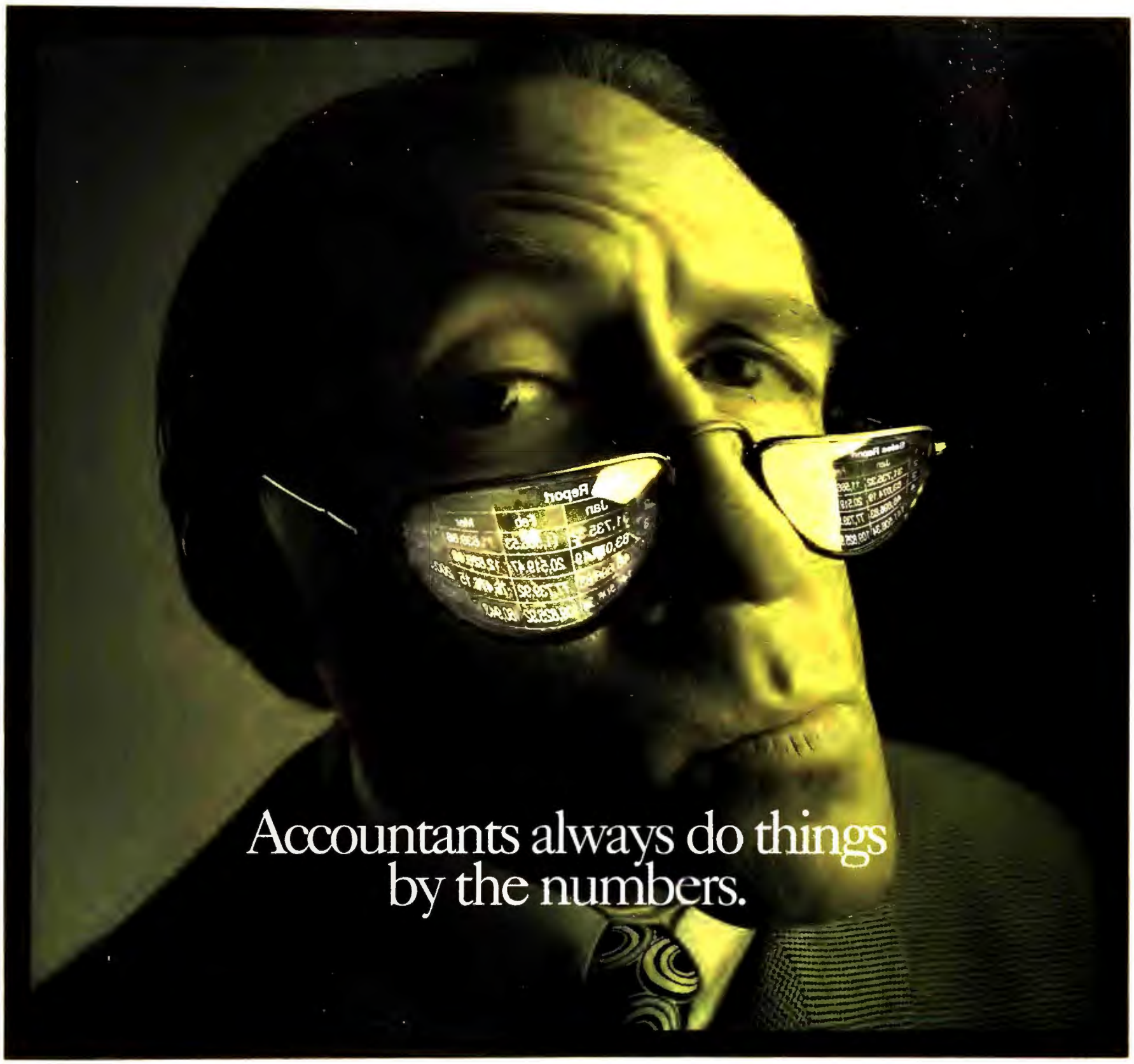

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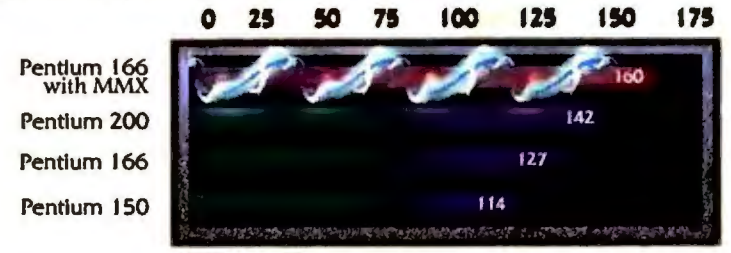

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Quicken still stricken ◆ Beware ActiveX and FAT32 ◆ PageMaker perfectionism

Quicken Wins Some, Loses Some

INTUIT HAS POSTED an update to Quicken version 6, numbered 6.0b, that fixes problems with file and year-end copy operations, and adds Financial Newsstand, an online financial news and advice feature. To download the new version, select *Features•Online•Quicken Live (Internet)• Update my Quicken 6*. Then click the *Update Now* button.

But be warned: Quicken 6.0b introduces a new headache. It prevents Quicken from automatically moving scheduled transactions from the Reminders window to the register.

Intuit says it's working on a corrected, bug-free patch that may be available by the time you read this. In the meantime, the company has posted several work-arounds to the new problem. You can find the instructions at http://www.intuit.com/quicken/technical-support/quicken/releases/qfw6-releases/qw6updat.html.

ACTIVEX WAKE-UP CALL: SET SECURITY TO HIGH

ACTIVEX CONTROLS—little programs that run inside Microsoft's Internet Explorer—can sometimes be malicious. If you use Internet Explorer, you've probably downloaded a number of these controls, which can enhance a site by adding anything from better forms to full-fledged multimedia. But they can also do things you don't want, as a group of German hackers proved. The hackers demonstrated that an ActiveX control can look for pending electronic fund transfers on someone's computer, then add a few of its own. Technically speaking, I'm not talking about a bug here, but a potentially dangerous situation.

Microsoft's Authenticode signing technology is a partial solution—ActiveX developers can apply for a digital certificate that documents which company made the control. Setting Internet Explorer 3.0's security setting to High *(View•Options•Security•Safety Level•High)* prevents unsigned ActiveX controls from downloading and running automatically.

But Authenticode is no guarantee. Spiteful programmers can create their own dangerous controls, then slap on their company's certificate. Likely? Perhaps not. Possible? Absolutely. To keep all ActiveX controls, Java applications, and scripts out of your copy of Internet Explorer 3.0, choose *View•Options•Security*, uncheck each option in the Active Content area, and click *OK*.

FAT32 HEALTH HAZARDS

THE FAT32 FILE system shipping with some current Windows 95 PCs is creating compatibility problems. Turning up so far:

◆ The version of Iomega Tools for Windows 95 5.0 that came with your Jaz drive may crash your system and fail to eject, write-protect, or password-protect cartridges if you install it on a FAT32 volume. The 7.3MB Version 5.2 update solves these problems and is available at http://www.iomega.com/product/jaz/promo/index.html#win95.

◆ IBM AntiVirus versions 2.5 and earlier can't scan master boot records on FAT32 volumes, and reports errors when scanning files. Versions 2.5.1 and later fix the problem. If you sent in your 2.5 registration card, you should receive a free upgrade automatically. If you haven't, call IBM's update service at 800/742-2493.

◆ Paradox 7, Visual dBASE, or any other database product that uses the Borland Database Engine can go haywire with FAT32. A fix in the form of a 2.4MB self-extracting archive file called bde35f.exe is available at ftp://ftp.corel.com/pub/paradox/BDE/ or http://www.borland.com/techsupport/bde/utilities.html.

Scott Spanbauer is a contributing editor for PC World. ■

ICON: JEFFREY PELO

BUGGED?

IF YOU FIND a hardware or software bug, post your report on PC World Online, or send us e-mail at bugs@pcworld.com.

IN BRIEF

PageMaker 6.51

THIS 860K UPDATE fixes a bunch of minor glitches in version 6.5. The old version substitutes Courier for printer-resident fonts that aren't supported by Adobe Type Manager, crashes under certain conditions when working with frames, and sometimes loses hyperlinks in an HTML file. You can download the patch from Adobe's FTP server (ftp://ftp.adobe.com/pub/adobe/pagemaker/win/6.x/updaters/pm65-651.exe) or from its BBS (206/623-6984), or request a disk from Adobe Customer Service (800/833-6687).

PC-cillin: One Step Forward, One Step Back

THE PC-CILLIN 95 1.04 patch noted in February's column came out a little underdone, reporting virus infections where there weren't any and preventing Excel from saving files. TouchStone and Trend Micro, which coauthor the software, have yanked the patch from Trend's FTP server, saying it shouldn't have been released to the public in the first place. As we went to press, the most recent patch you can get for PC-cillin 95 is version 1.03, available in the 1.74MB self-extracting archive file current.exe. You'll find it on TouchStone's Web site (http://www.checkit.com/support/filearea.htm).

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(*Or, a guide for spotting the differences b*

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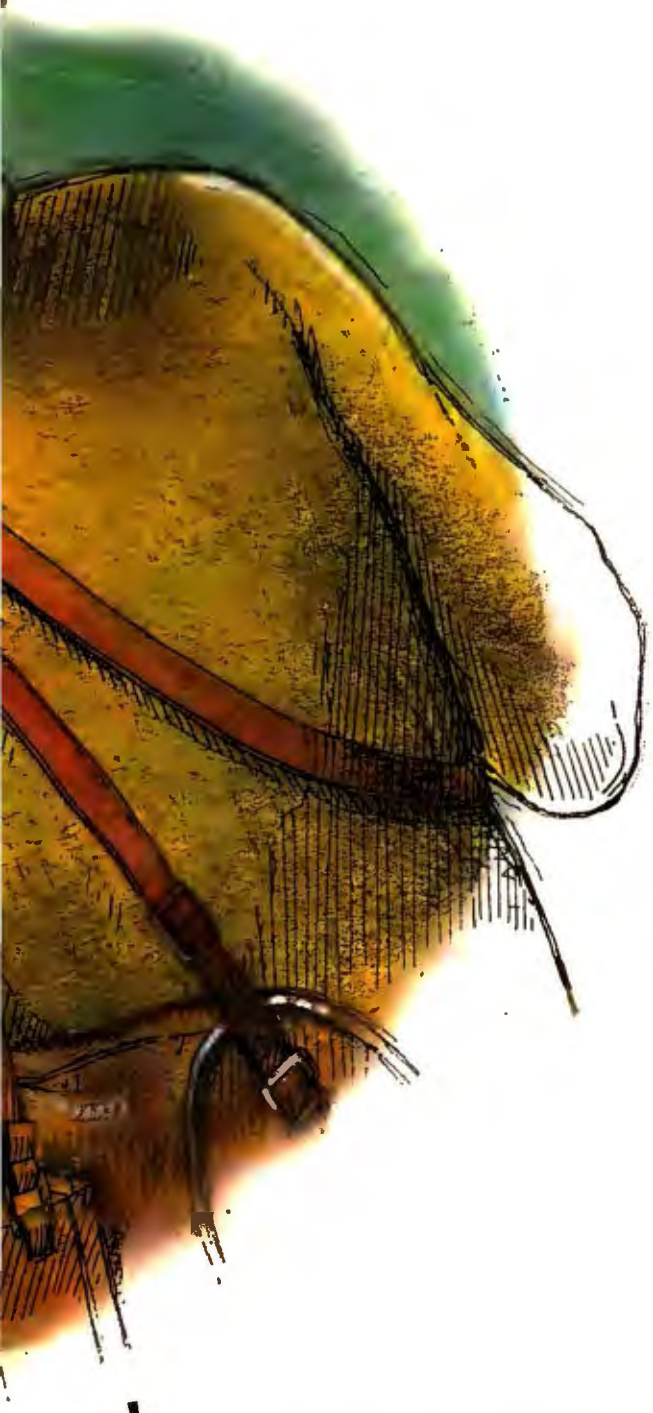

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TOP OF THE NEWS

TOP SPEED Pentium II runs as fast as 266 MHz, more than 30 percent faster than the fastest Pentium and Pentium Pro CPUs.

MULTIMEDIA BOOST Pentium II includes support for the MMX instruction set found in Pentium MMX processors.

NO WAITING A bulked-up 32K primary cache and a high-speed secondary cache cut delays of earlier processors.

PC World tests the first Pentium II and AMD K6 systems. With clock speeds up to 266 MHz, these chips could transform your buying plans.

WINDOWS 95 BLAST Improved handling of 16-bit code allows Pentium II to run Windows 95 and older applications much more efficiently than Pentium Pro.

PENTIUM II–based motherboard; the new cartridge-based black CPU housing is shown at top.

JUST IN

Pentium II Computer Is Fastest PC Ever

IF YOU'VE HAD your eye on a Pentium MMX system, you might want to reconsider. As we went to press, AMD was poised to release its long-promised K6-PR2-233 CPU, a next-generation processor that the company expects to compete against Intel's soon-to-be-released Pentium II, the Pentium Pro successor formerly known as Klamath. Intel, meanwhile, is expected to launch Pentium II in early May. Both chips are designed to blow away Pentium MMX competition, and both support the multimedia instructions found in Pentium MMX chips.

Will Pentium II and K6 deliver? And can AMD pose a credible challenge to Intel? *PC World* obtained the first prerelease PCs outfitted with the K6 and Pentium II processors and ran them through our PC WorldBench business applications suite. We also tested performance with MMX-enabled multimedia and graphics applications. Our K6 prototype system from AMD included a 233-MHz K6 CPU, while our Pentium II PC featured a 266-MHz CPU.

The result? Both prototype systems set new performance records. The AMD K6 system charged through our benchmark faster than any PC before it, edging past the previous speed champ—a Pentium Pro-200 from Sys Technology. The K6 system scored 251 on our PC WorldBench suite.

But the record didn't last long. With

a PC WorldBench score of 260, our 266-MHz Pentium II system passed the K6-PR2-233 to finish about 4 percent faster than AMD's prototype system, and about 10 percent faster than Sys Technology's Performance Pro 200 (see Top 20 Power Desktops, December 1996, for a review of that machine). The Pentium II unit performed at approximately the level that the PC World Test Center expected, given the CPU's clock speed, cache, and support for MMX instructions.

Intel won the foot race, but will that feat be enough to turn back the K6 challenge? The company will position Pentium II as a high-end CPU targeted for power-hungry workstations and multimedia dream machines that cost $3500 or more. After all, it has a profitable Pentium MMX franchise to protect. But PC vendors have their own plans, and buyers may be able to find loaded Pentium II systems for as little as $3000. AMD, meanwhile, has priced K6 to move: Expect 233-MHz K6-based PCs to sell for about $2500. All this is great news for buyers—the competition should push prices lower and accelerate the introduction of new CPUs.

FASTEST SYSTEMS

HOW FAST ARE these new CPUs? The AMD prototype, outfitted with a 1MB secondary cache and an exceptionally fast 4.55GB SCSI hard disk, ran up an astounding PC WorldBench score of 251, 15 points higher than the Sys Technology Performance Pro 200's score of 236. It set performance records in four of the six PC WorldBench application tests, and fell just shy of a record pace in the two others.

The ink was barely dry in the record books when our Pentium II prototype clocked a PC WorldBench score of 260. The system set new ▶

EDITED BY
Charles Piller and Randy Ross

Secure Your Internet Explorer

If you use Internet Explorer for Windows 95 or NT 4.0, Microsoft "strongly recommends" that you download a security patch from its Web site. The patch plugs three security leaks discovered in early March that can allow malicious programs access to your computer. The patch for I.E. 3.*x* users is available at http://www.microsoft.com/ie/security/download.htm. Users of I.E. 2.0 have to download a free upgrade to 3.01 and then add the patch. Users of Windows 3.1 are not vulnerable to the security leak, Microsoft claims.

Spam Ban

Spamming—the practice of sending unsolicited e-mail advertising, usually in bulk—would become a misdemeanor under a bill being considered by the state of Nevada. If passed, the bill would make Nevada the first state to outlaw spamming. Critics say that the bill would hurt small businesses, which can't afford more expensive advertising media. The Nevada senate's judiciary committee is considering proposed revisions of the bill and at press time had not set a timetable for a vote. California and Virginia are considering similar e-mail advertising bans. ▶

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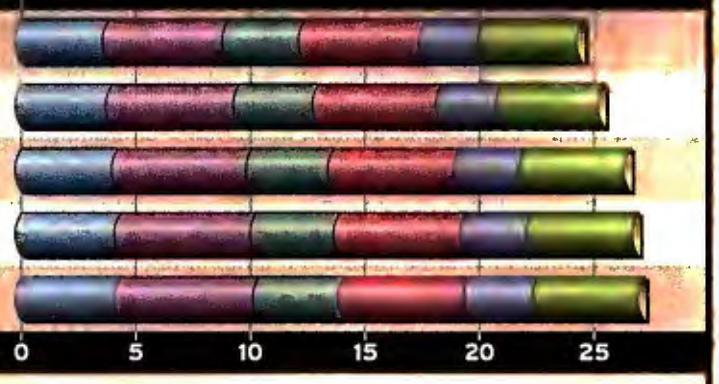
New CPUs Set Performance Records

Business Applications and Multimedia See Big Speed-Ups

NEW SPEED CHAMPS FOR BUSINESS TASKS

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
Pentium II-266	Pentium II-266	32	256	260
AMD K6-PR2-233	AMD K6-PR2-233	32	1024	251
Polywell Poly 500 TX1	Pentium MMX-200	32	512	238
MicroExperts MMXP-5000	Pentium MMX-200	32	512	234
Average for 10 Pentium MMX-200 PCs	Pentium MMX-200	32	512	231



Word 7.0 for Windows 95 · Excel 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · Paradox 5.0 for Windows · WordPerfect 6.1 for Windows · 1-2-3 release 5 for Windows

BURNING THROUGH MULTIMEDIA

SYSTEMS	Test times (Faster ◀ Slower ▶)	Macromedia Director movie viewing (Frames per second)
Pentium II-266		91
MicroExperts MMXP-5000		86
AMD K6-PR2-233		87
Polywell Poly 500 TX1		85
Average for 10 Pentium MMX-200 PCs		80

Adobe Photoshop image editing · Ray Dream 3D Studio redraw

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 (http://www.pcworld.com/testing).

Multimedia applications: We tested each system using a series of MMX-enhanced applications. In Adobe Photoshop 4.0, we time several image editing operations. In Fractal Ray Dream 3D Studio, 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 graphic-intensive executable file.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

performance records in every application test we ran.

The lead extends further in our custom MMX tests. K6 is the first non-Intel processor to support MMX instructions, which can greatly speed the execution of video, audio, and other multimedia tasks written for MMX. K6 outpaced all the Pentium MMX-200 PCs we've reviewed in previous months, but it fell a bit short of the 266-MHz Pentium II. The Intel-based system excelled at 3-D graphics, needing just 55 seconds for redraw operations in Fractal Design's Ray Dream 3D Studio, versus 68 seconds for the K6 prototype. A typical Pentium MMX-200 system takes 80 seconds.

The Pentium II's performance lead narrows in the Adobe Photoshop and Macromedia Director tests, which focus on graphics filtering and animation. In our Director animations, the Pentium II displayed 91 frames per second, compared to the K6's 87. In Photoshop, K6 actually posted big leads in our filtering and color conversion tests, taking less than 47 seconds versus Pentium II's 59 seconds to complete the tasks. However, Pentium II ran away with the image resize test, doing in less than 45 seconds the tasks that K6 needed nearly 68 seconds to complete, resulting in the Pentium II's overall edge in Photoshop. Both CPUs enjoyed wide leads over typical Pentium MMX-200 performance.

INTEL (AND AMD) INSIDE

THE K6 USED a fast SCSI hard drive and a 1MB cache (versus the Pentium II system's 512K), which accounts for some of its strong performance. Still, our results reflect favorably on AMD's predictions that K6 will compete well against Pentium II—and should do even better when AMD introduces 266-MHz and 300-MHz versions of K6, expected later this year.

Today's K6 and Pentium II chips are built with a manufacturing process that creates transistor elements typically .35 micron in size. The 300-MHz K6 CPU will probably be the first in its family to be built on a smaller .25-micron process, reducing power consumption and heat. AMD would not discuss possible K6 notebooks, but Linley Gwennap, editor of *Microprocessor Report*, says K6 is poised for life on the road.

Pentium II, on the other hand, evolved from the existing Pentium Pro. The Pen-

tium II CPU provides better 16-bit and 32-bit performance for Windows 95 than its predecessor, as well as MMX instructions and an internal cache that is doubled from 16K to 32K. (Historical averages for Pentium Pro-200 scores for 16-bit applications compare poorly against Pentium MMX-200 averages, while 32-bit scores in the same comparison have favored the Pentium Pro.) Intel placed the secondary cache inside the Pentium II's Single Edge Contact (SEC) cartridge to help exploit core CPU clock speeds of 233-MHz and higher.

Like the K6, the Pentium II is based on a .35-micron manufacturing process but will be moved to a tighter, .25-micron process. The .25-micron CPU, code-named Deschutes and expected near year-end, will be the first P6-class processor that will work well inside typical notebook configurations.

PRICE OVER SPEED?

FOR NOW, K6 seems the better bargain. AMD is expected to sell the K6-PR2-233 CPU to system makers for $469, about $130 to $250 less than analysts expect Intel to charge for its 266-MHz Pentium II. The K6 processor even competes well on a price/performance basis against the Pentium MMX. What's more, K6 plugs into existing Pentium motherboards using the ubiquitous Socket 7 processor mount, while Pentium II requires new motherboards that accept the CPU's SEC cartridge. AMD seems to have the pieces in place to make K6 a mainstream choice—if it can sign up system vendors.

AMD K6
AMD'S PROTOTYPE is built around its 233-MHz K6 processor (circled).

Gwennap says that AMD has a history of working with top-tier PC vendors, and could produce 10 to 15 million K6 CPUs this year and as many as 40 million in 1998 after it moves to a smaller version of the chip. These high volumes may allow major system makers to commit to K6. AST is considering a K6 system, and Everex, Polywell, and Robotec say that they will sell K6-based systems.

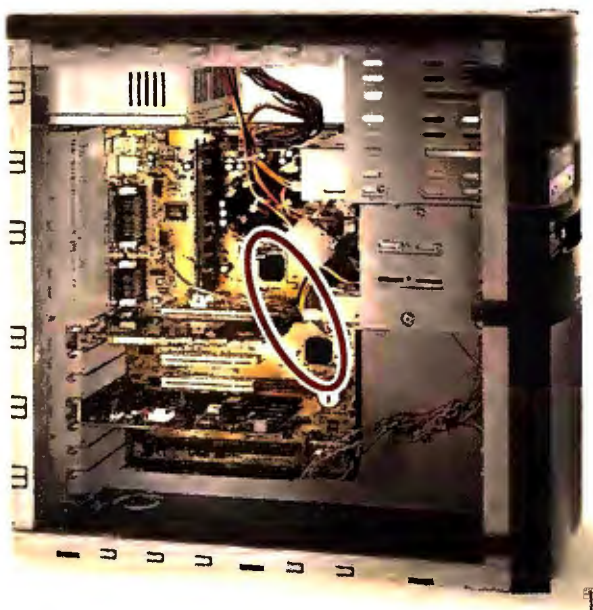
But advancing clock speeds could work in the Pentium II's favor, since the CPU's tightly bound secondary cache can run much faster than the standard motherboard-based cache that the K6 uses. Intel will also introduce on Pentium II motherboards a dedicated graphics bus called Accelerated Graphics Port that promises to greatly enhance 3-D performance and quality.

Where does Cyrix's next-generation processor, the M2, fall into all of this? *Microprocessor Report*'s Gwennap predicts that M2—expected by June—will not match K6 or Pentium II performance.

PENTIUM'S NEW LIFE

DESPITE the Pentium II's strong performance, the Pentium MMX well isn't dry. Intel's new 430TX chip set optimizes performance in key components—such as system memory and the hard disk. The two Pentium MMX-200 desktops we tested that were based on the 430TX chip set—the Polywell Poly 500TX1 and MicroExperts MMXP-5000—turned in PC WorldBench scores of 238 and 234, respectively. MMX tests showed bigger gains, where the MMXP-5000 outpaced all but the Pentium II-266 in the Photoshop image editing.

If you are in the market for a Pentium MMX system, TX may be your answer. Home office users will also welcome new TX features such as Always On—Intel says that function will let the PC fire up from a suspend mode to take care of emergent tasks such as processing e-mail. 430TX should really pay off in notebooks, thanks to better power management and support for the faster synchronous SDRAM.



POLY 500TX1
POLYWELL'S Poly 500TX1 with its MMX 430TX chipset (circled) was fastest—until K6 and Pentium II arrived.

ON THE MONEY

WHICH TYPE of system should you buy? K6 systems promise top price/performance, but you may have a hard time finding vendors who carry AMD's CPU line. And it may take months for AMD to hit volume production, so you may need to be patient. However, if your budget is around $2500, check out K6 systems.

Pentium II looks to be an excellent choice for those who need fast midrange and high-end systems. Intel should be able to produce many more Pentium IIs than AMD can supply K6s, but may take its time ramping up production. Still, expect vendors to price Pentium II systems aggressively as a way to differentiate. You may be able to score a fully loaded Pentium II PC for about $3000.

If you don't want K6, and don't have $3000 or more for a Pentium II, the clear choice is a Pentium MMX system with the 430TX chip set. Prices should fit under $2500, and a 430TX can bring out the most in a system's multimedia performance. Best of all, Pentium MMX has been tested by the marketplace—a good choice for conservative buyers.

—Michael Desmond ▶

PHOTOGRAPHS: JOHN GREENLEIGH

$1000 Desktop PCs—Great Buys for Modest Needs

IF YOU WENT out shopping for a PC six months ago with $1000 to spend, you would have been greeted with a shrug. But now a growing number of vendors are introducing basic systems at rock-bottom prices—and some are surprisingly good buys if you primarily use business productivity applications.

Companies have long targeted $2000 to $2500 as the ideal price range for a PC, but many people can't afford even that. Moreover, many PC owners and small offices want an additional, less expensive machine, and corporate buyers don't need fancy systems for every employee. Now vendors including AST, Compaq, Everex, Packard Bell, and Vektron have shaken up the market with $1000-range desktop systems.

$1000 OFFICE PCS

THE LEAST-EXPENSIVE system that earned a Best Buy in our Top 20 Budget Desktops review this month was the $1499 Gateway 2000 P5-133, with 16MB of RAM, a 2GB hard drive, a 12X CD-ROM drive, and a 15-inch monitor. Compare that PC with two speedy new PCs that cost much less and lack frills, but offer plenty of horsepower and perform faster than the average Pentium-133 by about 5 percent in PC WorldBench tests: Everex's Explora 995, based on AMD's K5-PR133 processor, and Vektron's Corporate Station P-133, based on an Intel Pentium-133.

Everex Explorer 995

At $995, the Corporate Station P-133 comes with a 2GB hard drive, 16MB of RAM, a 15-inch monitor, a Mitsumi 4X CD-ROM drive, and a built-in network adapter. (Add $75 for a 33.6-kbps fax-modem.) Its only drawbacks are a slow CD-ROM drive and Vektron's skimpy tech support hours: 12 on weekdays and 7 on Saturdays.

The Everex Explora 995 costs $1215 with a 14-inch monitor. (The PC alone costs $995; larger monitors are also available.) It includes 16MB of RAM, a 1.2GB hard drive, a NEC 8X CD-ROM drive, and a 33.6-kbps fax-modem. It

BASIC BARGAINS: $1000 PCS TAKE ON STANDARD DESKTOPS

$1000-RANGE PCS [1]	Street price	CPU	RAM (MB)	Secondary cache (K)	Hard drive (MB)	CD-ROM drive	16-bit sound card	Network adapter	Reader service number
AST Adventure 200 800/876-4278 http://www.ast.com	$997	AMD K5-PR133	8	256	1000	8X	●	○	753
AST Adventure 200e 800/876-4278 http://www.ast.com	$1199	Intel Pentium-133	16	256	1000	8X	●	○	754
Compaq Presario 2100 800/345-1518 http://www.compaq.com	$1298	Cyrix MediaGX-133	24	–	2000	8X	●	○	755
Everex Explora 995 800/383-7391 http://www.everex.com	$1215	AMD K5-PR133	16	256	1200	8X	●	○	756
Packard Bell Multimedia C115A 800/733-5858 http://www.packardbell.com	$999	Intel Pentium-120	16	–	1200	8X	●	○	757
Vektron Corporate Station P-133 800/725-0020 http://www.vektron.com	$995	Intel Pentium-133	16	256	2000	4X	○	●	758
BEST BUY BUDGET DESKTOP PC									
Gateway 2000 P5-133 800/846-2000 http://www.gw2K.com	$1499	Intel Pentium-133	16	256	2000	12X	○	○	759
NETWORK COMPUTER									
IBM Network Station 800/426-7080 http://www.internet.ibm.com/networkstation	$1000	Motorola PowerPC 403	8	–	–	–	○	●	–

● Yes ○ No

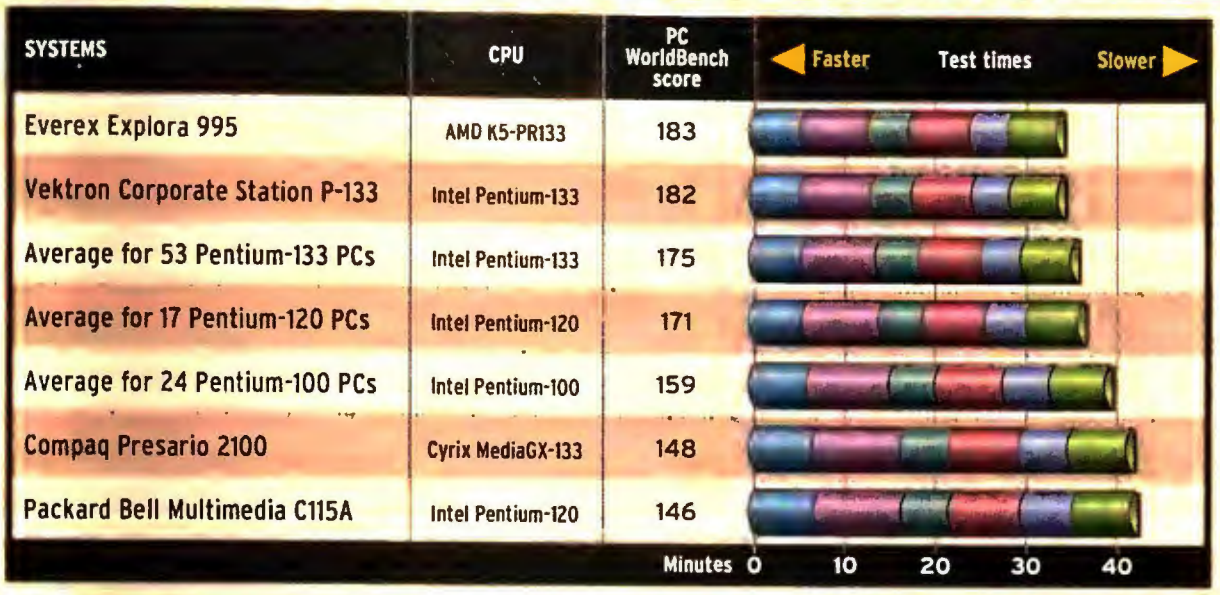
[1] All prices include 14- or 15-inch monitors, and all units except IBM come with floppy drives. All units except Vektron include 33.6-kbps fax-modem; Vektron charges $75 extra.

All products: 912

PHOTOGRAPH: JOHN GREENLEIGH

SURPRISING SPEED FOR ABOUT $1000

SYSTEMS	CPU	PC WorldBench score
Everex Explora 995	AMD K5-PR133	183
Vektron Corporate Station P-133	Intel Pentium-133	182
Average for 53 Pentium-133 PCs	Intel Pentium-133	175
Average for 17 Pentium-120 PCs	Intel Pentium-120	171
Average for 24 Pentium-100 PCs	Intel Pentium-100	159
Compaq Presario 2100	Cyrix MediaGX-133	148
Packard Bell Multimedia C115A	Intel Pentium-120	146



HOW WE TEST We tested all systems using PC WorldBench, *PC World's* application-based benchmark. Higher PC WorldBench scores are better. Data based on testing conducted by the PC World Test Center. All rights reserved.

comes with 7-day, 24-hour toll-free tech support and good on-screen documentation. Look for similar business machines from other vendors later this spring: At press time, HP slashed prices to as little as $999 on its low-end Pentium-120 Vectras, without monitors.

ON THE HOME FRONT

AST, COMPAQ, and Packard Bell have each taken a swing at $1000-range PCs designed for the home or home office. It's hard to recommend Packard Bell's Multimedia C115A, despite the $799 price (without monitor). This Pentium-120 desktop has no secondary cache and therefore ran sluggishly in our tests, scoring 8 percent below the average Pentium-100 with 16MB of RAM and a 256K secondary cache. To achieve a sub-$1000 system price, Packard Bell offers an inferior-quality .39mm dot-pitch 14-inch monitor for $200; their .28 dot-pitch option costs closer to $300. Finally, Packard Bell has a history of poor reliability and service (see "PC Reliability and Service: Good-Bye to Good Support?" December 1996).

As this goes to press, AST was phasing out its $897 Adventure 575 in favor of two improved models: The Adventure 200 (based on the K5-PR133) sells for $997 with a 14-inch monitor, and the Adventure 200e Pentium-133 sells for $999 without monitor (a 14-inch monitor is $200, a 15-inch unit is $250). Neither unit was available for testing.

> The biggest **problem** with $1000 PCs is **life span**—as anyone with an old PC who's **tried to upgrade** to Microsoft Office will tell you.

Compaq's Presario 2100 costs about $1298 ($999 for the PC; $299 for a 14-inch monitor). Based on the new 133-MHz Cyrix MediaGX-133 chip, this sleek, black system includes 24MB of EDO RAM, a 2GB hard drive, an 8X CD-ROM drive, and a 33.6-kbps fax-modem. But this system has limited expansion options and ran slower than the average Pentium-100 in our tests.

The biggest problem with $1000-range systems is their life span. As anyone with an old PC who's tried to upgrade to Microsoft Office 97 will tell you, software makers quickly revise applications to demand more memory and processing power. And multimedia software designed for Pentium MMX machines won't play well—if at all—on basic boxes. "If you market a system that's at the bottom of the food chain, its chances of [becoming obsolete] are highest," says Dave Berger, a director of product marketing for Gateway 2000. These PCs will never fill the bill for publishing or Web development. But for running business applications on a tight budget, these basic systems are welcome news.

—Laurianne McLaughlin ▶

24X CD-ROM Drive

Panasonic will introduce a 24X internal drive in IDE/ATAPI and SCSI versions in May. The company hasn't yet set pricing, but it expects the new drives to cost only a bit more than today's 12X drives, which sell for about $200. CD-ROM drives in 18X, 20X, and 24X speeds are expected from several other vendors by June. However, 12X CD-ROM drives already push the physical limits of such devices; how much these faster drives will improve users' experience working with available CD-ROMs therefore remains a question.

TidBytes

PC HOUSECLEANING: Helix Software's $50 Nuts & Bolts is a Windows utilities package that supports Windows 95, Win 3.1, and the upcoming Windows 97, Helix claims. It features more than 15 applications grouped in four categories: system cleanup and optimization, system repair and recovery, data security and management, and error prevention and crash detection. The product competes with Symantec's $79 Norton Utilities for Windows 95. **$99 3-D Video Card:** At that ultralow price, Graphics Blaster 3D from Creative Labs includes a 64-bit graphics engine, 4MB of memory, support for screen resolutions up to 1600 by 1200 and up to 16.8 million simultaneous colors. The $99 introductory price lasts only through June 8, however. After that, the street price will jump to $149.

Net Regulation: How Much Is Enough?

ANALYSIS

CAN FEDERAL agencies adequately protect consumers from Web scams and online invasions of privacy using today's regulations?

The Clinton administration thinks so. And the Federal Trade Commission's recent successes against Internet-based fraud support the administration's position. At press time the administration was preparing to release its Framework for Global Electronic Commerce, created by a task force of 18 federal agencies. A draft of the report rejects new taxes and regulatory initiatives, favoring a market-driven approach that some key critics fear could leave consumers vulnerable to online crooks or the prying eyes of aggressive marketers.

"Buyers and sellers should be able to come together freely and do business on the Internet," says Ira Magaziner, head of the task force and a senior adviser to President Clinton. Instead of new regulation, Magaziner favors consumer education, technologies such as privacy and content filters, and Better Business Bureau–style seals of approval for sites meeting certain security standards.

Some leading Internet advocates endorse Magaziner's overall approach to online commerce. "The Magaziner report represents the [White House's] first real stake in the ground supporting the user-empowerment approach to protect consumer interests," says Daniel Weitzner, deputy director of the Center for Democracy and Technology.

But given the rapid proliferation of Web-based fraud (see "CyberScams" in this issue) and increasingly effective tools for sifting through personal data, can today's legal protections safeguard consumer interests? Maybe, and maybe not.

LEFT: Jeffrey Chester, executive director, the Center for Media Education, Washington, D.C. Below: Ira Magaziner, senior adviser to the president.

Is the **format** of the Web itself inherently **deceptive?**

For starters, the FTC has all the enforcement authority it needs. But, says FTC Commissioner Christine Varney, it lacks the staff and technical sophistication necessary to manage the apparent explosion of commercial crimes on the Internet. While Varney supports the general intent of the Magaziner draft, she notes that it fails to address consumer protection, "a very important missing piece."

TARGETING CHILDREN

JEFFREY CHESTER, executive director of the nonprofit advocacy group Center for Media Education, recently released a report criticizing aggressive Web-based tobacco and alcohol marketing that collects personal data and uses cartoon imagery and interactive graphics that may be particularly appealing to children. He questions the trend toward custom Web marketing tailored to individuals—children included. One such service, StarPoint Software's Ad System, "builds user profiles by combining input from a variety of sources—including demographic, geographic, psychographic, http information, and collaborative filtering," according to StarPoint's Web site. Individual profiles are automatically assembled when the service analyzes users' browse trails, and relevant ads can even be delivered to anonymous users who haven't registered.

Software filters can help parents and consumers screen potentially offensive Web sites. But "if the format of the Web is deceptive in itself"—as Chester suggests would be true if StarPoint-style marketing tools became widely used—filters won't offer nearly enough protection.

In light of aggressive marketing to children, Varney agrees that voluntary approaches to protecting them may fall short. "How children's data are handled may open the door to government regulation," she says. Magaziner allows that some areas—like children's privacy—will require special attention, possibly even regulation.

In the meantime, some members of Congress remain skeptical. Rep. Edward Markey (D-Massachusetts) suggests that overreliance on self-regulation could undermine consumer confidence—a worst-case scenario for Web commerce.

He's pushing to increase the FTC's budget for enforcement against fraud, and planning to introduce legislation requiring that Internet businesses inform consumers when personal data is gathered, notify them when that data is reused or sold, and allow consumers to curtail or prohibit the use of their personal data.

—Charles Piller ▶

PHOTOGRAPHS: (TOP) BARBARA RIES; (BOTTOM) KATHERINE LAMBERT

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Circle 190 on reader service card

First 56-kbps Modems: Fast, Inexpensive, but Not for Everyone

ARE YOU looking for relief from cyberslowdown? *PC World* tests show that 56-kilobits-per-second modems may help. Unfortunately, the devices have a nasty side effect: cyberconfusion. Shoppers have never had so much to ponder in a modem purchase. A major standards war is forcing buyers to choose between two incompatible data transfer protocols: U.S. Robotics' x2 and Rockwell/Lucent's K56flex. (A formal global ITU standard isn't expected until summer 1998.) Upgrade policies are sometimes confounding. Worse, 56-kbps modems can be exceptionally picky about line conditions. Lines that work fine for a standard 28.8- or 33.6-kbps V.34 modem may not allow you to connect at the higher data rates.

OUR FIRST SPIN ON ROUTE 56

THERE'S NO question that improved performance is possible. We pitted the U.S. Robotics Sportster 56K Faxmodem and Courier V.Everything 56 Kbps external modems against the company's popular Sportster 28,800 Fax modem with V.34 and V.32bis, and found dramatic performance boosts. In our real-world tests, the 56-kbps models typically downloaded files between 65 and 75 percent faster than the Sportster 28.8-kbps modem. In informal testing the 56-kbps devices also loaded some Web pages noticeably faster.

Testers at CompuServe and MindSpring using U.S. Robotics modems were able to connect routinely at rates of 40 kbps and above, which is very good considering that most real-world connections are in the mid-20s. At press time, K56flex modems were not available.

As we expected, the 56-kbps and 28.8-kbps modems sent files at about the same rates. 56-kbps modems can reach their top speeds in only one direction—from the service provider to you. Speeds for outbound data are limited to 33.6 kbps. So these modems will be most appreciated by Internet junkies, because most of their online activity involves receiving data such as Web pages loaded with graphics and other goodies.

56-kbps modems **will be available in** internal, external, and later this year, **PC Card versions.**

U.S. ROBOTICS' Sportster 56K.

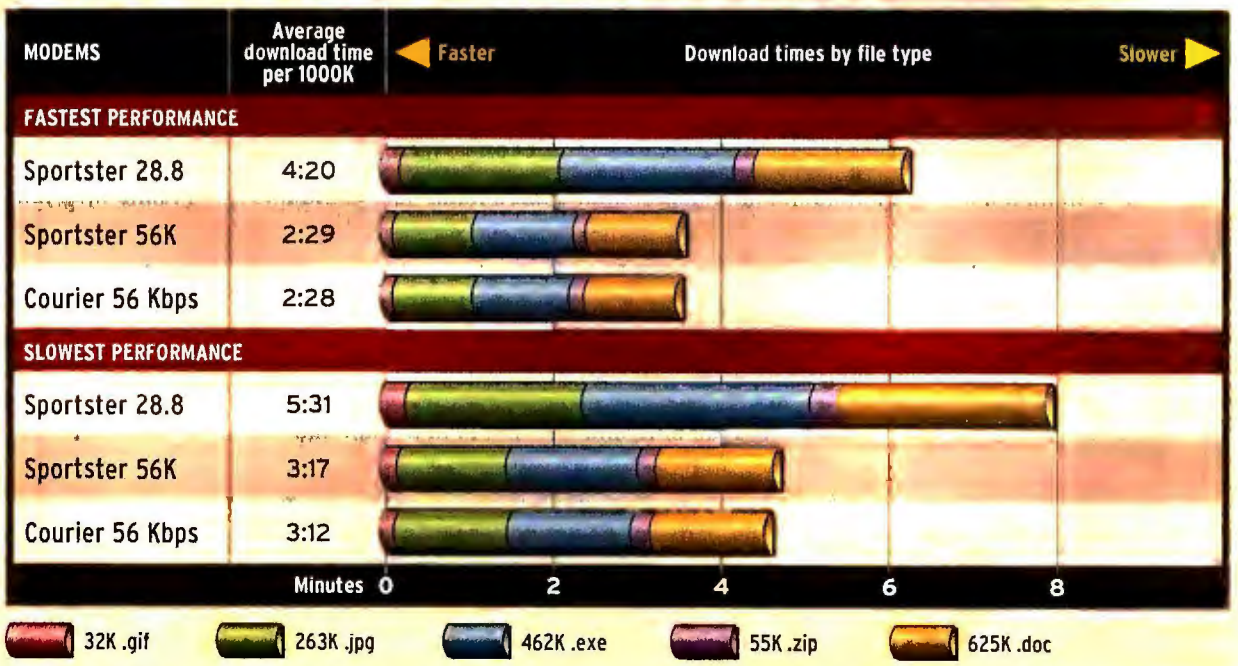
The real phenomenon of 56-kbps modems is their exceptionally low cost. For the first time, leading-edge modems are coming out of the chute with sub-$200 prices. If you're replacing a modem that's slower than 28.8 or 33.6 kbps, consider jumping to a 56-kbps model. Most run around $50 more than their 33.6-kbps counterparts—but with some of the aggressive upgrade policies we're seeing, you could be shelling out less for a 56-kbps unit with a trade-in than you would for a new 33.6-kbps model. Most manufacturers are offering upgrades, especially from 28.8 and 33.6-kbps models. Their policies vary all over the map, and some vendors were revising them at this writing; we recommend that you get updates from vendors you're interested in. Hayes plans to offer a K56flex modem for $115 plus a trade-in—and the company will accept any modem of any brand.

56K CAVEATS

STILL, BEFORE you run out and buy a 56-kbps modem, consider compatibility. An x2-based modem can't connect to a K56flex modem at the higher speeds, and vice versa. The fastest the two modems can communicate is at 33.6 kbps. So determine which protocol, if any, will be supported by ▶

PHOTOGRAPH: JOHN GREENLEIGH

FIRST 56-KBPS MODEMS DELIVER



HOW WE TEST We ran our tests eight times (fastest and slowest results shown) on an HP Vectra Series 4P-166 PC with a Hayes ESP serial card set to a 230-kbps data rate. We dialed in to the Internet on a PPP connection and used Procomm Plus's FTP client to transfer files.

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your online service provider. At the moment, only x2 service is available, and major providers like America Online and Netcom are deploying it extensively. However, some major backbone providers, including UUNet and PSINet, are expected to offer K56flex widely (see chart below).

At least one provider—AT&T WorldNet—said it won't even offer 56-kbps connections for the time being. Others, like MindSpring, are rolling it out as fast as possible. MindSpring has already fully deployed x2 in the cities it covers in the Southeast, and is considering K56flex access in its locations around the rest of the country.

TRAVELERS' ISSUES

FOR THE MOST PART, however, providers are proceeding cautiously. CompuServe will offer x2 nationwide starting at the end of April, but only through an 800 connection with an hourly surcharge. Some providers will be offering x2 access in some areas but K56flex access in others. For example, MindSpring subscribers who are accustomed to high-speed x2 access in Atlanta will be disappointed when they log on from New York City if MindSpring opts for K56flex there. If you travel a lot, consider a provider that supports the same 56-kbps protocol in all the places you visit regularly.

Another issue to consider is how easily and cheaply you can upgrade a 56-kbps modem once a global ITU standard is set. Ideally, you should be able to upgrade it by installing new software. While there's no guarantee the final standard will permit that, you can hedge your bet by buying a modem with a software-upgradable digital signal processor. U.S. Robotics' x2 modems come with a software upgradable DSP. In contrast, most of the first K56flex modems to hit the market may include technology that's trickier to upgrade.

At press time, many vendors had not spelled out an upgrade policy. Of the few that had, Hayes's is the most attractive. The company guarantees free upgrades to the final ITU standard for customers of Hayes and Practical Peripherals 56-kbps modems, whether they're software upgrades or modem replacements.

Even if you choose a modem that meets all the above criteria, there's no guarantee you'll connect at high rates. The 56-kbps modem technology uses Pulse Code Modulation and is vulnerable to poor and irregular line conditions. In general, if you're connecting well below the maximum rate with your 28.8 or 33.6 modem, expect similar inefficiencies with 56-kbps connections. Ultimately, it's impossible to know whether you can use a PCM connection until you try it.

The upshot? If you've got a 28.8- or 33.6-kbps modem and need more speed, you might want to consider a 56-kbps device. Look for products that specify both an upgrade path and a price for making the modem compatible with the final 56-kbps standard. However, if you need a new modem, and a 56-kbps modem ends up costing less than a 33.6 unit, there's no reason to wait. But even here exercise due diligence: Pay with a credit card, and make sure you get a money-back guarantee.

—Bryan Hastings ▶

MODEM MAKERS' 56K PLANS

VENDOR	Product(s)	Protocol / Cost	Reader service number
Boca Research 561/997-8621 http://www.bocaresearch.com	Boca 56K Internet Modem	K56flex/$149	744
Cardinal 800/775-0899 http://www.cardtech.com	Connecta 56 series	x2/$159 to $219	745
Hayes 800/377-4377 http://www.hayes.com	Accura, Optima	K56flex/$179 to $289	746
Microcom 800/249-6476 http://www.microcom.com	OfficePorte Voice, DeskPorte P	K56flex/$189 to $209	747
Motorola 800/426-6336 http://www.motorola.com	ModemSurfr 56K, VoiceSurfr 56K	K56flex/$159 to $199	748
Multi-Tech Systems 800/328-9717 http://www.multitech.com	MT5634ZPX, MT5634ZDX, MT5634ZPW	K56flex/$279 to $299	749
Practical Peripherals 770/840-9966 http://www.practinet.com	Practical Peripherals 56K Data/Fax Modem series	K56flex, x2/$149 to $199	750
U.S. Robotics 800/877-2677 http://www.usr.com	Sportster 56K Faxmodem [1], Courier V.Everything 56 Kbps [1]	x2/$199 to $275	751
[1] Tested modems.		All products:	911

SERVICE PROVIDERS' 56K PLANS

SERVICE PROVIDER	x2 support	K56flex support
America Online	New York; Washington, D.C.; Chicago; San Francisco; Skokie, Illinois; nationwide number with surcharge	under consideration
CompuServe	nationwide number with surcharge	under consideration
EarthLink	Southern California (beta test)	nationwide
IBM Internet Connection	nationwide with 400 local numbers	none
MindSpring	36 cities in southeastern states	nationwide
Netcom	San Francisco, New York, Boston, Chicago, Los Angeles; six more cities by summer	none
Prodigy	Boston, Los Angeles, Dallas, New York, Atlanta; 385 more local numbers by summer	nationwide

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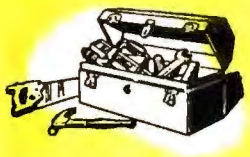

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Waiting on DVD-ROM? Sit Tight

AFTER A YEAR of hype, promises, and industry infighting, the DVD-ROM drive—heir apparent to the CD-ROM drive—has finally arrived. The devices will appear in desktop PCs and upgrade kits this month. We examined a preproduction model of Toshiba's DVD-ROM SD-M1002. Our recommendation: Consider waiting a few more months for DVD to spin up to speed.

QUANTEX QP/5-200 SM-3

We have no beefs with these first drives, which offer the features that vendors have been touting. They read 4.7GB discs packed with data such as high-quality MPEG-2 video and top-notch Dolby AC-3 audio. The drives play games, run applications, and let you watch feature films on your PC. We saw a demonstration of a DVD game and were impressed with the graphics and sound. And these drives also read existing CD-ROMs: In our tests, a preproduction Toshiba DVD-ROM drive performed on a par with 8X to 10X CD-ROM drives.

So what's the catch? DVD suffers from the same problems that affect any new platform: high prices, a dearth of software, and compatibility issues. The first desktop systems sporting DVD-ROM drives—the $3199 Toshiba Infinia 7220 and $3599 Quantex QP5-200SM-3—both ship with a 200-MHz Pentium MMX CPU and Toshiba's DVD-ROM SD-M1002 drive. A comparable Quantex system with a 12X CD-ROM drive would go for $599 less.

This month Creative Labs will release the $499 Creative PC-DVD, the first DVD-ROM upgrade kit. (12X CD-ROM drives sell for about $175.) Expect upgrade solutions from STB and others, but these kits may cost from $600 to $1000.

DVD software will be scarce for some time. Though analysts expect over 100 DVD movies by Christmas, DVD applications may not be widely available until mid-1998. As well, Toshiba's drive—and many early competitors—will not read CD-recordable discs.

Mid-year Sony plans to offer the first DVD-ROM drive that can read CD-R discs in an upgrade kit costing less than $1000. Other developments should push drive prices well below $500 by Christmas. But if you're currently shopping for a CD-ROM drive, buy a 12X CD-ROM drive. It will be a while before DVD prices drop and software becomes more available.

—Dean Andrews

Creative PC-DVD
Creative Labs 800/998-5227
http://www.creativelabs.com
Street price: $499
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QP/5-200 SM-3
Quantex 800/896-4898
http://www.quantex.com
Street price: $3599
READER SERVICE NO. 774

DVD Theater Upgrade Kit
STB 888/234-8750
http://www.stb.com
Street price: $799
READER SERVICE NO. 775

Infinia 7220
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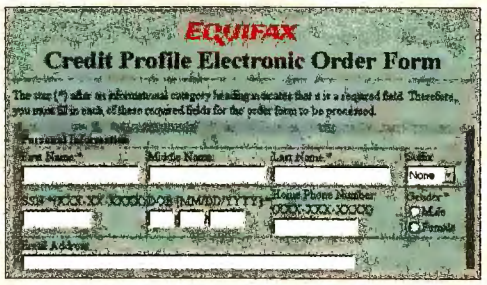
WEB BROWSER

Easier Ways to Check Your Credit

WANT TO CHECK your credit rating before you apply for a loan? Start with the World Wide Web. Several new sites can help you understand and expedite the credit checking process.

Online credit bureaus streamline the process by reducing paperwork. Plus, you can make a request 24 hours a day, seven days a week.

Such services are fairly new, according to the Electronic Privacy Information Center. And they can be helpful. But beware: Using these services may involve divulging detailed personal information, including your Social Security and credit card numbers. To protect your privacy, the Federal Trade Commission advises using one of the larger bureaus, such as Experian—formerly known as TRW—or Equifax.



THE EQUIFAX SITE lets you request your credit report online—but the report is sent via regular mail.

CreditCheck Monitoring Service at the Consumer Info site (http://www.consumerinfo.com) has an agreement with Experian, it provides the most comprehensive service, and it's the only bureau that lets you request and receive a copy of its reports online. But there's a $49.95 annual fee. Once the company receives your application, it mails you an ID number that you use to request and view reports. (See "Keeping Up" in this issue's *@Home Products.*)

Equifax (http://www.equifax.com) lets you request your report online, but currently you can't view the document on screen. The report is sent via regular mail. After you order a copy you receive a phone number to which you can direct inquiries. Later this year, Equifax expects to offer a feature that lets you view reports on screen.

Experian makes credit checking almost fun, with a colorful Disneyland-esque site (http//www.experian.com). The Credit 101 section offers a quick course explaining credit reports. The site includes a form for requesting a credit report, but you'll need to mail it in. Later this year, you'll be able to view reports on screen.

—Kerry Hall ■

PHOTOGRAPH: JOHN GREENLEIGH

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Ziff-Davis' Winstone 97 Version 1.0 produced scores of 16.9 and 36.4; 18.2 and 38.0; and 20.2 and 42.7 Winstooe Versioo 1.0 units on its High-End Wiostooe 97 suite and Business Winstooe 97 suite on Gateway 2000, Inc. PCs configured with 166MHz Iotel Peotium Processor with MMX technology, 200MHz Intel Pentium Processor with MMX technology, and 200MHz Intel Pentium Pro processor, respectively. All Gateway 2000 PCs tested featured 32MB RAM, 256K RAM cache, 3.8GB hard disk, IDE controller, FAT file system, and oo hardware disk cache. Systems include S3 ViRGE/VX graphics adapter; with 4MB VRAM with v1.23m3 driver; 1024x768 with 256 colors; and a refresh rate of 75Hz. Test systems used MS DOS 7.1 and MS Windows 95. All products used io the test were shipping versions available to the geoeral public, and the test and its results were oot verified by Ziff Davis.

intel inside
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NEW PRODUCTS

Toshiba Desktops Take Care of Business

NEW TO THE OFFICE: Toshiba Equium 5200D fits right in.

DESKTOP

TOSHIBA MADE A splash in the desktop PC market with its sleek Infinia home systems. Now the company is trying to swim with the sharks, introducing its first line of corporate PCs. Toshiba's four new Equium models range from a Pentium MMX-166 desktop to a packed Pentium Pro-200 minitower.

Toshiba has been a top business notebook vendor for quite some time. Why did it choose this particular moment to introduce corporate desktop machines? Customer demand has increased, says Equium product manager Elizabeth Marks. The company hopes to ride a trend. "More corporate buyers want a single source for all their PCs, because standardization is one of the easiest ways to keep support costs down," explains Kevin Hause, a desktop system analyst with International Data Corporation.

Based on our early tests, Toshiba's debut units do much more than keep their heads above water. We reviewed a preproduction **Equium 5200D,** a Pentium MMX-200 desktop. The PC's performance and features are similar to those of systems on *PC World*'s Power Desktops Top 20 chart, and its price is low. Compared with Dell's OptiPlex PCs (our current top-ranked corporate desktops), the $2848 Equium 5200D costs substantially less—nearly $900 less than a similar OptiPlex unit, which has a few extras such as a modem. The two machines posted almost equal scores in our performance tests and offer similar configurations, including 32MB of RAM, multigigabyte hard drives, and 17-inch monitors.

ALL WORK, NO PLAY

JUST REMEMBER, Toshiba designed the 5200D strictly for the corporate office. The Equiums lack niceties such as a MIDI/game port, modem, external speakers, and fancy software. The system does include Windows 95 (or Windows for Workgroups 3.11 by request), Puma's TranXit file transfer utility, and Intel's LANDesk Client Manager.

IS managers should find the 5200D appealing. The sturdy cover pops off at the press of two buttons for quick access to expansion slots and drive bays. The system includes Desktop Management Interface 2.0 technology, so IS staff can analyze remote PCs without using a remote control utility. It also comes with a 10/100 Fast Ethernet adapter.

Our only complaints: If the expansion slots are filled, you'll have to pull out a couple of cards to get to SIMM sockets. Also, the case measures at least an inch wider and deeper than most other desktops.

NOTABLE PRICES

THREE OTHER models round out Toshiba's Equium line. At the top, the $4248 Equium

Toshiba Equium 5200D

PRO: Good performance and feature set, easy-access slots and bays.

CON: Takes up slightly more desk space than most desktops.

VALUE: Highly affordable and well suited for the corporate office.

Toshiba America Information Systems
800/457-7777
http://www.toshiba.com/tais
Street price: $2848
READER SERVICE NO. 729

PHOTOGRAPH: MARC SIMON

6200M Pentium Pro-200 minitower comes with power features such as a 4.3GB SCSI drive with an Ultra Wide SCSI controller, and 32MB of Error Checking and Correcting EDO RAM expandable to 512MB. (This expensive type of RAM corrects memory errors, preventing some crashes and data loss.) The $3248 Equium 6200D has the same processor but a 3GB IDE drive and 32MB of EDO RAM. The entry-level Pentium MMX-166 desktop, the $2648 Equium 5160D, comes with 32MB of EDO RAM and a 2.1GB IDE hard drive. Prices include a 17-inch monitor.

Toshiba has created a separate Equium support division and offers a typical package—a three-year warranty with a year of on-site service, and toll-free phone support during business hours on weekdays (8 a.m. to 8 p.m. PST).

Our preliminary conclusion? Service and reliability count. You may want to wait a bit for a chance to assess the quality of Toshiba's desktop support, especially if you're planning to buy a complete new set of desktops and notebooks. But the prices of the Equiums look quite good.

—Bryan Hastings

A Phone That Sends E-Mail

TELEPHONY

YOU'VE JUST SHUT off your PC, then realize you need to send an important e-mail message—but the thought of sitting through the rigmarole of boot-up is aggravating. With the $299.95 **Intelifone,** however, you can now dispatch e-mail right from your phone. The device comes from InteliData Technologies (formerly US Order and Colonial Data Technologies). It's not inexpensive, but it is convenient.

The Intelifone's recessed, palmtop-size keyboard and four-line, 30-character LCD screen let you send e-mail over the Internet or an alphanumeric message to a pager, both via InteliData's SmartTime Network. As we went to press, the service was slated to let you receive e-mail as well, starting in April. (However, this function will not be very convenient, since you'll have one set of messages on your PC and one set on this phone, with no way to consolidate them.)

I was impressed with the e-mail features on the shipping unit I tried out but liked the advanced call management capabilities even more.

PC-FREE E-MAIL: Type your e-mail or paging message on the Intelifone's recessed palmtop-size keyboard and dial up the Internet.

If you subscribe to your local phone company's Caller ID service, Intelifone maintains a log of the last 50 callers' phone numbers; it also remembers the last 10 numbers you've dialed. You can scroll through these lists, then dial a number with the touch of a button.

The somewhat small keyboard can make for typing errors, but I got accustomed to it in short order.

For $7.95 a month (the first month is free), the InteliData SmartTime Network also offers a package of interactive services, including sports scores, delayed or real-time stock quotes, weather forecasts for any major U.S. or Canadian city, lottery results, horoscopes, and my favorite—visual directory assistance. This handy feature lets you search for a phone number by typing in a name, a street address, a city and state, or just a zip code.

Once you get the search results, you can save the information in the phone's 500-entry directory. The directory stores up to three phone numbers for each person (home, work, and pager numbers, for example). It also lets you easily set up some of these contacts for speed dialing.

Oh, yes, the Intelifone also comes with a speakerphone that permits hands-free conversation. Now that's what I call intelligent.

—Michael S. Lasky ▶

Intelifone

PRO: PC-free e-mail, speed dialing, information services.

CON: Small keyboard, monthly fee.

VALUE: Convenience at a price.

InteliData Technologies, Inc.
800/335-9976
http://www.intelidata.com

List price: $299.95, SmartTime Network $7.95 per month

READER SERVICE NO. 730

EDITED BY
Yardena Arar and Laurianne McLaughlin

CONTENTS

76 Toshiba Equium 5200D
77 Intelifone
78 Dell Dimension M200a
78 SyQuest SyJet drives
80 ATI All-in-Wonder card
80 Arcadia home monitors
80 MacTec Fix-a-Disc service
82 ViaTV 100 videoconferencing
82 U.S. Robotics Bigpicture
86 InfoSelect 4.0 PIM
86 SaddleBag, Zero Halliburton Attaché notebook PC cases
86 Fujitsu Palm Mouse
88 MyMailManager
88 CoStar LabelWriter XL Plus
88 Personal Font
92 Epson Stylus Color 400, 600, and 800 printers
92 HP OfficeJet Pro 1150C
94 Infini-D 3.5 graphics software
94 Scala MultiMedia MM200
94 Reachout 7.0
96 Debt Analyzer
96 DataSafe, PC-Crypto 1.0
96 Seagate Medalist Pro 6450
98 InterJet 100
100 UPStart Network 550

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

MMX on the Cheap: Dell Dimension M Series

DESKTOP

WAVE GOOD-BYE to the Dell Dimension P series, it's time for the divine Dimension M. In its new cast of Pentium MMX desktops, Dell has included two entry-level business machines, the M166a and the **M200a,** targeted at small to medium-size companies. Considering the aggressively competitive street prices of $1999 and $2179, our advice is to take your pick.

There's nothing stylish about the Dimension M systems. They resemble their former Dimension siblings: plain, off-white workhorses. You won't find anything fancy about the M166a or M200a inside, either. Each machine comes with a modest 16MB of RAM, a 2.1GB hard drive, a 33.6-kbps telephony modem, and a 15-inch monitor. One notable limitation: The units accommodate only 64MB of memory. Nearly all of today's PCs can hold 128MB or more.

These MMX units integrate the standard variety of multimedia extras: S3 Virge-DX video (with 2MB of DRAM), a Sound Blaster 16 Vibra sound card, ACS 90 speakers, and a 12X CD-ROM drive.

These systems don't come with a fancy software bundle.

LOW BILLS, NO FRILLS: Dell's Dimension M200a saves you money if you don't require a fancy case or a lot of preloaded software.

Dell preinstalls Windows 95 and Microsoft Office 97 Small Business Edition (consisting of Microsoft Works, Excel, Publisher, Outlook, Small Business Financial Manager, and Internet Explorer).

But performance isn't standard: A preproduction version of the Dimension M200a raced through our PC WorldBench test suite. In fact, this machine did not perform significantly slower than some MMX-200 machines that had 32MB of RAM. At press time we had tested only one other Pentium MMX system with 16MB of RAM—Caliber's $2028 Voyager 200MMX, which earned a similar PC WorldBench score.

Overall, the M200a's $2179 price is a strong selling point. This Dell Dimension doesn't come loaded with memory, but it is a snappy, affordable machine. Dell also scores well in our reader fax-back reliability and service survey.

—Aoife McEvoy

Dell Dimension M200a

PRO: Attractive price, fast machine.
CON: 16MB of RAM standard; total RAM limited to 64MB.
VALUE: Solid choice.
Dell
800/388-8542
http://www.dell.com
Street price: $2179
READER SERVICE NO. 731

Attention Jaz Lovers: SyJet Costs Less

STORAGE

PEOPLE WHO RUN space-hungry applications in areas like desktop publishing, multimedia authoring, and graphics manipulation always need more hard drive space. Iomega's affordable Jaz SCSI drive—with its removable cartridges and hard drive speeds—was a big step forward. At last, you could swap in an inexpensive 1GB cartridge as needed. But SyQuest Technology's new **SyJet** SCSI models deliver even more storage for the same price: $399 for an internal drive, $499 for an external drive. (The internal version fits in a standard 3.5-inch bay, or a 5.25-inch bay using the included adapter.)

The cartridges cost about the same as Jaz media—$124.95 each or $299.95 for a three-pack. (To get you started, SyQuest bundles one cartridge free with the drive.) But the SyJet media holds 1.5GB of data compared with the Jaz's 1GB, yielding a significantly lower cost per megabyte. If your PC doesn't have a SCSI adapter, you'll need to buy and install one (adapters cost at least $50). SyQuest also sells a parallel port package for $529 that includes a SCSI-to-parallel port adapter and a SCSI external drive. Transfer rates using the parallel port won't match SCSI-2 rates.

Speed-related specs for the SyJet are similar to those for the Iomega Jaz, except that the SyJet comes with a 512K cache, double the size of the Jaz drive's cache.

SyJet performance in typical use seemed as fast as the Jaz's. The SyJet also proved as easy to install. With a SCSI adapter already available in my PC, it took me about 30 minutes to install the drive and set up the software. If you need this type of storage, look no further.

—Rex Farrance ▶

SyQuest SyJet SCSI Drives

PRO: Affordable drive and media, high-capacity 1.5GB cartridges.
CON: Requires a SCSI adapter (costs at least $50) to attain hard drive speeds.
VALUE: The new value leader in its category.
SyQuest Technology
800/245-2278, 510/226-4000
http://www.syquest.com/
List price: internal version $399, external version $499; includes one cartridge
READER SERVICE NO. 732

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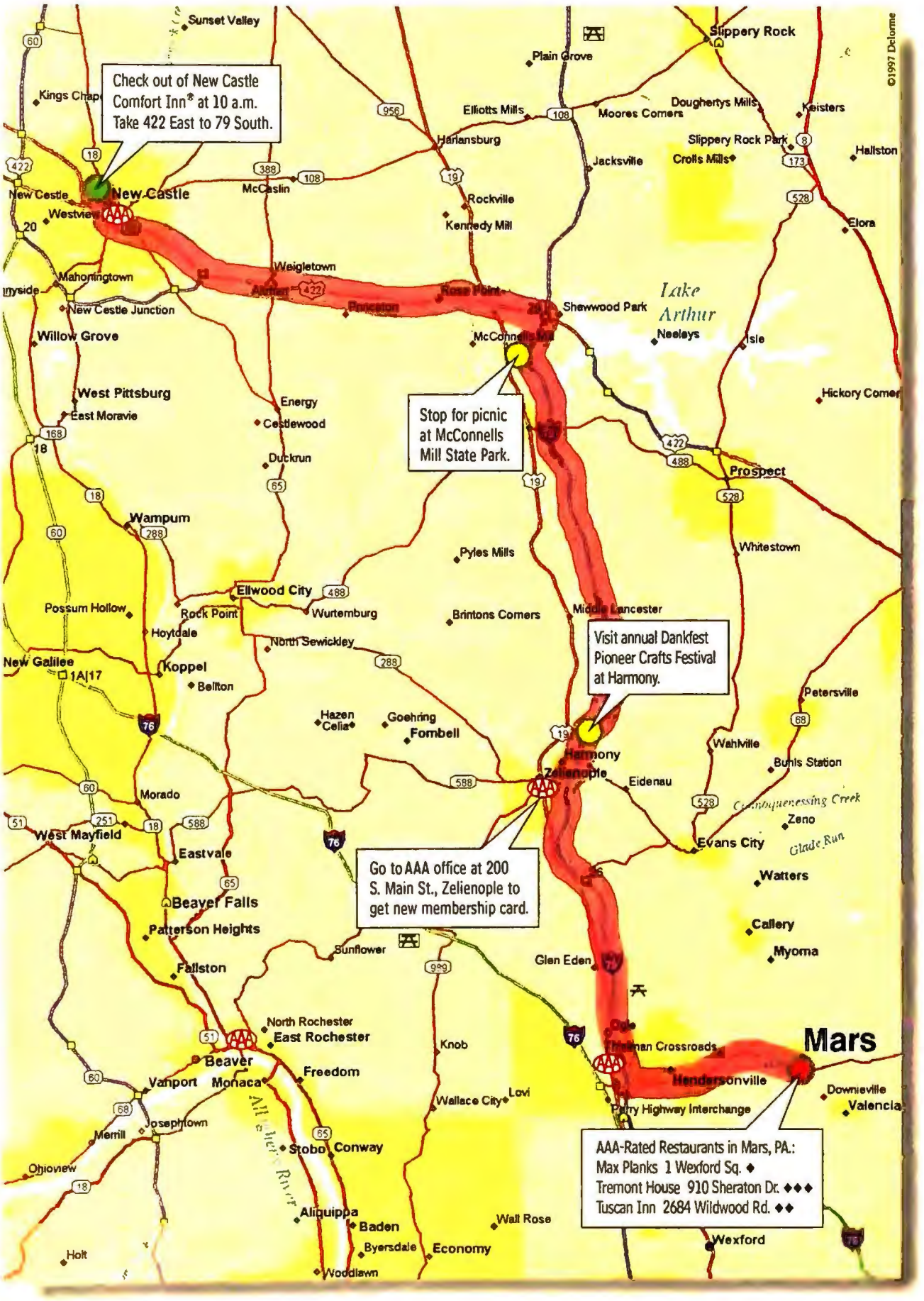

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Circle 37 on reader service card

ATI's $299 Video Card Does It All

VIDEO CARD

ATI'S NEW **All-in-Wonder** video card won't run your Windows programs any faster than other boards, and it won't blow the doors off your 3-D games, but the things it can do with a TV signal are like nothing you've seen from a video card. The $299 All-in-Wonder gives you features that normally would require the purchase of two products.

It's a graphics board, a 3-D accelerator, a TV tuner, and a video capture card all in one PCI board. It even has a TV-out port so you can play games or browse the Web on a television screen.

The All-in-Wonder will wow you in its role as an intelligent TV tuner. After you've attached the board to an antenna or cable hookup, you can go right into ATI's Video Player Setup program. My favorite feature takes screen shots of available TV channels and shows you thumbnail images. You know what's playing on every channel, and you can change stations with the click of a mouse.

More practical uses for the All-in-Wonder's TV tuner relate to closed captioning. You can run the TV in the background while working in a program: If you've specified keywords, the TV screen will pop up when those words are detected in the captioning. You can also scroll backward through 5 minutes of captions to see what you missed, or use the software to capture transcripts of shows such as documentaries and cooking programs so you can read them later. You won't find a similar product at this price.

—Brad Grimes

ATI All-in-Wonder

PRO: Easy to set up and use; superior TV features.

CON: All-inclusive graphics board limits upgrade options.

VALUE: Economical, innovative choice.

ATI Technologies

905/882-2600

http://www.atitech.ca

Street price: $299

READER SERVICE NO. 733

QUICK TAKES

Rx for Damaged CD-ROMs

You may have learned the hard way: A small scratch on the bottom surface of a CD-ROM can render it useless, except as a cocktail coaster. The digital bits imprinted on a CD-ROM are read by a laser beam. An imperfection on the protective layer causes problems. But MacTec Products' $9.95 Fix-a-Disc service saves injured CD-ROMs. You use the company's prepaid mailer with safety sleeve to mail the damaged disc. In two to four weeks, MacTec fixes it. Our mangled disc came back as good as new. If MacTec can't repair a disc, it issues credit for another disc to be repaired free. MacTec Products; 800/622-8321; http://www.cdessentials.com.

READER SERVICE NO. 734

—Michael S. Lasky

Monitors Combine TV and PC Features

MONITOR

TAKE A LOOK at a whole new kind of monitor: Princeton Graphics' **Arcadia** home monitors serve as big-screen displays for the home or office. When connected to a VGA graphics board, each Arcadia monitor can display presentations, multimedia CD-ROMs, or Web sites. You can also use the monitor to watch video from your VCR, camcorder, videodisc player, or cable television service.

The Arcadia supports 800 by 600 resolution and comes in 27- and 31-inch models, street priced at $999 and $1399. If you just want a large-screen monitor for your PC, you can buy either model without the TV input features for a few hundred dollars less.

WATCH IT ON THE BIG SCREEN: Princeton Graphics' Arcadia monitors connect to your PC, VCR, cable box, and more.

To test a preproduction version of the 27-inch model, the Arcadia AR2.7AV, I connected it to my PC's VGA and sound boards and to a VCR, a camcorder, and a cable TV converter box. The Arcadia looked great as a PC display. Whether I sat 5 feet or 15 feet from the set, images looked consistently sharp and colorful.

The Arcadia also worked well as a TV display. However, I wish there were a control for adjusting image sharpness. The Arcadia lacks a television tuner, so you need to connect it to a cable box, a cable-ready VCR, or a PC/TV tuner card in order to watch TV.

—Richard Jantz ▶

Arcadia Home Monitors

PRO: Big-screen monitors for TV and PC.

CON: Limited to 800 by 600 resolution, lacks TV focus control.

VALUE: Worth considering for big-screen TV fans.

Princeton Graphics Systems

800/747-6249

http://www.prgr.com

Street price: 27-inch monitor $999, 31-inch monitor $1399

READER SERVICE NO. 735

$999*

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Circle 154 on reader service card

Videoconferencing the Easy Way: Without a PC

CONFERENCING

POOR PC videoconferencing systems—these unloved products elicit countless tales of woe. But you can avoid the almost-guaranteed gauntlet of hardware conflicts and installation headaches with 8x8's **ViaTV 100,** a compact set-top box that turns your TV and telephone into a videoconferencing system.

I tested ViaTV on a 19-inch television and found that the product worked well with other ViaTV systems and with PC-based videoconferencing systems. Making a video call was simple: I dialed the other party's number to start a voice call and initiated the video link by pressing the pound key on the phone. The system took about 35 seconds to establish the video, during which time we couldn't speak.

Once the link was established, we used the phone keypad to navigate through text menus that allowed us to size the video window, set the volume, and adjust the clarity and frame rate of the video. Navigation is somewhat clumsy—you use the pound and star keys to move left and right among items, and 0 to select a command—but you only have to master a few options.

Don't expect too much in the way of video quality: It's only so-so, with reasonably clear images on talking-head close-ups. As with other analog videoconferencing systems, any movement in the scene degrades video quality severely, slowing frame rates and breaking up the image. The slight lag in video can also be a bit distracting since it breaks lip sync. You need to scoot up close to the camera for the other party to get a clear look at you. A camera with a zooming lens would be a welcome enhancement.

While ViaTV is not perfect, it's clearly the most accessible home videoconferencing system on the market today. Installation is simple, and the system takes just seconds to become active. Most important, ViaTV does not affect the operation of your phone or TV. At $499 it's not inexpensive, but I'd recommend ViaTV for the hassle-free setup.

—Michael Desmond

ViaTV 100

PRO: Simple setup; compatible with PC-based videophones.

CON: Clumsy menus; analog video limits visual quality of calls.

VALUE: Plug-and-play videoconferencing that delivers.

8x8, Inc.

888/843-9898

http://www.viatv.com

Street price: $499

READER SERVICE NO. 736

Bigpicture: Good Idea, Bad Support Policy

CONFERENCING

U.S. ROBOTICS has introduced a PC videoconferencing system that's more consumer-friendly than most, but it's still not perfect. The $399 **Bigpicture** video kit is reasonably priced, but skimpy support policies preclude our hearty recommendation.

This kit delivers an internal 33.6-kbps modem, a tiny video camera that sits on top of your monitor, a video capture card, and a clever collection of image editing and modem software. The former includes Asymetrix's Digital Video Producer for video editing, and Kai's Power Goo, which was an instant hit with my kids. They had a great time capturing images of themselves and the dog and morphing them.

Keep in mind, if you want to videoconference with Grandma, you'll need two of these kits and, at minimum, a Pentium-75 PC at each end. And once you're connected, keep your expectations low—the sound is clear, but as with analog systems generally, image quality is still choppy.

CLOSE BUT NO CIGAR: U.S. Robotics' Bigpicture video kit is simpler to set up than some products, but think twice before spending the $399.

Bigpicture Video Kit

PRO: Includes fun image capture and editing software.

CON: No phone support late evenings or weekends.

VALUE: Requires powerful PC at both ends, may be tricky to install.

U.S. Robotics

800/342-5877

http://www.usr.com

Street price: $399

READER SERVICE NO. 737

Any videoconferencing system can be complex to set up, depending on your computer. If you own a new system with Plug and Play components, that's the best starting point. If you have a PC with non–Plug and Play components, such as the combo modem/sound card in my one-and-a-half-year-old machine, watch out—the installation could take you several hours.

But the biggest flaw with this package is the support. U.S. Robotics provides none at all on weekends, or after 6 p.m. central time on weekdays. And just when are you likely to install it?

—Tracey Capen ▶

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Circle 204 on reader service card

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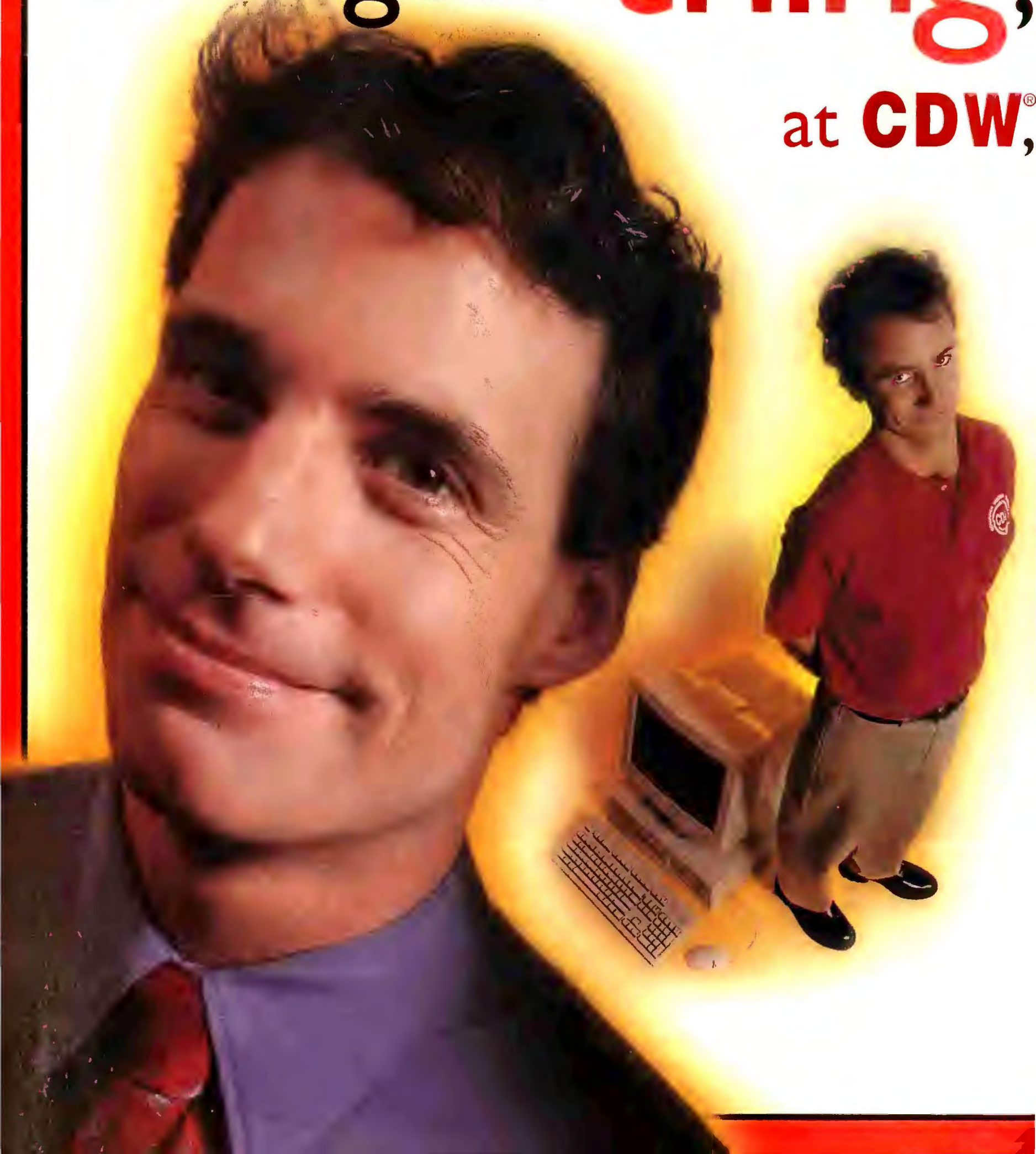

but Bryan, my account manager seems to know just what my company's looking for, at the right price, when it's going to be introduced, and when my ear itches."

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Circle 44 on reader service card

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Info Select 4.0: New Look for a Low-Cost PIM

PRODUCTIVITY

INFO SELECT has come a long way from its first incarnation as Tornado Notes, an anarchic free-form database that managed to capture a following thanks to its powerful search features. I tested an early beta version of **Info Select 4.0,** the first version for Windows 95. At a reasonable $70 (street), this personal information manager offers a revamped interface. Info Select 4.0 is worth considering if you don't like the datebook-style interface of Lotus Organizer or Starfish Sidekick.

This PIM's new outline-based look is clean and easily accessible, even for rank beginners (Tornado Notes could, at times, look like a landfill in a gale).

You can drag and drop information from Info Select into other Windows applications, and vice versa. You can also drag files from Windows Explorer into the PIM. Once a file's in Info Select, just double-click on its icon to open the file and launch the application. A powerful keyword search feature makes it easy to find any nugget of data.

You can click on URLs to go to the Web from Info Select's notes section, although this feature is a little awkward. You have to select the URL, then choose 'Go to Web address' from the menu bar.

Overall, Info Select 4.0 offers an appealing look and plenty of muscle.

—John P. Mello Jr.

Info Select 4.0 for Windows 95

PRO: New outline look, powerful search features.

CON: Awkward to launch URLs.

VALUE: Good alternative to datebook-interface PIMs.

Micro Logic Corp.

800/342-5930

http://www.miclog.com/

Street price: $70

READER SERVICE NO. 738

QUICK TAKES

Mini Mouse

Fujitsu's **Palm Mouse** is meant for notebook PCs and presentations but works with desktop PCs. List priced at $36, it looks like a flat kidney bean, about 2 inches wide and 3 inches long; you cradle the unit in one hand. Navigation and right-click buttons are on one of the flat sides, within reach of your thumb. The left-click button curves along the top edge, where your index finger falls as you hold the mouse. The harder you push the navigation button, the faster the cursor moves. The mouse is comfy, but don't choose it for detailed work like graphics. Fujitsu Takamisawa America, Inc.; 800/380-0059; http://www.fujitsufta.com.

READER SERVICE NO. 739

—Melissa Riofrio

The Case of the Hidden Notebook

GEAR

WHAT'S THE DIFFERENCE between looking cool and being cool? With notebook carrying cases, the answer is easy: The $259 shock-resistant **Zero Halliburton Attaché** looks cool. The James Bond–like brushed metallic case radiates authority. Conversely, Kensington Microware's $89 water-resistant fabric and faux suede **SaddleBag** is the true master of disguise. The bag's casual styling doesn't suggest that an expensive notebook computer is inside.

Zero Enclosures' 13-by-18-inch Attaché is constructed of "aircraft-quality aluminum" that's plenty rugged. A gasketed seal keeps out dust and moisture, and an interior foam lining adds shock resistance. But this bag has many drawbacks. The hard shell means that you can't stuff the case, and it tips over easily. The case also screams "expensive" to potential thieves. Add a notebook PC and accessories to the 5.5-pound case, and you're schlepping 12 to 15 pounds. So while you look cool carrying it, you won't be cool for long.

UNDER WRAPS: Kensington's SaddleBag (left) offers three comfortable ways to tote your PC. The Zero Halliburton Attaché (below) looks sleek but is heavy and conspicuous.

The 2.5-pound Kensington SaddleBag, the best case I've ever tried, is an expandable soft bag with plenty of padding. In addition to the three carrying options of paddle handle, shoulder strap, or recessed backpack straps, it incorporates a removable accordion file storage liner, plus pockets for a cell phone, accessories, and travel gear. Its lightweight, sporty design lets it double for business and casual use. That's cool.

—Michael S. Lasky ▶

SaddleBag

PRO: Versatile carrying options, extremely comfortable, holds extras.

CON: May be too casual in some business environments.

VALUE: Excellent—has lifetime guarantee.

Kensington Microware

800/535-4242

http://www.kensington.com

Street price: $89

READER SERVICE NO. 740

Zero Halliburton Attaché

PRO: Sleek design, protective shell.

CON: Heavy, may attract thieves.

VALUE: What's good for Bond isn't always good for you.

Zero Enclosures

800/728-0068

http://www.zerocorp.com

Street price: $259

READER SERVICE NO. 741

We're thinking what you're thinking: with your data, there's no such thing as safe enough. At Imation, we understand. We're a new $2.2 billion world leader in information and imaging (NYSE symbol: IMN), and our business includes the former Data Storage business of 3M. With 3M™ products by Imation™, you'll continue to get 3M reliability, plus an added understanding of your needs that leads to great new ideas. Like LS-120, the simple, easy new 120 MB diskette technology that's compatible with standard diskettes. And our new DVD technology, which we support with full-service publishing. We sell more 3.5" diskettes, more 1/2" tape cartridges, and more 1/4" and Travan™ minicartridges than anyone else. Which makes us a leader in more than technology. We're also a leader in keeping your data safe. Call 1-888-466-3456 or see http://www.imation.com to find out more about what makes Imation a **world leader in data storage.**

Circle 111 on reader service card

IMATION
Borne of 3M Innovation

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QUICK TAKES

Wait a Minute, Mr. Postman

UTILITY

DO YOU KNOW how to address for success? **MyMailManager,** from MySoftware Company, helps you simplify the process and save money if you're sending out large volumes of good old-fashioned snail mail.

MyMailManager

PRO: Makes mass mailings easier and more affordable.

CON: Form-letter features are not intuitive.

VALUE: Worth the price for frequent snail-mailers.

MySoftware Company
800/325-3508, 415/473-3600
http://www.mysoftware.com
Street price: $49

READER SERVICE NO. 760

Based on my experience with a shipping copy, this $49 Win 95 program is a good investment for people running their own businesses—for example, real estate agents who do frequent mailings.

MyMailManager comes with canned layouts for mailing labels and a simple database management system. If you have an existing list, you can import .dbf files. Printing address labels is easy, but some of the form-letter features take time to learn.

MyMailManager can help you get lower-cost postal bulk rates: It prints out a completed copy of the application that you must submit to the post office, and it presorts your mailing list to comply with USPS requirements.

Smaller companies and organizations can save some money by using the included software to do a presort. If you have to do large mailings, you can save big with an automated bar-coded presort. This requires checking addresses against an up-to-date USPS-certified database, so you'll need a companion product such as MyAddressChecker CD. (A $219.65 subscription provides you with four quarterly updates.)

MyMailManager includes a thorough software manual and a book that teaches you the basics of bulk mail.

—Richard Cranford

The Write Font

I have lousy handwriting. But now Signature Software has converted it to my very own TrueType font, Lasky. At last you can read what I write, er, type. For $99, Signature Software transforms your writing into a font that retains your own handwriting style. They create the Personal Font using specific connective-cursive handwriting samples on a registration form. After the company ships the finished font, you're given a chance to fix characters you don't like (this costs an additional $37.50 for 15 characters). You can use an included utility to convert existing documents into your writing. Signature Software; 800/925-8840; http://www.signaturesoftware.com.

READER SERVICE NO. 762

—Michael S. Lasky

Label This Printer Handy but Not Perfect

LABEL PRINTER

THE LAST FEDEX pickup was 10 minutes away and I needed to print a couple of address labels quickly. No problem. I typed in the information, put a sheet of precut labels in the laser printer—and watched in horror as the paper curled up and jammed. This will not be a problem with the $249 **CoStar LabelWriter XL Plus.**

CoStar LabelWriter XL Plus With Easy Software Suite

PRO: Convenient and versatile for single or multiple label printing.

CON: Templates are not easily customizable.

VALUE: Worth the price for heavy label users only.

CoStar Corp.
800/426-7827
http://www.costar.com
List price: $249

READER SERVICE NO. 761

This compact printer accepts labels in many sizes, in roll format only. It took me a couple of minutes to set up the shipping version I reviewed. I just plugged in the power cord, connected the included serial cable to the PC, and installed the Windows 95 or 3.*x* drivers and the two-floppy-disk Easy Software Suite bundled with the printer.

ROLL OUT THE LABELS: CoStar's new printer works well, but software could be better.

The suite offers applets for labels, bar coding, and badges, and Addressmate, a database. The CoStar also comes with software links to Microsoft Word, Corel WordPerfect, and Lotus Word Pro, so you can call up the labeler from within your documents.

While the software suite includes 37 label templates for common business and personal needs, creating new templates requires the skill of a programmer. The instructions are arcane at best. Also, you can't easily modify a template or resize an imported graphic. When I tried to put *PC World*'s logo on a label, the template resized my bit map to a tiny dot. Previous versions of the CoStar printer offered more flexibility with graphics.

Despite this flaw, I find the LabelWriter useful for printing labels for mail, floppy disks, Zip disks, and VHS cassette boxes, plus UPS codes. If the printer had only given me more room to customize, I'd label this one a winner.

—Michael S. Lasky ▶

Lo
and rem

Grab the case with both hands and remove it. Avoid damaging any parts.

Locate the memory sockets (they may be under the power supply).

P ny wires
it may be

Gently insert memory into appropriate slot ensuring that it is seated properly.

Locate cache sockets. You may have to clear additional wires or expansion cards.

Gently insert cache int
ensuring that it is seated

ner and remove the
sitioned on

Configure jumpers or dipswitches to modify CPU bus speed. Refer to manufacturer specs.

Check to make sure that CPU is properly indexed before inserting.

Be sure pins on the CPU are properly aligned before inserting into the socket.

Resecure the fan on top of the CPU, making sure to reconnect the wire securely.

e for internal drive.
an external drive cage
supply.

the ws of the internal
or lift the cage

Place the internal drive in the cage.

Place the cage assembly into the chassis

Resecure the

Resecure any expansion cards you may have removed and push wires back into position.

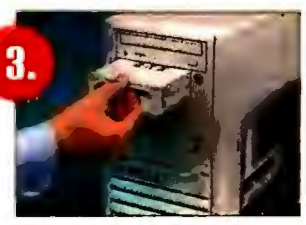
Resecure the case on the chassis. Make sure not to pinch wires or damage parts.

't does
tire
p

We've taken some unconventional steps to make our PCs easy to upgrade. Three to be exact.

Remove the left-side quick access panel to add to expansion slots.

Remove the right-side quick access panel to install CPU, cache and RAM.



Pull out hard drive slide, insert drive and close. You're done.

A high-performance PC that literally upgrades in seconds? Without tools? Without training? Either we're kidding, or we're NEXAR. Unlike conventional PCs, the NEXAR PC puts the CPU, cache, memory, hard drive and expansion slots right under your fingers. You don't even take off the cabinet. Just pop the side panels and slide out the hard drive caddy for instant configuration and instant upgrades. It's that simple.

As for performance, the NEXAR PC passes benchmark tests with flying colors. And when it comes time to upgrade, Nexar makes it easy — because the NEXAR PC not only accepts current industry standard components, it's ready for the future because it supports Universal Serial Bus, SDRAM and Pentium® processors with MMX™ technology. Why waste money on a computer without a future? To find out about the NEXAR PC, or obtain a copy of the latest benchmark performance test scores, contact NEXAR at the number or web address below. Or contact the nearest NEXAR reseller. And take a few steps toward preserving your computer investment.

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pentium®

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Circle 167 on reader service card

"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.

Mail-In Offer

$30 REBATE

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

Just send this completed certificate along with an original UPC symbol from an APC Back-UPS® Office™ box and the original store receipt with the Back-UPS Office circled, and get a $30 rebate! See details.

APC®

888-289-APCC Ext: 8121
Fax: 401-788-2797
E-mail: bkoffice@apcc.com
http://www.apcc.com

Just send this completed certificate along with a UPC symbol from an APC Back-UPS® Office™ box and the original dated store receipt with the Back-UPS Office circled for your $30 mail in rebate!

Mail Coupon to: Back-UPS® Office™ Rebate
P.O. Box 52930
Dept. #10311
Phoenix, AZ 85072-2930

Name: _____

Company/Title: _____

Address: _____

_____

City: _____ State: _____ Zip: _____ Ctry: _____

Phone: _____ E-mail: _____

Additional Terms and Conditions:

1. Offer good in US & Canada only. Rebate in US Dollars only.
2. Store receipts must be dated between April 1, 1997, and August 30, 1997.
3. Requests must be received by September 15, 1997.
4. Customers must send in: - Original UPC labels printed on APC Back-UPS Office packaging, - Original store receipt, - Completed coupon.
5. Only original receipts accepted. Customer can request that their receipt be returned by including a note and a self-addressed stamped envelope with their rebate request.
6. Void where prohibited or restricted by law.
7. Limit five (5) rebates per customer.
8. Proof of mailing does not constitute proof of delivery. APC is not responsible for lost, late, illegible or incomplete orders or postage-due, damaged or sepa rated mail.
9. Not eligible: APC employees, agencies, distributors or resellers.
10. Fraudulent submission of multiple requests could result in federal prosecu tion under the U.S. Mail Fraud Statues (18 USC, Section 1341 and 1342).
11. Not valid with any other offer.
12. Allow 6-8 weeks for delivery.
13. Offer expires August 30, 1997.
14. Offer only good on Back-UPS Office (UPC code 7 31304 00588 9).
15. APC Reserves the right to rescind promotion at any time.

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Mail Code:P3-RE

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.

Protect ME! APC

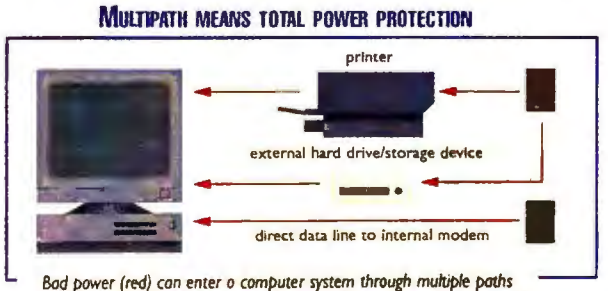
Power problems attack computers relentlessly. Did you know that you have a better chance of winning the lottery than of escaping power problems? They are the single largest cause of computer data loss and hardware damage.

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.

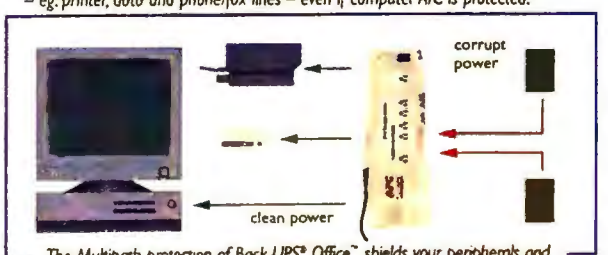
Unique multipath protection keeps your PC and data safe

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	8
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 fax coupon below to APC at **(401) 788-2797** or download the redemption information from our Web Site at:
http://www.apcc.com/english/promo/promo025.htm

FREE SOLUTIONS GUIDE!

Just complete the information below and send to APC to receive redemption information regarding the $30 Rebate Offer. We'll send you a Free 60 Page Solutions Catalog just for filling out the coupon!

☐ **YES!** Send me a $30 Rebate Redemption Card.

☐ **NO** I'm not interested at this time but please send me a free 60 Page Solutions guide.

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Title: _____
Company: _____
Address: _____
City/Town: _____
State: _____ Zip: _____ Country _____
Phone: _____
How many workstations on site? _____
Brand of UPS used? _____

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Circle 45 on reader service card

Epson's $229 Ink Jet Produces Best Color in Its Class

PRINTER

AMONG EPSON'S fine new trio of personal ink jet printers—the **Stylus Color 400, 600,** and **800**—even the $229 entry-level model is a printer to be reckoned with. Most low-end ink jets are remarkably chintzy, producing washed-out text and graphics and lacking basics like an output tray and the ability to hold both a color and black ink cartridge at once. Not the Stylus Color 400: It creates by far the best color I've seen from an ink jet in the $200 price range.

THE PROOF IS IN THE PICTURES: Epson's Stylus Color 400 produced great quality output in our print tests.

I tested a shipping version of the Stylus Color 400. Presentation graphics on Epson's special coated paper look vivid and smooth, and photographs look better than average. Text quality on plain paper isn't bad, but it's not as crisp as laser printer output.

The $299 Stylus Color 600 and $449 Stylus Color 800 offer what Epson calls 1440-dots-per-inch resolution. If you read the specifications carefully, though, you'll discover that the printers' maximum resolution is really 1440 by 720 dpi. Although both printers produce great-looking pages, I found the improvement over the 720-by-720-dpi Stylus Color 400's output barely perceptible, even under a magnifying glass, except for photos on glossy paper.

However, there is a speed advantage. In informal tests, the 600 printed substantially faster than the 400, and the 800, set at its default 360-dpi resolution, is the speediest personal ink jet I've seen overall, based on spot tests of photos and word processing documents. The 600 and 800 also double the 400's one-year warranty. All three Epson ink jets are unusually easy to set up and use. The 600 and 400 both come with Sierra's Print Artist and Adobe's PhotoDeluxe software.

—Harry McCracken

Epson Stylus Color 400, 600, and 800

PRO: Excellent print quality and speed, easy to use.

CON: Stylus Color 800 runs faster but doesn't produce better output.

VALUE: Superior color from personal ink jets.

Epson
800/463-7766
http://www.epson.com/
Street price: $229, $299, $449

HP's Newest Multifunction Color Printer

PRINTER

AS ONE-PERSON businesses proliferate, they increase demand for all-in-one office equipment. In response, this spring Hewlett-Packard will roll out six new multifunction devices based on color ink jet printers. Five are next-generation models of the OfficeJet 350; the new **OfficeJet Pro 1150C** replaces the CopyJet, which had been the first ink jet–based device to print, scan, and copy in color.

The OfficeJet Pro 1150C will sell for about $1000. The device is based on HP's excellent-quality DeskJet 870 ink jet color printer. In my tests of a preproduction unit, the 1150C produced top-notch color graphics and color copies. HP rates its printer's speed at 8 pages per minute for 600-by-600-dpi black; 2 ppm for normal color pages or 4 ppm for draft color pages, both at 600 by 300 dpi.

I got good results from its 24-bit color, 300-dpi flatbed scanner. Less expensive multifunction printers have sheetfed scanners, which can't easily capture pages from a book. The included OmniPage Limited Edition OCR software converts documents to editable text, but I'd prefer the more accurate full version of OmniPage Pro. The 1150C's software bundle also includes Adobe PhotoDeluxe image editing software. The 1150C lacks fax capability: HP's theory is that most offices already have a dedicated fax machine.

The OfficeJet 500, 520, 570, 580, and 590 devices should ship in May; units were not available in time for testing. Pricing hadn't been finalized but will start at $500, HP says. All five units are built around the DeskJet 682C ink jet, with 600-dpi monochrome prints and 600-by-300-dpi color. The sheetfed scanners work at 300 to 600 dpi, depending on model. These units don't scan or copy in color.

—Dan Littman ▶

OfficeJet Pro 1150C

PRO: Excellent color prints, excellent color copies.

CON: No fax capability built-in.

VALUE: Costs about the same as buying equivalent scanner and printer separately.

Hewlett-Packard
800/752-0900
http://www.hp.com
Street price: $1000

READER SERVICE NO. 763

We said our revolutionary software could help you satisfy your customers better and identify new sales opportunities. Small businesses across the country said, "Prove it."

So we did!

We made some pretty bold claims. We said Proven Edge™ software could help you improve customer service. Find more business. Boost your efficiency and profitability. All in less time than you're spending now. And that we'd make sure you got up and running without a hitch.

We anticipated that all this might be met with some, well, skepticism. Especially on the part of those who'd been handed a line or two by software companies in the past. "Fair enough," we said. "Put Proven Edge to work in your business for a month. If you need help setting it up, just call our toll-free RapidStart Hot Line."

People all across the country—in all kinds of businesses—took us up on it. And agreed it was the best business software they'd ever used.

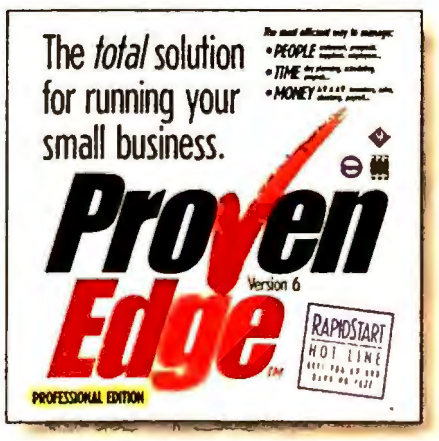
Proven Edge puts whatever you need to run your business at your fingertips—whenever you need it. Information about your customers, prospects, employees, suppliers, and friends. Your products and services. Your schedules. Your projects. Your finances.

Together with all the tools you need to organize, manage, and USE those details quickly, easily, and efficiently. From accounting with full inventory control to payroll, contact management, project scheduling, and decision support.

And unlike software suites, Proven Edge is a single, *genuinely* integrated program. So you only enter information once, and it's instantly available. There's no need to close one program and open another to quickly retrieve details about any aspect of your business.

Get up and running in no time with our RapidStart Hot Line. Getting started with new software (even the easiest!) can be a bit challenging. To make it simple, we give you access to our toll-free RapidStart Hot Line (different from our regular support number), with friendly advisors ready to walk you through the basics if you need a hand.

Let us prove it to you. Call for your trial copy of Proven Edge Professional Edition (the real thing, not some crippled "demo program"). See for yourself how much it can improve your customer service, boost your efficiency, and increase your sales opportunities. If you agree that it's the best business software you've ever used, give us a call in 30 days, and we'll apply the shipping and handling charge toward the full cost of Proven Edge.



Call 888-8PROVEN for your fully functional trial copy of Proven Edge Professional Edition, or for more information.

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www.provenedge.com

Circle 183 on reader service card

Infini-D Creates Great 3-D Graphics

GRAPHICS

NOT SO LONG AGO, the Macintosh platform was a graphics software wonderland—and the Windows PC packed about as much artistic versatility as a number 2 pencil. But with the arrival of the Windows 95 and NT version of Specular's **Infini-D,** nearly all the great Mac graphics packages have made the move to the PC platform. I tested a shipping copy.

Infini-D 3.5 is a professional-strength three-dimensional modeling and animation program. Like just about any other 3-D package, it lets you manipulate objects, lights, and camera angles to create realistic-looking scenes. When you're done, you can render still images or animations in a variety of standard formats, ready to export to a document or a multimedia presentation.

Entry-level products such as Asymetrix's $70 3D F/X do this too, but what sets Infini-D apart—and justifies its $449 street price—is the far greater degree of control it gives you over your creations. It comes with some nifty predesigned 3-D shapes; you can also build objects from scratch, then squish and squash them to your liking. You can add realism to animations by controlling object velocity—for example, making an airplane accelerate as it takes flight. And for still pictures or animations, the SuperFlare feature lets you simulate the subtle refractions of light you'd see in a real photograph.

Unfortunately, Infini-D does not use a standard Windows interface. It offers no real wizards, for instance, or even ToolTip labels for help with the many exotic icons. Casual users will probably be intimidated. But the manual and tutorials are well done, and the results can be spectacular once you've scaled the program's learning curve.

—Harry McCracken

Infini-D 3.5

PRO: Advanced 3-D modeling and animation.

CON: Interface takes some learning.

VALUE: Fine package for sophisticated graphics work.

Specular

413/253-3100

http://www.specular.com

Street price: $449

READER SERVICE NO. 764

QUICK TAKES

Better Remote Control

Reachout 7.0, the newest version of Stac's remote control software, offers an appealing new feature for travelers. The product lets your Web site administrator post a downloadable module called Passport on your company site. If you're on the road and need access to an application back at the office but don't have Reachout on your portable PC, you're not stuck. You can download Passport, install it as a plug-in or ActiveX control on a Web browser, and run applications remotely. Reachout 7.0 is expected to sell for $140 and supports Windows NT 4.0, Windows 95, Windows 3.1, and DOS, all in one package. A new setup feature automatically detects your operating system. Stac Inc.; 800/279-7822; http://www.stac.com.

READER SERVICE NO. 765

—Randy Ross

A Moving Experience: Scala Presentations

PRESENTATIONS

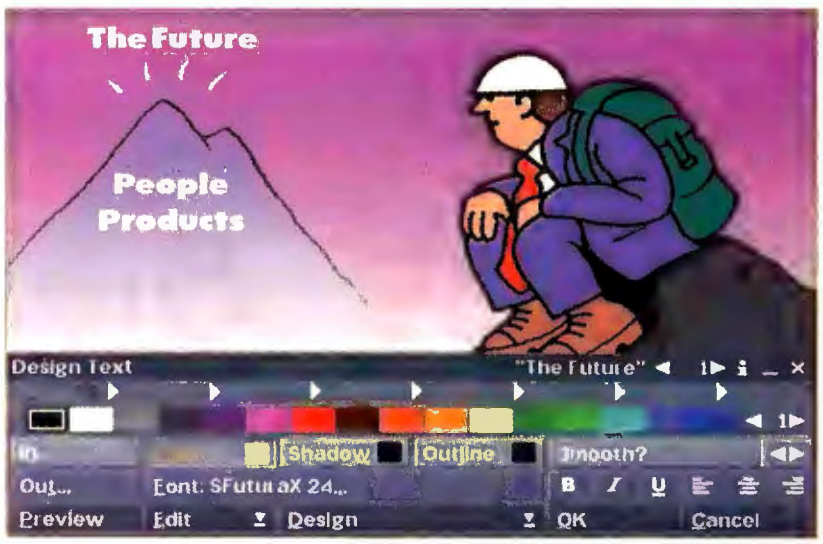
WHEN YOU START UP **Scala MultiMedia MM200,** you may feel you've left Windows 95. The custom graphics interface—and custom operating system, which runs on top of any flavor of Windows and many other operating systems—makes this presentation package look unusual. Getting used to the quirky interface takes time. But I liked the results I saw from a preproduction copy.

Scala's forte is creating presentations that move—with animations, videos, sound and music, and TV-type effects like wipes and fly-ins. Other packages provide some of these features, but none help you put it all together this well. The package makes presentations look as finished as TV.

Scala offers new support for Microsoft DirectX and ActiveMovie in presentations, and the ability to publish presentations on the Internet. Participants can watch using a free run-time player. The program comes on a CD-ROM that's packed with content—hundreds of backgrounds, music, animations, sound effects, videos, and art.

Scala is fairly straightforward to use, though the lack of on-screen help is frustrating. Beginners should pass, but presentation experts will be impressed.

—Stan Miastkowski ▶



GET MOVING: Use Scala MultiMedia MM200 to create presentations with animations, videos, and TV-like effects.

Scala MultiMedia MM200

PRO: Creates complicated multimedia presentations with pizzazz.

CON: Quirky interface, complete manual but no on-screen help.

VALUE: Not for casual use, but it lets you create great effects.

Scala

800/947-2252, 703/713-0900

http://www.scala.com

List price: $299

READER SERVICE NO. 766

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Debt Analyzer Tells the Owe-ful Truth

PERSONAL FINANCE

YOU'VE TAPPED credit cards, auto loans, school loans, home improvement loans. Maybe you even borrowed a few bucks to finance your beloved PC. You owe people—big time. You need to create a plan that will get you out of debt.

Insight Software Solutions' **Debt Analyzer** does the job for $25. Simply enter your debt data (amounts, minimum payments, interest rates, monthly due dates), monthly income, and household expenses, and the program generates a repayment plan that tells you exactly how much to pay each creditor each month.

Quicken 6's Debt Reduction feature does all this as well, but the shipping version of Debt Analyzer I reviewed provides a bit more flexibility. While the default plan advises you to pay off the highest-interest loans first (thereby saving the most interest), you can choose other priorities, such as paying off the smallest or largest debts first. (Quicken only lets you manually reprioritize the debts.)

You can also find out what you need to pay to be debt-free by a certain date, and see how altering a monthly payment or the duration of the loan affects other variables. Finally, Debt Analyzer will generate pages upon pages of reports covering every gory detail of your debt situation.

Debt Analyzer doesn't have Quicken's multimedia frills—such as comforting voice-over instructions—and it requires you to manually enter household finance data. The on-screen-only documentation lacks a start-up guide. Still, Debt Analyzer is worth the money for those who want more than Quicken's straightforward approach.

—Yardena Arar

Debt Analyzer

PRO: Flexible; examines lots of scenarios; detailed reports.

CON: No get-started guide.

VALUE: Good alternative to Quicken's Debt Reduction feature.

Insight Software Solutions, Inc.
801/295-1890
http://www.wintools.com
Street price: $25

READER SERVICE NO. 767

Low-Effort, Low-Cost Encryption

SECURITY

YOU DON'T NEED a state secret to appreciate encryption—anything you'd like to keep from prying eyes will do. Two new inexpensive software packages allow you to protect sensitive data.

McAfee Associates' $49 **PC-Crypto 1.0** offers better security options, including two encryption formulas—40-bit or military-grade 160-bit, the most powerful available in a desktop product. You can e-mail files as ASCII attachments—which is helpful for sending e-mail to people who don't use Windows—or in self-extracting format.

Authentex Software's $60 **DataSafe** is not as full-featured and doesn't provide such high-grade encryption. However, it does have an appealing and intuitive interface: To encrypt files, just drop them into the little safe that's on screen. When you shut the safe and drag the handle to the locked position, you're prompted to create an eight-digit combination, which can be encrypted as a password. DataSafe files can be e-mailed as self-extracting attachments, but you can send them only to people running Windows 3.*x*, 95, or NT.

BETTER SAFE THAN SORRY? DataSafe looks cute but PC-Crypto is a better encryption choice.

PC-Crypto's power and versatility make it far more attractive—and by the time you read this, version 2.0 should be available. Its new features include drag-and-drop encryption of files and entire folders.

—Yardena Arar ▶

DataSafe

PRO: Drag-and-drop interface.

CON: Can't send e-mail to non-Windows users.

VALUE: We'd pass.

Authentex Software Corp.
888/665-8228
http://www.authentex.com/
Price: downloadable version $60

READER SERVICE NO. 769

PC-Crypto 1.0

PRO: Full-featured, inexpensive.

CON: Interface not perfect.

VALUE: Outstanding desktop tool.

McAfee Associates
800/332-9966
http://www.mcafee.com/
Street price: $49

READER SERVICE NO. 770

QUICK TAKES

Fast Hard Drive

Seagate's new Medalist Pro 6450 hard drive offers 6.4GB of storage, more than enough for huge applications and space-gobbling multimedia files. But gigantic storage capacity is only part of the story. With its 5400-rpm speed and 9.5-ms seek time, this IDE drive offers performance that's been available only with more expensive SCSI drives. Seagate says the 6450 transfers data at up to 16.6MB per second, fast enough for the most demanding multimedia applications, such as video editing, and a great match for Pentium MMX PCs. Pricing wasn't set at press time; Seagate expects a street price between $500 and $640. Seagate Technology; 408/438-6550; http://www.seagate.com.

READER SERVICE NO. 768

—Stan Miastkowski

WITH seven hours of battery life, the AcerNote Nuovo makes other portables suddenly seem not so portable.

The AcerNote™ Nuovo™ has a single battery that lasts for over seven hours, making it pretty much the only portable that truly stays portable. Besides offering the longest battery life of any notebook, the Nuovo also has a Pentium® processor with MMX™ technology and Acer's own Heuristic Power Management. So whenever you open a Nuovo to work on something, you might actually—believe it or not—be able to finish it. Wouldn't that be refreshing?*

MMX intel inside pentium processor

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Circle 188 on reader service card

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Net Access for Small Offices

CONNECTIVITY

IN A SMALL BUSINESS with a local area network, giving everyone Internet access and e-mail can be a genuine pain. You have to buy all sorts of hardware and software, then try to make it work—or pay for a consultant. Here's an alternative: Whistle Communications' $1995 **InterJet 100** puts everything you need in one plug-and-play package.

InterJet 100

PRO: Easy small-business Internet connectivity, e-mail.

CON: Only limited ISP support now.

VALUE: A good deal for many small offices.

Whistle Communications
415/577-7000
http://www.whistle.com
List price: $1995

READER SERVICE NO. 771

This device integrates a 75-MHz 486 PC, a 1GB hard drive, a 33.6-kbps modem, and even a backup power supply. Setting up my preproduction unit was easy: I just plugged in AC power, hooked up a telephone line, and connected it to the network (10Base-T twisted-pair only). The InterJet 100 will call an Internet service provider and set up your account.

The downside: The InterJet works with two ISPs, Netcomm and PSInet. If you don't have a local access number, you'll pay hefty connect charges. At press time Whistle Communications was campaigning to sign up ISPs.

Once you do a quick software installation on all the PCs on the LAN, everyone can browse the Web with Netscape Navigator and send internal and Internet e-mail using Netscape Mail. The InterJet can create an intranet with firewall protection.

Whistle says the InterJet can handle 25 to 30 heavy users and 50 to 75 occasional users. But the 33.6-kbps modem will slow down if everyone stays logged on. This doesn't happen in most offices—people connect briefly. But for more bandwidth, use an ISDN connection. The InterJet works with popular ISDN modems; an optional card connects it to a T1 line.

The InterJet 100 could save you time and money. It would be more expensive to start from scratch: You'd need to buy a PC to act as an e-mail and Web server (at least $2000), collect all the necessary software, set up the modem and ISDN line, then make it all work together. I tried this route—it took more than two weeks.

—Stan Miastkowski ▶

THE INTERJET 100: Internet access and e-mail for small offices.

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Model	CRT size/ Viewable	Dot Pitch	Max Resolution	Optimal Res/ Refresh	Plug & Play
V773	17"/15.8"	.026mm	1280x1024	1024x768/85Hz	Yes
V775	17"/16.0"	.026mm	1600x1280	1280x1024/79Hz	Yes

PC MAGAZINE EDITORS' CHOICE™
Optiquest V775
September 1996

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Circle 246 on reader service card

A Young UPStart: Save Your Files From Disasters

U P S

FIERCE WINDS THAT left 20,000 people without power ripped through my neighborhood recently, making me particularly eager to check out a shipping unit of SL Waber's new $249 **UPStart Network 550** uninterruptible power supply.

POWER RANGER: If power goes out, the UPStart saves files to your local PC, even if they're files from a network server.

I tried it on my Pentium PC, which is connected to a multiserver network.

The UPStart improves on traditional desktop UPS units: Its Windows 3.*x* and 95 Save and Restore software saves open files and shuts down the PC. If the network server loses power, the software saves files to your local PC. When power is restored, your applications and files automatically open.

The UPStart works well under ideal conditions. However, new documents that have not yet been named wreak havoc on the entire shutdown process, often preventing themselves from being saved. It's not a problem if you name your files promptly after creating them and save your work frequently. Since the UPS provides 15 to 30 minutes of backup power and on-screen alerts, you can save your new files before the shutdown process begins—if you're on hand.

The UPStart is easy to set up and configure. It has four receptacles for backup power and two additional outlets for other peripherals.

—David Schamus

SL Waber UPStart Network 550

PRO: Automatic file saves.

CON: Still must save work frequently to avoid kinks in shutdown.

VALUE: Competitively priced, plenty of backup power.

SL Waber

800/634-1485

http://www.waber.com/

Street price: $249

READER SERVICE NO. 777

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

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– PC WORLD, December, 1996 –

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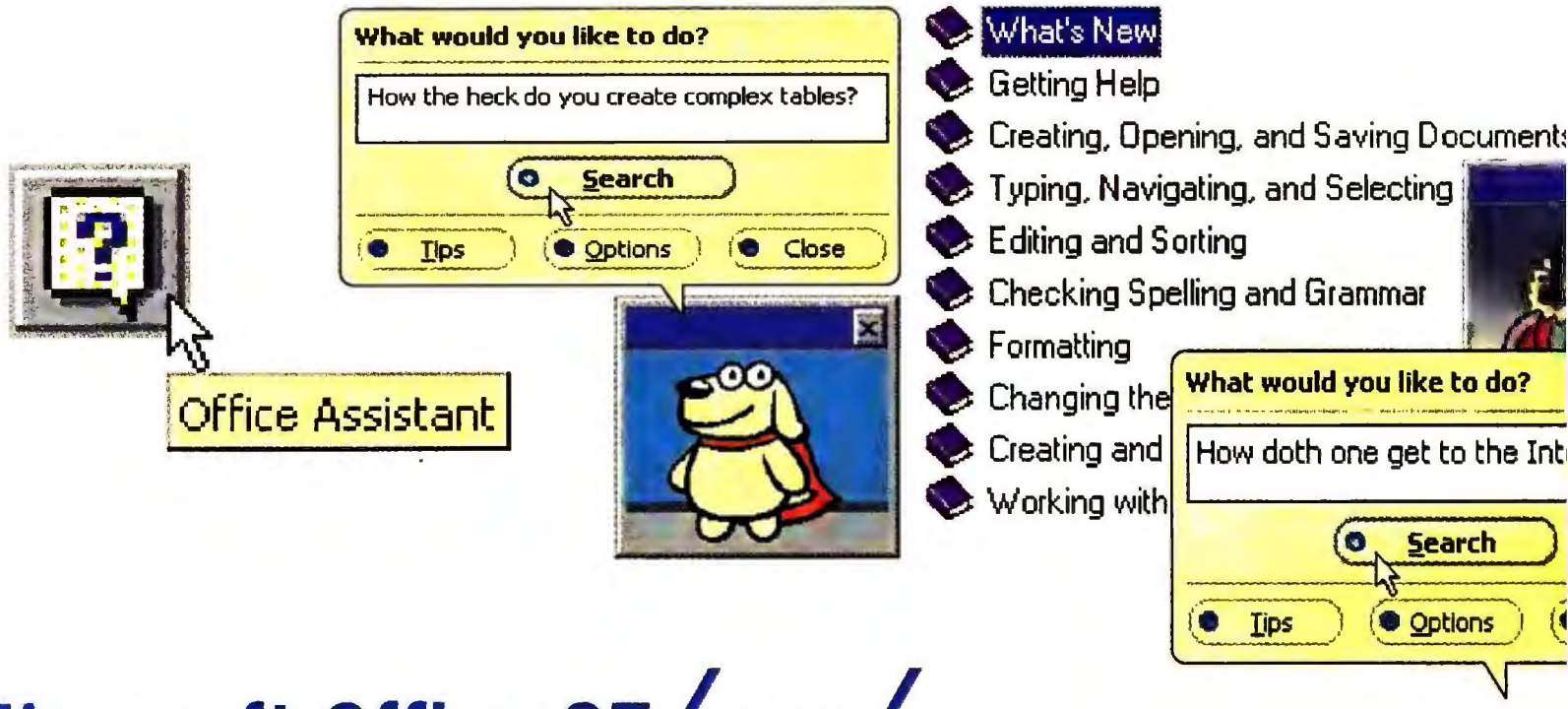

Microsoft Office 97/now/

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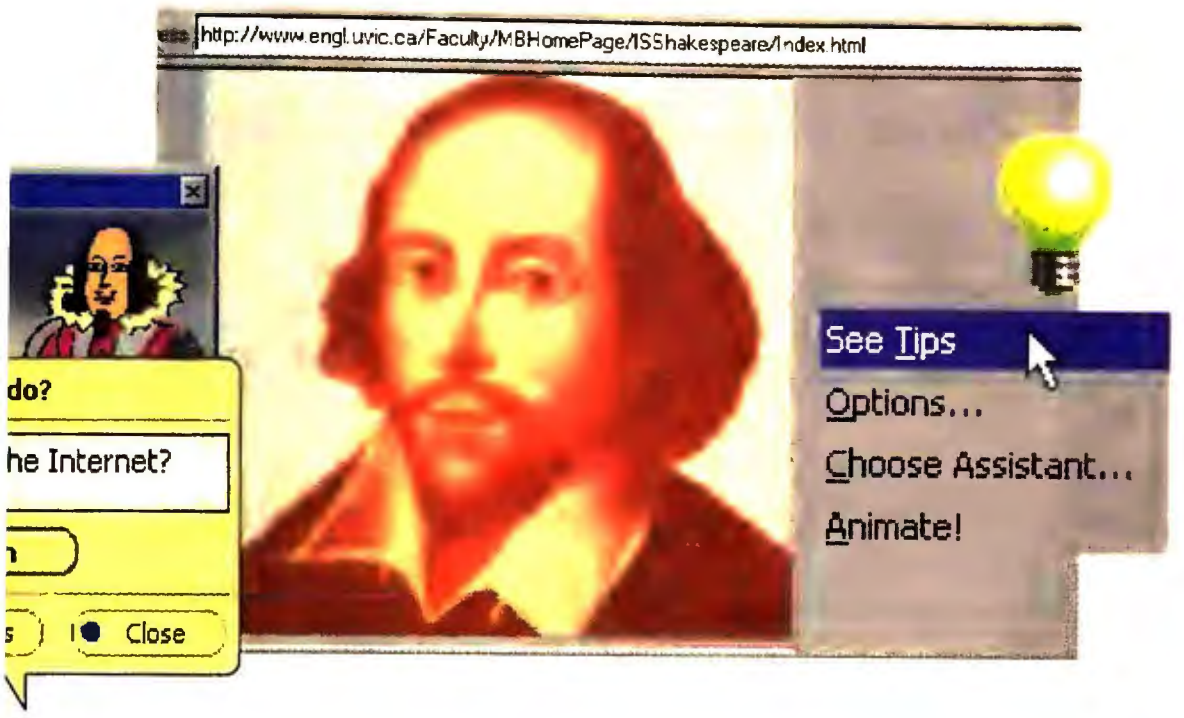

espeare, the little animated dog.

His name is Power Pup, and he's one of the Office Assistants, your personal guides to new Microsoft® Office 97. Office Assistants are designed to help you do things in fewer steps, with better results and less frustration. For instance, if Power Pup sees a shortcut to what you're doing, he'll suggest it. He'll walk you through tasks you need help completing. And you can ask him questions in plain English. There are nine Office Assistants, including the aforementioned bard and pup, a Hoverbot and a sarcastic, slightly bent paper clip. You can customize your helper to offer as much or as little help as you'd like—or you can turn him, her or it off. Microsoft Office 97 has lots of other intelligent improvements, like the overall webbiness, or the automatic correction of formula mistakes in Microsoft Excel. But what may prove invaluable to your mental well-being is that goofy-looking dog. To find out more about the little critters, visit our Web site.

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Free Stuff Online

BY DYLAN TWENEY

OKAY, I'LL ADMIT IT. I'm cheap. I read newspapers and magazines in waiting rooms instead of buying them at newsstands. I'll drive half a mile out of my way, past several garages, just so I can park for free on the street. As for cable TV, I'd rather watch what comes over the airwaves at no cost, thank you very much.

That's why I like surfing the Internet: Almost everything you find is free. And these days that means a lot more than just static Web pages. Software utilities and technical support, career advice and travel tips, business news and stock quotes—all can be had at no, or virtually no, cost. Another new wrinkle is free *services*. Now you can use the Internet to make phone calls, hold meetings, check your schedule, and a lot more (see "Ten Things You Can Do for Free on the Net").

As with everything else in life that's free, there's a catch: You have to know where to find the good stuff. But don't worry: I've done the work for you. I've scoured cyberspace for the best sources of free products, services, and information in three categories: computers, business, and fun.

They range from the useful (sites that offer little-known Windows time-savers) to the downright silly (a free screen saver of an artificial log burning in a fireplace). You'll find our picks for the best shareware libraries on the Net, and the best programs to download once you get there. You'll also find the top sites for graphics and fonts, e-mail and Web tools, business directories, government advice, general trivia, and much more.

All you have to do is visit the sites and download what you want. And you'd better act now, because later this year many of these things may no longer be free (see "Dialing for Digital Dollars").

Oh, and if you're reading this in some doctor's waiting room—leave the magazine behind for others to enjoy, okay? ▶

ILLUSTRATIONS BY RANDALL ENOS

The Best Free Computer Stuff ➤ 108

Shareware Shopping Malls ➤ 108
High-Tech Help ➤ 109
Free Internet Services ➤ 109
Get the Pictures ➤ 111
Dress Up Your Desktop ➤ 111
Fonts Fare Well ➤ 111

The Best Free Business Stuff ➤ 114

Business News ➤ 114
Uncle Sam Online ➤ 114
What a Trip ➤ 114
Career Guidance ➤ 119
You Can Look It Up ➤ 120

The Best Free Fun Stuff ➤ 120

The Best Free Computer Stuff

IT'S NO SURPRISE that some of the best free stuff to be had on the Web is software, services, and information for and about computers. You spent thousands getting the perfect system together—isn't it time it gave you a little something back?

SHAREWARE SHOPPING MALLS

HUNTING FOR THE BEST source of free (or nearly free) software? Your first stop should be PC World Online's shareware library (www.pcworld.com/software_lib), where you'll find a huge collection of the top downloads on the Net. If our site doesn't have what you're looking for, check out these other "shareware malls." Each offers huge quantities of software in an easy-to-search location. Remember, if you try out a shareware package and decide to keep using it, do the right thing: Send in the registration fee, usually under $50. It's the best way to ensure that the software will see future enhancements.

Shareware.com ➤ www.shareware.com
The first shareware library on the Web, Shareware.com is still one of the biggest and best places to find new software. Shareware.com is a "virtual" library—it serves as a catalog to dozens of huge file archives containing shareware programs, utilities, graphics, fonts, and more. But the downloadable files are actually stored in the archives themselves, not on Shareware.com's computers. That means the quality of service isn't guaranteed, and you may find yourself waiting a long time for downloads. If that happens, just pick another of the many archive sites listed for each file. Shareware.com provides sophisticated search tools, and lists estimated download times and (if available) descriptions of the files.

TUCOWS ➤ www.tucows.com
TUCOWS is short for The Ultimate Collection of Winsock Software, and the title pretty much sums it up: It's a large, well-organized, well-documented collection of Internet utilities for Windows 3.*x*, Windows 95, and the Macintosh. Its files are stored in various sites around the world (you pick one as soon as you hit the main page), so response times are almost always fast. Helpful, complete descriptions, and ratings (in cows, not stars) accompany each downloadable file.

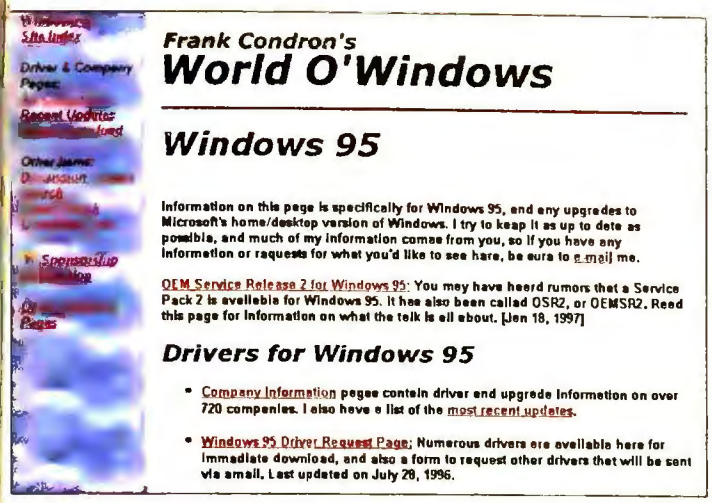
SEEN 'N' HERD: The Ultimate Collection of Winsock Software rates shareware with cows, not stars.

IBM File Finder ➤ CompuServe: go ibmff
CompuServe's many forums have rich libraries of downloadable files, including lots of freeware, shareware, and informational files packed with tips, bug fixes, and more. The problem is that these files are scattered across scores of forums. You can use CompuServe's IBM File Finder to search all the DOS, Windows 3.1, Windows 95, and Windows NT forums for files you're interested in.

Jumbo ➤ www.jumbo.com
This elephant-size archive indexes and organizes shareware files from a variety of public file libraries. To browse through the available files, click on a category, such as 'Business' or 'Internet & Intranet', then pick your operating system. In many cases there are hundreds of files per category, so you'll probably want to use the site's Search tool to zero in on what you want. One note of caution: Jumbo's Web pages are larded with graphics, and many files are listed without any description at all, so use it with care.

DON'T FORGET: Jumbo's archive of shareware and freeware files is truly elephantine.

Happy Puppy ➤ www.happypuppy.com
Why is this pooch so perky? Maybe it's all the shareware games he's been digging up. Happy Puppy has a huge, popular collection of downloadable games and entertainment software. And, as if that weren't enough, the site sponsors frequent contests and giveaways. There's also a substantial library of "cheats" and tricks for popular computer games, and plenty of info on how to set up and play games like Quake over the Internet.



WHY WAIT ON HOLD? World O'Windows offers drivers, tips, and more, without the hassle of a tech support call.

HIGH-TECH HELP

PSST! WANNA KNOW a secret? Your local computer gurus probably don't have all the answers. What separates them from the rest of us is that they know where to *find* the answers. The sites listed here are probably on their list of bookmarks. Visit them yourself, and you, too, can build a reputation as a techie.

Windows95.com

➤ **www.windows95.com**

Steve Jenkins maintains this collection of Windows 95 technical tips, shareware, and device drivers. The quality of information is high, and it's a good place to start your search when you're trying to solve a Windows 95 problem. Steve's list of favorite Windows 95 shareware is especially useful.

Microsoft's Knowledge Base

➤ **www.microsoft.com/kb**

If you're having problems with DOS, Windows, or any other Microsoft product, look for help at Microsoft's venerable Knowledge Base. This is the ultimate repository of technical information, bug fixes (though Microsoft doesn't call them that), and tips on a huge range of software. It has an easy-to-use search interface that lets you scan the entire database or browse by operating system and product. Many articles contain information you simply can't find anywhere else, which can save you hours of waiting on hold for tech support. And it's free! Does Bill know about this?

Frank Condron's World O' Windows

➤ **www.conitech.com/windows**

Frank's site, devoted to Windows 95 and Windows NT, is a rich source of updated drivers, news, and some great tips. Even if you've been using Windows for a while, the tips are bound to help you find shortcuts or solve a problem you didn't even know you had.

FREE INTERNET SERVICES

FREE WEB PAGES, e-mail, even vanity e-mail addresses—they all can be had on the Web. Here's where to find the best gratis Internet services.

My Place

➤ **America Online keyword: my place**

Finally, some good news for you AOL members. AOL's My Place offers 2MB of Web storage space for creating your own home page. In fact, if you have multiple screen names, each screen name gets its own 2MB—quite a deal. AOL also throws in a bunch of HTML publishing tools and instructions; better yet, the service's own Personal Publisher simplifies the process of creating your first home page with an easy-to-use wizard.

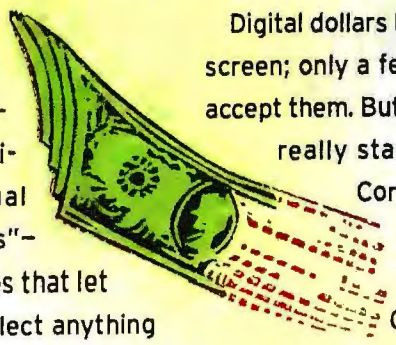
AOL'S PERSONAL PUBLISHER lets you point and click to create your home page for My Place.

Starmail.com ➤ **www.starmail.com**

Stuck with a dull, hard-to-remember e-mail address, like DT432091@vax2.bigcorp.com? Turn that into something a little more memorable with Starmail's ▶

Dialing for Digital Dollars

DO YOU LIKE GETTING all that cool, free stuff on the Net? Better enjoy the free ride while you can. We are entering the era of the *micro cash transaction*—where you'll be charged from a few pennies to a few dollars for stuff you download.



Granted, there is always likely to be useful, free stuff on the Internet. But a few online transaction companies are now experimenting with "e-cash," "virtual accounts," and "Internet wallets"—electronic commerce technologies that let merchants on the Web easily collect anything from small change to hundreds of dollars for items purchased by you and me. Using digital dough, consumers can go online and conduct micro cash transactions for newspaper articles, business research reports, clip art, software, subscriptions to online magazines, and more.

CyberCash (www.cybercash.com/) and DigiCash (digicash.com) are the leading firms bringing such transactions to the Net. CyberCash's CyberCoins software lets consumers use their PCs to transfer funds from bank or credit card accounts into an electronic purse. DigiCash's Ecash differs in that your bank converts your money into digital cash, which is stored on your hard drive. The amount you have in the account is updated automatically whenever you make an electronic purchase.

Digital dollars barely make a blip on the radar screen; only a few hundred retailers currently accept them. But this year the cyberdough may really start to rise. Digital Equipment Corporation is experimenting with a technology called Millicent (a form of digital check), and Carnegie Mellon has developed an electronic monetary system called NetBill.

In addition, 1997 should be the year that vendors, credit card companies, cyber-account managers, Microsoft, and Netscape all agree to support the Secure Electronic Transactions nonproprietary protocol. This should clear up many issues of security and privacy and make it easier to offer online goods.

But that's just the beginning. The next big task: Figuring out how to get Net surfers—who are used to enjoying the free ride—to spend money online. —*James Oliver Cury*

vanity e-mail address service. Starmail has dozens of domain names to choose from, like bruce-lee.com or the-flintstones.com. (I chose dylan@bob-dylan.com—why not?) Any e-mail sent to your vanity address will be forwarded to your real e-mail account automatically.

Anonymizer.com

➤ **www.anonymizer.com**

Every Web site you visit collects information about you—more than you may want them to know. Skeptical? Check out Anonymizer.com's "Don't Believe Us?" page at www.anonymizer.com/cgi-bin/snoop.pl, which will tell you what browser you're using, what kind of computer and operating system you're running, and even your company (or ISP) and geographic location. (Just be prepared to wait—Anonymizer can take up to a minute to analyze your browser data.) If all that snooping bothers you, surf the Web via Anonymizer, which blocks all that information and preserves your anonymity. On the downside, Anonymizer adds its toolbars to every Web page you view, and slows down your surfing somewhat.

PRIVATE MATTERS: Anonymizer.com lets you surf the Web without revealing your identity.

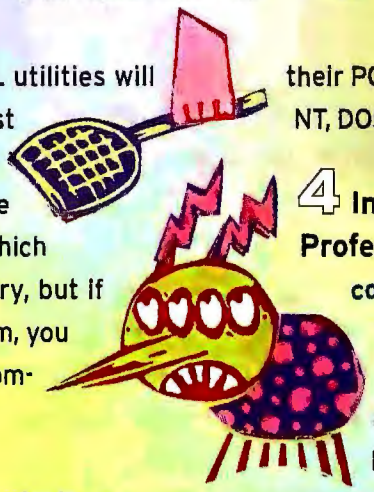
Pegasus Mail

➤ **www.pegasus.usa.com**

This sophisticated e-mail program offers address books and mailing lists, automatic message filtering, the ability to connect to multiple servers, support for a wide variety of attachment types—and guess what? It's free. Pegasus Mail's only drawbacks are its slightly quirky interface and the time it will take you to learn all those features. Available for DOS, Windows 3.*x*, and Windows 95.

Shareware and Freeware The Top 10 Must-Have Utilities

THESE TEN ESSENTIAL utilities will help you make the most of your online time. Some are truly free, while others are shareware—which means they're free to try, but if you continue to use them, you must pay the (usually nominal) registration fee.



1 WinZip 6.2 ➤ www.winzip.com

A key part of any online user's tool kit, WinZip compresses and decompresses ZIP files and handles files encoded for transmission via e-mail. For Windows 3.1, 95, or NT; download size 630K (about 4 minutes at 28.8 kbps); $29 fee.

2 Drag and View

➤ **www.canyonsw.com**

Drag and View lets you quickly look at many types of documents and graphics files by dragging the files onto its icon. Windows 3.1, 95, or NT; 900K (5 minutes); $35 fee.

3 McAfee VirusScan

➤ **www.mcafee.com**

An essential utility for those who download files from the Internet and don't want to risk a nasty infection—or those who need to cure their PCs of one in a hurry. Windows 3.1, 95, NT, DOS, or OS/2; 1MB (6 minutes); $65 fee.

4 Information Transfer Professional 1.1.2 ➤ www.sabasoft.com/info/xferpro.htm

This handy e-mail utility makes attaching and detaching binary files a breeze. It handles UUencode, MIME, BinHex, and other encoding formats. Windows 3.1, 95, or NT; 140K (1 minute); $14 fee.

5 Pretty Good Privacy 2.6.2

➤ **web.mit.edu/network/pgp.html**

If you have secrets you need to keep, the best way to secure them is with a strong encryption program. PGP sets the standard. (Commercial Windows versions of e-mail and Web encryption software are available from Pretty Good Privacy at www.pgp.com.) DOS or UNIX; 275K (2 minutes); free.

6 Adobe Acrobat Reader 3.0

➤ **www.adobe.com**

Adobe's Portable Document Format is one of the most popular ways to transmit, read, and print formatted documents electronically. Windows 3.1, 95, NT, DOS, OS/2, or UNIX; 4MB (24 minutes); free.

7 Paint Shop Pro 4.10

➤ **www.jasc.com**

This popular, powerful image-editing program boasts a wide range of features. It's even compatible with Adobe Photoshop plug-ins. Windows 95 or NT 4.0; 2.8MB (17 minutes); $69 fee.

8 PassKeeper

➤ **www.isys.hu/staff/brad/passkeeper.html**

Once you've registered at a few Web sites, it can get hard to keep track of all your user names and passwords. PassKeeper stores them for you in an encrypted database. Windows 3.1 or 95; 86K (1 minute); free.

9 RAS+ ➤ www.lambsoftware.com

If you use Windows 95's Dial-Up Networking tool to connect to the Net, RAS+ will make your life easier. It handles multiple Internet accounts, tracks your online time, and more. Windows 95; 1MB (6 minutes); $30 fee.

10 Microsoft Powertoys

➤ **www.microsoft.com/windows/software/powertoy.htm**

This bundle of tweaks and enhancements contains some goodies Microsoft left out of Windows 95. It's a must for any user. Windows 95; 275K (2 minutes); free. —*D. T.*

HomeSite 1.2

➤ **www.dexnet.com/homesite.html**

This powerful HTML editor is easy to use, it's fast, and it doesn't take up much space on your hard drive. It's best for Web authors who are comfortable with HTML, since it doesn't shelter you from the code—it simply makes it easier for you to insert tags, build tables, and assemble pages. HomeSite 2.0 is shareware, but version 1.2 is free and offers plenty of power for most users.

FreeLoader ➤ www.freeloader.com

Many tools let you download Web sites for later browsing—but as its name implies, FreeLoader doesn't cost a thing. FreeLoader comes with preconfigured "channels" of content (including news, weather, and business information), but you can customize it to your heart's content. You access FreeLoader's controls through a toolbar it tacks onto the bottom of your Web browser. However, be forewarned: FreeLoader can use up a significant amount of system resources, slowing down your online Web browsing.

GET THE PICTURES

IF IT'S ART you want, go to a museum—or cruise these sites for a quick fix of royalty-free images that you can put on your Web page, in a newsletter, or in the next presentation to the big boss.

Andy's Art Attack

➤ **www.andyart.com**

Here are dozens of useful and entertaining backgrounds, bullets, buttons, and animated GIFs for use on your Web pages. Andy just seems to enjoy giving, and we're all the better for it, because the art he's put up for grabs will add panache to anyone's Web site. One caveat: As Andy himself puts it, "I'm a graphic designer so this site contains heavy graphics, so if you're impatient...take a hike!"

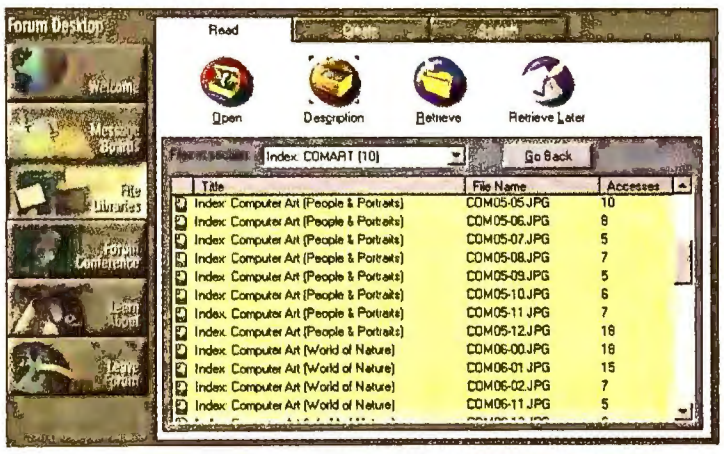
The Design Shoppe ➤ www.softworldnet.com/theshop/theshop.html

Looking to give your Web pages a touch of class? Check out The Design Shoppe's collection of distinctive bullets, dividers, arrows, icons, and backgrounds, courtesy of Fat Cat Computer Works in Victoria, British Columbia. They're all small GIF images—perfect for use in Web pages—and have a more polished look than most free clip art collections you'll find.

Multimedia Zone

➤ **America Online keyword: mmzone**

This is the one-stop source for multimedia junkies of all descriptions. Whether you're looking for a good MPEG player and some movies to play on it, a graphics file format conversion tool, or cool .wav files for your custom desktop theme, this is the place. The multimedia files are free; the software libraries contain freeware as well as shareware.



THE PERFECT PICTURE is out there—and odds are you'll find it in one of CompuServe's many graphics forums.

Graphics Forums

➤ **CompuServe: go graphics**

From high art to low wallpaper, you can find it all here. CompuServe's venerable collection of graphics forums continues to be one of the largest single sources of pictures, image-editing software, and graphics know-how in the online world. Don't miss it if you're serious about computer images.

DRESS UP YOUR DESKTOP

YOU'RE IN CONTROL—that's why they call it a *personal* computer. From downloadable desktop themes to screen savers, these sites provide the tools you need to make your computing environment as idiosyncratic as you are.

AJ's Desktop Themes

➤ **www.desktopthemes.com**

If you've got Windows 95 and the Windows 95 Plus Pack, you know that you can select coordinated sets of desktop wallpaper, sounds, and icons called *themes*. But the Plus Pack comes with only a few of them. AJ's site fixes that, with a well-organized collection containing hundreds of fun Windows 95 desktop themes culled from TV shows, movies, video games, and more. Whether you're a fan of Japanese animation, *The X-Files*, or Sandra Bullock, you'll find themes here to help you make your desktop a shrine to your favorite idol. Most themes are ZIP files between 300K and 800K in size.

Windows 95 and Mac Joke Wallpaper

➤ **www.jokewallpaper.com**

This site features humorous desktop "wallpaper" as well as start-up and shutdown screens for your Windows 95 and Windows NT systems. The images poke fun at everything from the Dalai Lama to our friends in Redmond—such as a shutdown screen that says, 'Please wait while your computer electronically transfers the balance of your checking account to Microsoft'.

Duraflame Log and Screen Saver ➤ www.duraflame.com

Want a free log? Fill out Duraflame's questionnaire, and the company will send you a coupon good for one. You can also get a screen saver showing a cozy hearth and a Duraflame log merrily burning away. Use this screen saver at work on a chilly winter's afternoon and be the envy of your coworkers.

THE CAPTAIN'S LOG? No, it's just another toasty screen saver, courtesy of Duraflame.

FONTS FARE WELL

LOOKING FOR A FONT that's just your type? Free fonts abound on the Net—from real masterpieces of typography to those more suitable for ransom notes. These sites will lead you to some of the best. ▶

Astigmatic One Eye

➤ www.comptechdev.com/cavop/aoe

This commercial font foundry offers several intriguing freeware fonts. The typeface designs found here have an edgy and techno look. Used judiciously, they'll give your documents and Web pages a sophisticated, cutting-edge appearance. You also might get some design ideas from the site itself, which makes excellent use of these fonts, dressing them up with special effects and colors.

Ray Larabie's Freeware Typeface of the Week

➤ www.passport.ca/~rlarable/freefont.htm

Every week, type designer Ray Larabie designs an original font and posts it on his Web site for all to download. If you're looking for a typeface that will help make your pages stand out—but not too far out—Larabie's fonts might be just the ticket. They're unusual, without being too grungy or radical. And you can't beat the price. Thanks, Ray!

Chankstore Fonts

➤ www.bitstream.net/chankstore/

Chank Diesel is one whacked-out font designer. His scribbly, handwritten fonts have shown up everywhere, including ads for McDonald's and IBM. Here Chank gives away many of his creations, some of which are inspired by the scribblings of his friends. Note: If you're easily offended, you may want to pass—Chank's fonts and online ramblings won't meet everyone's standards of decorum. ▶

Shareware and Freeware The Top 10 Unknown Utilities

TRUST US: There are lots of great programs out there in cyberspace—so many, in fact, that many of the best ones get lost in the crowd. Here are our picks of the top 10 lesser-known programs, available for free or for a few bucks. Give them a try—and pass the word.

1 ViruSafe Web

➤ www.eliashim.com/4home.html

If you plan on downloading shareware from the Net, start with EliaShim's ViruSafe Web, an antivirus plug-in for Web browsers. It automatically scans files for viruses—and can detect and remove infected files—before saving them to your hard drive. For Windows 3.*x*, 95, or DOS; download size 953K (about 5 minutes at 28.8 kbps); free.

2 Jackhammer

➤ www.sausage.com/jackhammer.htm

This persistent productivity tool will help you access sites that are constantly busy. Just enter the site's URL and select a default browser, and Jackhammer will pound away at the site until you get in. The program can also initiate downloads and notify you when the download is complete. Windows 95; 2MB (11 minutes); $25 fee.

3 File-Ex ➤ www.cottonwoodsw.com

Why climb directory trees when you don't have to? This nifty utility adds Recent and Favorites lists to Windows' Open and Save dialog boxes, so you can find files in a flash. Win 3.1 or 95; 336K (4 minutes); $29.95 fee.

4 Internet Text Translator

➤ members.aol.com:80/vbexpressn/index.htm

Looking for a Windows translator to degarble e-mail, attachments, and Mac documents? Look no further: Internet Text Translator converts UNIX or Mac text files to Windows format and UUencoded text files back to binary format, and vice versa. Windows 3.1 or 95; 1.5MB (8 minutes); $15 fee.

5 Almanac ➤ www.impactsoft.com/almanac/almanac.html

With its support for over 50 time zones, Almanac is an ideal personal information manager—including calendar, appointment scheduler, address book, to-do list manager, notepad—for international business travelers. Windows 3.*x*, 95, or NT; 574K (3 minutes); $39.95 fee.

6 WinWeather ➤ www.iqsnet.com/iqs

Before you head off on that trip, check out the latest weather conditions and ski reports via satellite images and maps. WinWeather goes onto the Net to bring you hourly updates for major U.S. cities and soon, the world. Windows 3.1, 95, or NT; 315K (1.5 minutes); $19.95 fee.

7 Cool Edit 96

➤ www.syntrillium.com/cool96.htm

Manipulate sound to your ear's content with this robust waveform editor. The utility includes an array of noise-altering effects such as Echo, Stretch, and more. Windows 95 or NT; 2MB (11 minutes); $50 fee.

8 Numerology Star Reader

➤ www2.pitnet.net/numer/numer.html

Put down that phone! With Numerology Star Reader, you don't need the Psychic Friends Network. This program can unlock your past and future with daily numerological and astrological readings, as well as dream and name interpretations. Windows 95 or NT; 662K (4 minutes); $10 fee.

9 NetMon

➤ www.windows95.com/apps/dialup.html?NetMon#first_hit

Curious what your modem's doing while you're online? Find out with NetMon, a freeware utility that displays the rate of data received and transmitted over your Internet connection. The graph is updated every second and the average throughput is calculated over a 5-minute interval. Windows 95; 149K (1 minute); free.

10 Let Me See

➤ www.pcworld.com/resources/current_issue/files/aug96.html

Tired of squinting at tiny Windows 95 dialog boxes? Open your eyes to Let Me See, a cool utility that lets you increase the size of Windows 95's file dialog boxes. They can be opened in List or Details view, sorted by name, size, file type, or date modified. Windows 95; 75K (less than 1 minute); $5 fee.

—Julie Campagna and Steve Bass

$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.)

You've just been bombarded by a ton of e-mail. One from your boss. A few jokes from Bob in accounting. And the usual batch from frazzled clients. So what's the best way to handle this e-mail avalanche? Eudora Pro™ 3.0.

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.

To find out more, just call 1-800-2-EUDORA, ext. 27111. Or send us e-mail at eudora-salespcw5@eudora.com. Or visit our Web site at www.eudora.com/pcw5 to download Eudora Pro 3.0 and use it FREE for 30 days.

EUDORA

FREE 30-DAY TRIAL!

DETAILS AT OUR WEB SITE: www.eudora.com/pcw5

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Circle 193 on reader service card

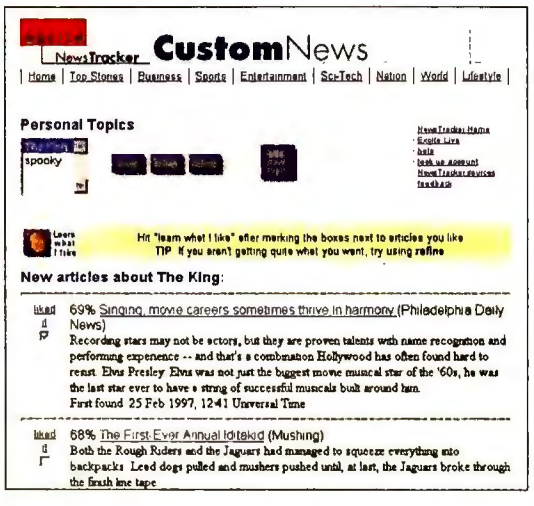
The Best Free Business Stuff

LOOKING TO GAIN an edge in business? Take a little trip to these sites, featuring career advice, travel planning, and the latest news from Wall Street.

BUSINESS NEWS

TO STAY ON TOP of the competition, you've got to stay in the know. That's where the Web comes in—putting volumes of information at your fingertips.

Quote.com ➤ www.quote.com
Quote.com offers a surprising amount of information at no charge. All you have to do is register to get access to time-delayed stock quotes, histories, graphs, news headlines, and market data.



ALL THE NEWS that fits: NewsTracker lets you create your own news-clipping service.

PR Newswire ➤ www.prnewswire.com
Wondering what your competitors are up to? Stop by PR Newswire and see if they've issued any press releases. It's also a good place to visit if you want to find out what's happening in a particular market.

NewsTracker ➤ nt.excite.com
Excite's NewsTracker is like a state-of-the-art clipping service. Enter a handful of keywords; NewsTracker will search the Internet for corresponding news stories and continually update your personal topic page with headlines and summaries. Many stories are represented by articles from a variety of newspapers and wire services, giving you access to several points of view.

UNCLE SAM ONLINE

YOU'RE PAYING FOR IT already, so you might as well take advantage of the information the government generates. These sites will help you find it.

FedWorld Information Network
➤ www.fedworld.gov
This massive site provides links to Web sites for hundreds of government agencies. Alas, the search function is hard to use and doesn't index the contents of linked sites. Still, this is the best place to start if you're seeking info from the Feds.

U.S. Business Advisor
➤ www.business.gov
The U.S. Business Advisor provides businesspeople with answers to questions about federal law. Whether you're curious about Social Security or OSHA guidelines, come here for the lowdown, government-style. A great search engine lets you scour the full text of Web pages across hundreds of government sites.

Matthew Lesko's Information USA
➤ www.lesko.com
Lesko is the eccentric, hyperactive author of *Lesko's Info-Power*, a huge reference book that describes freebies you can get from federal, state, and local governments. Skip his home page (mostly a catalog of his books) but don't miss the Find an Expert search—a database of experts (yes, real people) in a variety of agencies.

WHAT A TRIP

IF GOD WANTED you to set up your own business trips, you'd have been born a travel agent. Take the easy route out with these free online resources.

PLANE SPEAKING: TheTrip.com lets you plan every detail of a business trip—including where to park at the airport.

TheTrip.com ➤ www.thetrip.com
TheTrip.com provides all the services you need to set up a trip. From booking flights and getting to the airport to making car and hotel reservations, TheTrip.com lets you organize it all through its simple Web interface. Your requests are sent to travel agents, who book the reservations and mail you the tickets. ▶

Breakthrough

In Keyboard Monitor Switches

Multi Platform & On-Screen Display

See Us at:
COMDEX Spring
June 2-5
Atlanta, Georgia
Booth #N3049
AND at
PC EXPO • June 17-19
New York, NY
Booth #2221

BREAKTHROUGH the clutter of multiple keyboards, monitors, and mice with this latest **INNOVATION** from Rose. This switch has every feature you asked for:

Switches several servers or computers to a single monitor, keyboard, and mouse

Supports any mix of PC, Apple, Sun, RS 6000, HP 700 series, DEC Alpha, SGI, or other computers from any keyboard or mouse

Front panel has keypad for easy selection of computers and configuration

Front panel display shows computers name and other information

Command to switch can come from your keyboard, front panel, or RS232 port

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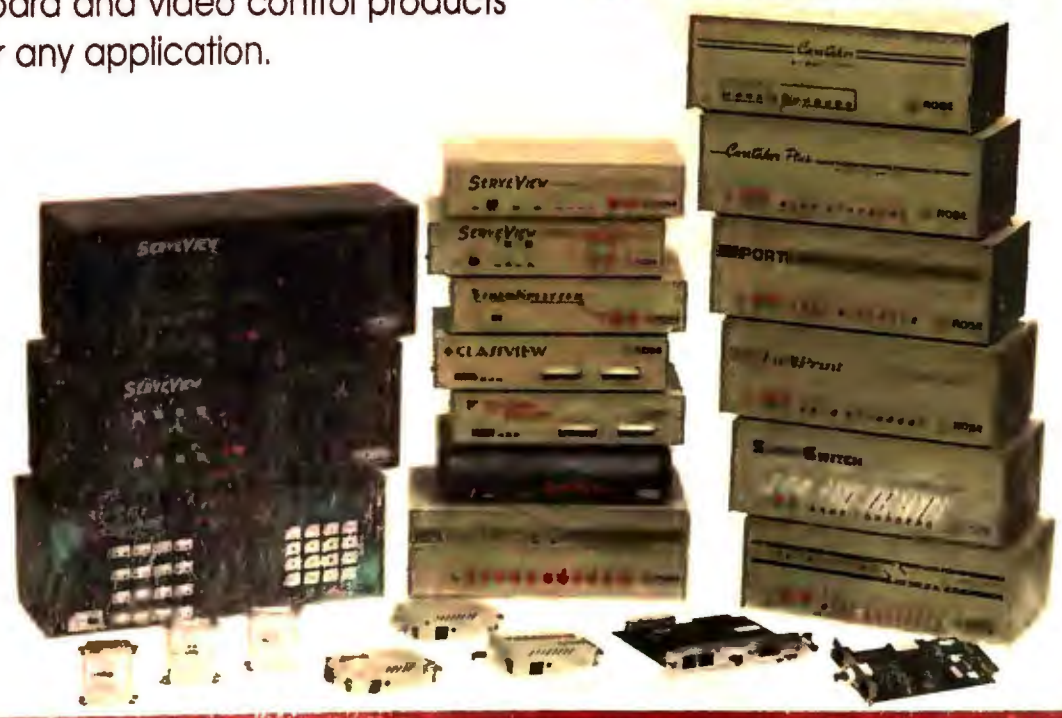

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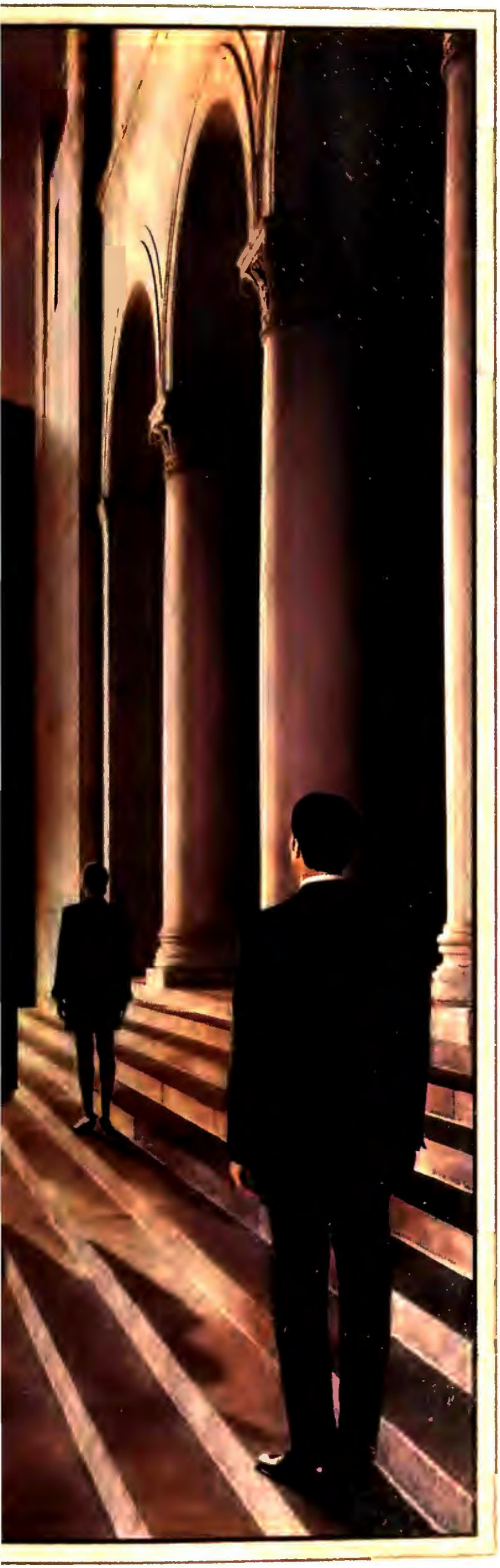

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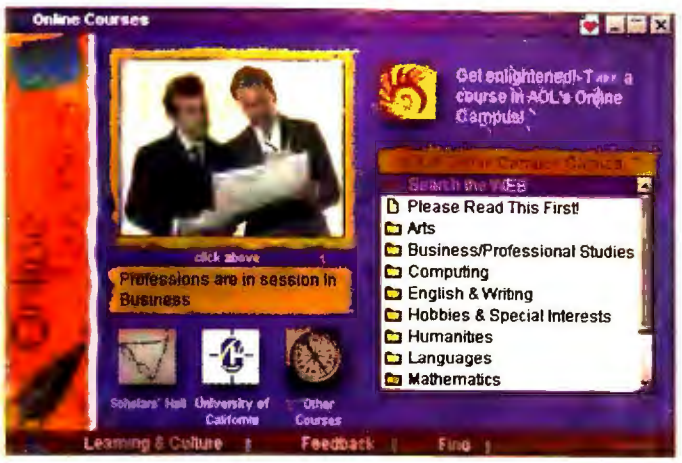

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Microsoft Expedia

➤ expedia.msn.com

Part travelogue, part travel agent, Microsoft's stylish Expedia site is an essential stop for serious travelers (even the armchair variety). Locations from Aruba to Zaire are covered in lavish and practical detail. Expedia's Travel Agent lets you book flights and hotel reservations, while the Fare Watcher can send you a weekly e-mail message listing the lowest fares to your favorite destinations.

CAREER GUIDANCE

THE NET IS an unbeatable resource for finding a job. Here are three of the best sites for jobs listings, résumés, career advice, and more.

E-Span ➤ www.espan.com

E-Span offers career advice and resources tailored to all sorts of professionals. It's a great place to post your résumé, but it's also worth stopping by E-Span's Career Companion for insights into how you might do better at your current job.

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Ten Things You Can Do for Free on the Net

THE WEB'S NOT JUST for surfing anymore. There are lots of free services available, too. Here are ten of the best.

1 Phone home ➤ www.vocaltec.com

Internet telephony software lets you use the Net to call anywhere in the world—without putting a dime in Ma Bell's purse. The catch? The party you're calling must have compatible software and be logged on when you call. Download a free seven-day trial version of Internet Phone from VocalTec's Web site.

• Internet Phone Release 4 $49.95; VocalTec; 800/843-2289, www.vocaltec.com

READER SERVICE NO. 717

2 Send a fax ➤ www.tpc.int/

You can send a fax at no cost, just by filling out a Web page form. Stop by the Web site of The Phone Company (a private enterprise) and check out its Remote Printing Service. Faxes usually go out within a few hours.

3 Check your e-mail

➤ netaddress.usa.net/

Net@ddress gives you free e-mail via your browser. And unlike many free e-mail services, it supports folders, rules for filtering mail, forwarding, and even attachments.

4 Take a meeting

➤ www.microsoft.com/netmeeting

With NetMeeting 2.0, you can meet with people anywhere in the world via video, audio, or text-based chat. You'll need a video camera to do videoconferencing, but the NetMeeting software is free.

5 Talk in private ➤ www.talk.com

When even a whisper is too public, meet your party in Talk.com, HotWired's free chat service, and let your fingers do the talking.

6 Remind yourself

➤ www.cvp.com/freemind

Have trouble remembering important dates (like your boss's birthday)? Send yourself a nudge with FreeMinder. Just fill in a form with a date, e-mail address, and the text of your message. At 12:30 a.m. on the date you specify, the service sends you a reminder.

7 Check your schedule

➤ calendar.stwing.upenn.edu/

Remind U-Mail helps you manage your busy schedule. You can add meetings and even have the service send you e-mail when an important meeting is coming up. Best of all, you can access it using a Web browser—so you can check your calendar from anywhere.

8 Promote yourself

➤ online-biz.com/promote/

Want to publicize your home page? OnLine's WebPromote links to 600-plus free services to help get the word out about your site.

9 Track your contacts

➤ www.planetall.com

This innovative service really comes in handy if your contacts also use it. PlanetAll updates your address book automatically when contacts change their addresses.

10 Upgrade your software

➤ www.cybermedia.com

CyberMedia's Oil Change can keep your system running smoothly. Oil Change scans your PC's software, then downloads the latest upgrades, patches, or bug fixes from company Web sites. A free 2MB demo updates up to four applications.

• Oil Change $39.95 per year; CyberMedia; 800/721-7824, www.cybermedia.com

READER SERVICE NO. 718

—*D. T.*

and by participating in AOL's message boards. Most courses cost about $50, but some of them are free.

Tripod ➤ www.tripod.com

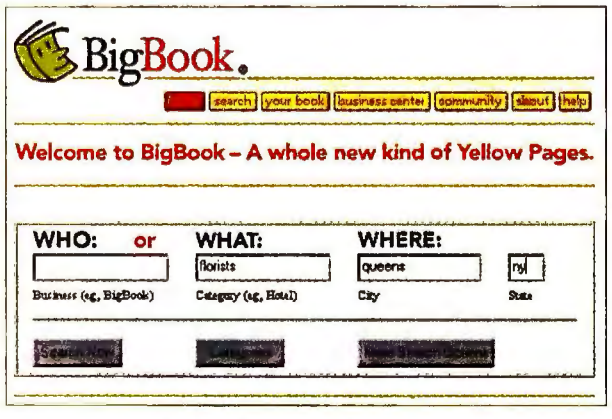
Aimed at recent college grads, Tripod is a one-stop shop for information on work and money. Its relentlessly casual attitude can seem forced, but there's often valuable info in the articles here. You'll get a free Web page of your own if you register, plus a handy résumé builder and links to sites where you can post your finished product.

YOU CAN LOOK IT UP

NEED TO FIND a phone number in a distant city? Don't call directory assistance, dial one of these directories on the Web.

BigBook ➤ www.bigbook.com

This Yellow Pages–like service couldn't be simpler to use. Just enter the name of a business, followed by the city and state. BigBook returns a list of matching businesses and will even plot them on a map.



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Four11 Directory Services

➤ www.four11.com

If you're looking for a person, not a business, dial Four11 on the Net. Enter as much as you can about the person's name and location, and Four11 gives you e-mail addresses, phone numbers, and even mailing addresses.

WhoWhere ➤ www.whowhere.com

WhoWhere is an Internet directory with a twist. Besides finding e-mail addresses, you can search WhoWhere's database by a person's hobbies, college, and languages spoken. WhoWhere also lets you search for companies, toll-free numbers, and even SEC filings.

The Best Free Fun Stuff

LIFE'S NOT ALL COMPUTERS and work, though sometimes it seems that way. From online games to free giveaways, these sites offer fun things to do after hours—or when the boss isn't looking.

BeZerk ➤ www.bezerk.com

Berkeley Systems, creators of the popular You Don't Know Jack computer trivia game, sponsors this online gaming site. Currently, it's home to an interactive "You Don't Know Jack" contest—and other online games are promised soon. BeZerk offers daily $100 prizes, plus a monthly grand prize. Good luck!

Christian Science Monitor Interactive Crossword

➤ www.csmonitor.com/cgi-bin/crossword/crossword.pl

The Christian Science Monitor's interactive crossword puzzle makes clever use of Web page forms. You select clues and submit your answers, and your answers will be posted in the crossword on the page. Way cool—and completely free.

New York Times Trivia

➤ www.nytimes.com/diversions/trivia

The New York Times sponsors this biweekly trivia contest on its Web site. There are no prizes, but it's fun to play. Check boxes to select your answers; when you're finished, you get a score. The answers even give you a little contextual information about the topic quizzed.

Free Offer Store

➤ Prodigy: jump free offer store

Although it still relies on Prodigy's chunky, old-style graphics, the Free Offer Store is packed with up-to-date freebies: catalogs, services, and special promotions from various companies that you can order at no charge (although sometimes you'll have to pay postage).

alt.consumers.free-stuff Home Page

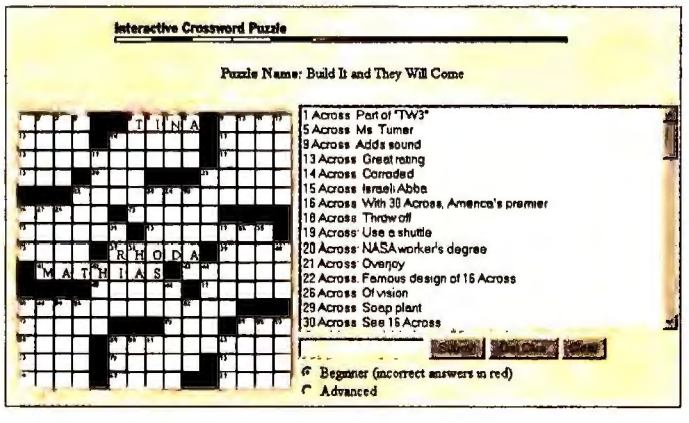
➤ www.icv.net/cgi-bin/free.cgi?top

This site offers an extensive, constantly updated array of freebies, giveaway offers, contests, marketing promotions, and other free things. An easy-to-use form lets you search for what you want, or just browse by category. The Duraflame log offer is here, as well as complimentary Pepto-Bismol, a free video on blue-green algae, and work-safety posters.

The FreeShop

➤ America Online keyword: freeshop, www.freeshop.com

The FreeShop, on AOL and on the Web, is a clearinghouse for giveaways, contests, and promotions from a variety of merchants. Most items are free or nearly free, including posters, audio CDs, books, software demos, and, of course, catalogs.



GET A CLUE, then type the answer to solve the Christian Science Monitor's interactive crossword puzzle.

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Find files from this article at www.pcworld.com/software_lib.

Dylan Tweney (dft@pobox.com) is a senior editor for InfoWorld. *Steve Bass is a contributing editor and Julie Campagna an editorial researcher for* PC World. *James Oliver Cury is a senior associate editor for* The Web *magazine.* ■

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NETSCAPE

The Great Communicator?

Netscape's latest browser is a must-upgrade. But is Communicator's new desktop suite enough to stop the Microsoft juggernaut?

NETSCAPE'S Communicator reminds us of Irving Stone's biography of Michelangelo, *The Agony and the Ecstasy*. The reason for the ecstasy is simple: The latest version of Netscape's browser, communication, and collaboration software is just plain terrific. It may not be David, but as software goes, Communicator is a masterpiece compared to its predecessor, Navigator 3.*x*. The agony? Probably nothing you need to worry about. Let's just say that Netscape may have to do some rethinking if it expects you to look beyond its browser and e-mail applications and buy into its groupware strategy.

For this article, we conducted a hands-on evaluation of the second preview release of Communicator Standard Edition. (Note: International Data Group, the parent company of *PC World*, has a minority interest in Netscape Communications.) The $59 Communicator package includes five main components, final versions of which should be available for downloading from Netscape's Web site (http://www.netscape.com/comprod/products/communicator) by the time you read this. Corel has also announced that it will include Communicator in Corel 8.

There's the Navigator browser; Messenger, the e-mail program; Collabra, a workgroup collabo- ▶

BY YAEL LI-RON

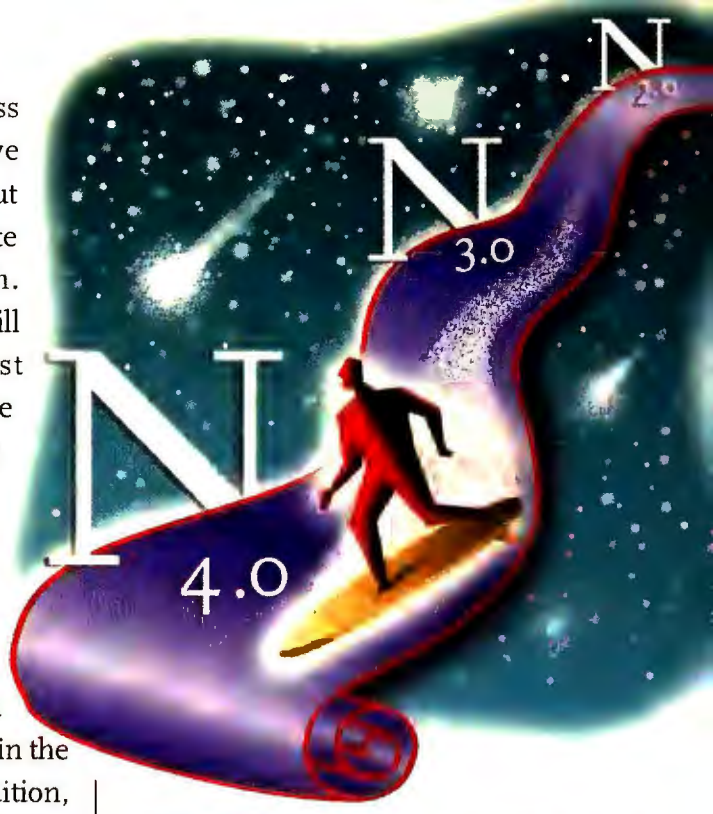
ILLUSTRATIONS BY JOHN BLECK

ration and discussion tool; Composer, an HTML editor for creating e-mail and Web pages; and Conference, with a Net phone, whiteboard, text chat utility, and more. We looked at the components, separately and combined, and examined the glue that holds them together—a common user interface and the ability to access each component from within the others.

We also saw a demo of an early version of Netscape's Constellation, a radically different desktop shell that's supposed to tie together all the Communicator components more closely and add pushed Web content (see "Constellation: Out of This World, or Lost in Space?"). It's too early to tell what Constellation will look like when it's completed (Netscape expects to ship it this fall), but the company is hoping its all-in-one Web-centric desktop will win over more users than will its nemesis, Internet Explorer 4.0.

Next month we'll preview a beta of IE 4.0, which wasn't ready in time for this article. Based on a demo of a pre-beta version we saw at press time, IE 4.0 looks like it will have many impressive improvements, but its features probably will be in a state of flux for at least another month. Microsoft is the first to admit it's still picking over Communicator's best new ideas for inclusion in IE 4.0 (see "From Super Browser to Operating System: IE 4.0 Plans to Do It All"). According to Microsoft, you'll be able to download a finished version by midyear.

If you're planning to deploy Communicator in your organization as a groupware tool, you'll need to invest in the $79 Communicator Professional Edition, which Netscape says will ship this spring—a little later than the standard edition. The professional edition, which we did not evaluate, offers everything found in the standard edition, plus three new tools: Calendar, a workgroup scheduling application; AutoAdmin IS, an administration tool; and Host on Demand, a 3270 host emulation program.



As we went to press, Netscape announced plans for its next generation of client/server software suites, called Mercury and Apollo. With them, the company expects to build on the e-mail and groupware packages that

What's New in Netscape Communicator

Global features	Navigator 4.0	Messenger	Collabra	Composer	Conference
Unifying interface and cross-program features	Latest version of Netscape's browser	E-mail program	News reader	Navigator Gold's HTML editor	Real-time collaboration tool (formerly CoolTalk)
IMPROVED USER INTERFACE: Completely customizable, supports drag and drop, extensive right-click menu options.	BETTER-LOOKING SITES: Supports style sheets, embedded fonts, absolute positioning, and layering, which are likely to spur dramatically improved Web page designs.	RICH TEXT: Lets you send and receive formatted text and images within the body of messages. (Uses Composer.)	JUST LIKE E-MAIL: Collabra postings look and act just like Messenger e-mail, making the program easy to learn and use.	RICH TEXT EDITOR: It's an adequate Web authoring tool, but better for creating rich text in e-mail messages and Collabra postings.	H.323 SPECIFICATION SUPPORT: Allows users to talk via Internet phone and receive real-time video from any other H.323 client running on most platforms.
MULTIPLE USER PROFILES: Lets several people share Communicator on one PC using their own preference settings. Can also create multiple custom views for one person.	PAINLESS PLUG-INS: Supports automatic installation of plug-ins, in addition to plug-in certificate signing.	SEARCHING AND FILTERING: Powerful new mailbox tools bring Messenger up to a par with e-mail programs like Eudora Pro and Pegasus Mail.	DISCUSSION NAMES: With Collabra Server installed, private corporate discussions can include plain-language discussion titles and categorized messages.	EASE OF USE: Uses a familiar word-processing environment for creating Web pages.	WHITEBOARD: Conference may have the best whiteboard in the business, with dual real-time editing, zoom, and capture abilities.
SPELLING CHECKER: Works in Collabra, Composer, and Messenger.	INCOMPATIBILITY: Lack of support for ActiveX content in the Navigator window will shut out a growing number of sites.	LDAP SUPPORT: Enables you to use address books on other servers in addition to your personal address book.	HORIZONTAL PANES: Two-pane newsgroup windows cannot be configured side by side.	ALMOST-WYSIWYG EDITOR: Supports table column editing, automatic image conversion to JPEG, and improved one-button publishing.	COLLABORATIVE BROWSING: Lets you surf the Web in tandem with someone else, one person leading the other.
PREFERENCES: New expandable-tree style, though not a standard dialog box, is a vast improvement over the complex Navigator 3.*x* dialog boxes.	CONVENIENT HELP: Clicking the Help button opens a window within the same Web page, instead of sending you to a different Help site and back.	HORIZONTAL PANES: Two-pane mailbox windows cannot be configured side by side.	PROPRIETARY: While Netscape did an admirable job sticking to open standards elsewhere, the Collabra server is entirely proprietary.	EXPANDABLE: New programming interface allows Netscape and third parties to add more capabilities, benefiting designers and surfers alike.	NO VIDEOCONFERENCE: While a plug-in will let other companies add this, Conference can't videoconference; it can only receive video.

Communicator and its Collabra server components provide. The two products will be available in 1998.

IMPROVEMENTS ALL AROUND

DESPITE ITS PHENOMENAL popularity, Navigator 3.*x* has serious shortcomings. Most notably, the interface is *so* early nineties. Very little is customizable, and there isn't much you can do with the right mouse button. Netscape Mail, the e-mail program, is rudimentary. It doesn't support rules, filtering, or other features found in competitors like Qualcomm's Eudora.

With a few exceptions, Communicator is a thoroughly worthy upgrade. The interface is terrific and the components are all tightly integrated. The version we evaluated was still buggy and missing a few features. But we could see that even in this early stage, it fixes most of the earlier problems and introduces some welcome new ideas. The size of the final program hasn't been determined, but we estimate it will be larger than 10MB.

What's immediately apparent about Communicator's new features is that they make the suite applications easier to use and help you create better-looking Web pages and e-mail messages. But what's under the hood is just as important as the cosmetic details—if not more so. Support for open standards lays the foundation for compatibility with third-party products. For example, because Lotus Notes relies on proprietary mail transports and server software, corporate users can't retrieve their Notes mail with Internet mail software such as Eudora or Netscape Mail. You won't have this problem with Communicator. It supports a veritable alphabet soup of standards: POP3 for mail, H.323 for conferencing, LDAP for Internet directories, and more.

Unfortunately, Netscape's enthusiasm for open standards doesn't extend to ActiveX, a technology promoted (but not owned) by Microsoft. Plenty of ActiveX controls—animated objects, for example—are already in use on the Web, but you won't be able to see these pages in their full glory unless you use a third-party plug-in, because Navigator 4.0 can't read the ActiveX controls. Another discrepancy in the open-standard scheme is Netscape's proprietary Collabra Server.

The package offers some other important high-level features. Like previous incarnations, it will come not only in Windows 95 versions, but Windows 3.*x*, NT, Macintosh, and several flavors of UNIX; these editions will ship at the same time. So everyone on the network using these platforms can access your corporate intranet with Communicator. Multiuser profiles, a new feature, allow several people who share a PC to have their own preference settings, address books, and bookmarks.

Worried about the learning curve? Don't be. If you're a Navigator 3.*x* user, getting to know Communicator shouldn't take long.

BROWSING MADE EASY

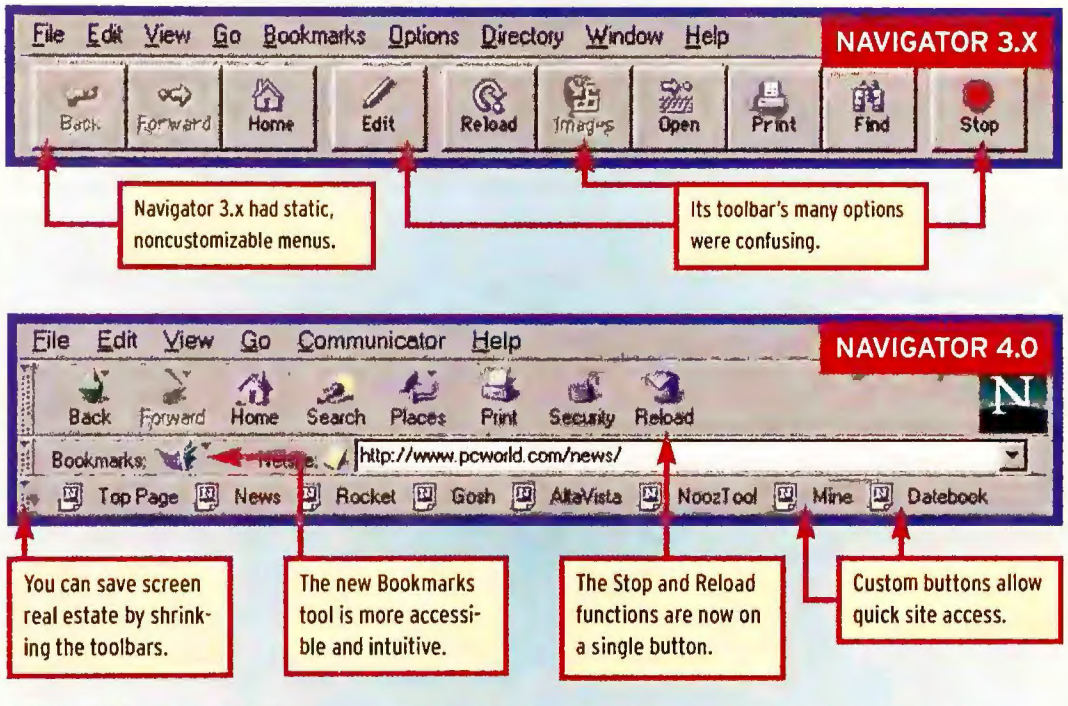
FOR MOST OF US, Navigator *is* the Web. And now, with a completely overhauled design in version 4.0, Navigator is better than ever. The brand-new toolbar is user-configurable, letting you drag and drop URLs into it and right-click to customize options. The Stop and Reload buttons have been smartly merged into a single button that switches between the two functions. Right-click the Forward or Back buttons, and you get a drop-down list of sites you've visited. There are three toolbar rows, each of which can shrink to a tab to free up screen real estate.

The menus are now streamlined and arranged more logically. The only jarring element is the Preferences dialog box, whose nonstandard design could be confusing. Instead of tabbed pages, it uses an expandable tree scheme, incongruous with the format of other dialog boxes.

Bookmarks are still somewhat disappointing. The biggest improvement is the ability to drag a URL from the address field onto the Bookmarks button and in one fell swoop place it in a specific folder and rename it. You can also save bookmarks the old-fashioned way: plop 'em into your bookmark file and organize them later. But you still can't drag and drop a bookmark folder to a new position within the file.

Tired of Navigator telling you to download a plug-in before you can view something? The new version fetches your plug-ins for you—no more annoying trips to another site just to get what you need ▶

It All Starts With THE TOOLBAR



NAVIGATOR 4.0's interface improves markedly over the 3.*x* browser. The new toolbars are easier on the eyes and far more functional. The Back and Forward buttons now have URL History drop-down lists. The Stop and Reload functions are on one button that switches between them. Reap some screen real estate by clicking tabs to close any toolbar you aren't using. Netscape has added a new feature called File Bookmark, which lets you store a new bookmark anywhere you want in your list. Access to other Communicator modules, such as Messenger or Conference, is just a click away with the new Communicator toolbar, which can also appear as a floating palette.

to finish browsing the page you're on. Navigator also now supports third-party digital "signing" of plug-ins and Java applets before you install them, so you'll know that no one has tampered with them—by adding a virus, for instance.

A new HTML-based help system takes care of another old annoyance. Previously, clicking the Help button took you to another page altogether; to return to the original page you had to click the Back button. Now, Help appears conveniently in a separate window within the same page.

One of the best things about the new Navigator is its support for the HTML 3.2 specification. As an end user, you probably don't care about the code behind Web pages—but Web authors do, and ultimately your browsing experience will be more satisfying because of this support. HTML 3.2 specifications will result in far more interesting-looking sites, thanks mostly to the new JavaScript-enhanced Dynamic HTML. This allows Web authors to create such special effects as elements that can disappear, pop up, or change their position on a page at preset times or when a user clicks or moves the cursor over them. ▶

Constellation

Out of This World, or Lost in Space?

MARTHA STEWART, BLESS Netscape and Microsoft. Like good hosts, they want to create a special place where we feel at home, where all our files, favorite Web sites, and e-mail are within easy reach, on one cozy desktop. Microsoft is taking full advantage of its arsenal—Windows—to accomplish this. Netscape's new desktop shell, on the other hand, is a major departure for the company—and for Windows users. Code-named Constellation, it's such a radical shift that its success depends on people accepting an entirely different vision of what an integrated, Net-savvy desktop should be.

A simple vision. We saw a prerelease version of Constellation. At press time, its cost, distribution method, and release date hadn't been determined. On the face of it, Netscape's vision is a fairly simple one: Overlay the user's desktop with an HTML shell, currently called HomePort, where a Web site icon, document icon, and e-mail icon can all reside within the same interface. Rather than traveling to another window to receive the latest information from the Web, you can be notified of updates right on your desktop. Some of the best ideas behind Constellation are why-didn't-I-think-of-it simple, like the InfoStream that pops up from the bottom of the screen and can scroll banners from sites you've selected, or the hidden browser interface that appears when you bring your cursor to the top.

An early prototype of Constellation shows the InfoStream—Web site banners that can scroll across the bottom of the screen. On the right is the HTML-based Selector screen that enables you to store links to e-mail addresses and favorite sites, and reach other components of Communicator.

But Netscape still has some kinks to work out before Constellation serves as a viable desktop. For example, file management requires the Windows interface. Switching between the Constellation and Windows 95 desktops is easy, but the two can't coexist on the same screen. Netscape says it plans to offer the option of better integration into the Win 95 desktop—or at least limit Constellation to part of the screen.

Another key component of Constellation is its ease of mobility. When you set your preferences and select the Internet sites you want delivered to your HomePort desktop, those settings are stored on your Web server. This means you'll be able to get to your HomePort with Navigator 4.0 from any computer capable of accessing that server. In theory, you could start reading a document delivered to your Macintosh-based HomePort desktop at home, and then finish it at your PC when you get to work, your content available from both places. A good many questions remain about this aspect of Constellation, however. For example, what if one machine you are using has a higher screen resolution? At press time, the gritty details had yet to be worked out.

Cross-platform support. Because Constellation is a shell that sits on top of the operating system that's running it, Netscape expects to create versions of Constellation for any platform Navigator supports. Microsoft, by contrast, is integrating Internet Explorer 4.0 deeply into its operating system, so it could have a much harder time bringing IE to operating systems other than Windows.

Do you need a new desktop or shell? Netscape and Microsoft are both betting you do. These desktops centralize the work space and integrate the Internet, making documents, e-mail, and Web sites accessible from one window. But learning and managing a new interface is never fun. Will users take a shine to Constellation? That's a big bet indeed. —*Eric Hellweg*

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

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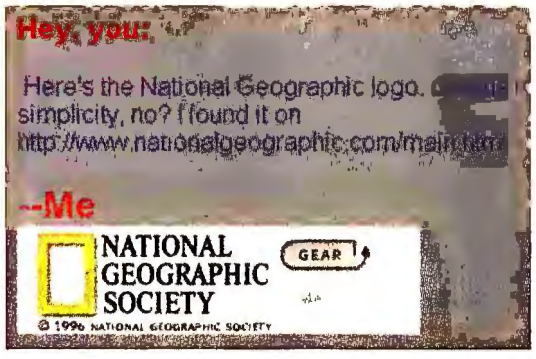
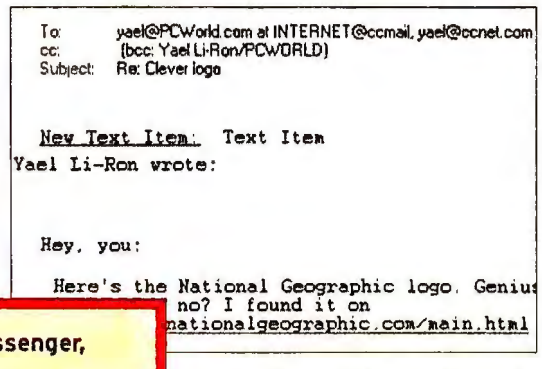
E-MAIL MEETS NEWSGROUPS

WHY SHOULD YOU have to use different programs with different interfaces to send e-mail and participate in newsgroups? Now you don't have to. Communicator's e-mail program, Messenger, and its news reader, Collabra, join forces in Message Center. You can send e-mail or post to newsgroups from inside this program.

Message Center's interface is a vast improvement over the old e-mail program's, with a new toolbar, one-click message sorting, improved context menus, and a wizard that helps you set up your mail and newsgroups. The horizontal dual-pane view, commonly found in e-mail programs and news readers, shows a list of your messages in the top pane and a preview of the currently selected message at the bottom.

Messenger relies on Composer to create *rich text* messages with fonts, colors, inline images, and more. When you select New Message, Messenger launches Composer (sans some Web-publishing tools), letting you compose e-mail with these rich text features. You can even place images and other objects, including Web pages, inside your messages. Just drag a page from Navigator directly into the message. You don't need to learn HTML code; the program does it for you.





With Messenger, Composer can create rich text messages (top). If the recipient's e-mail program lacks rich text support, the message won't look quite as great (bottom).

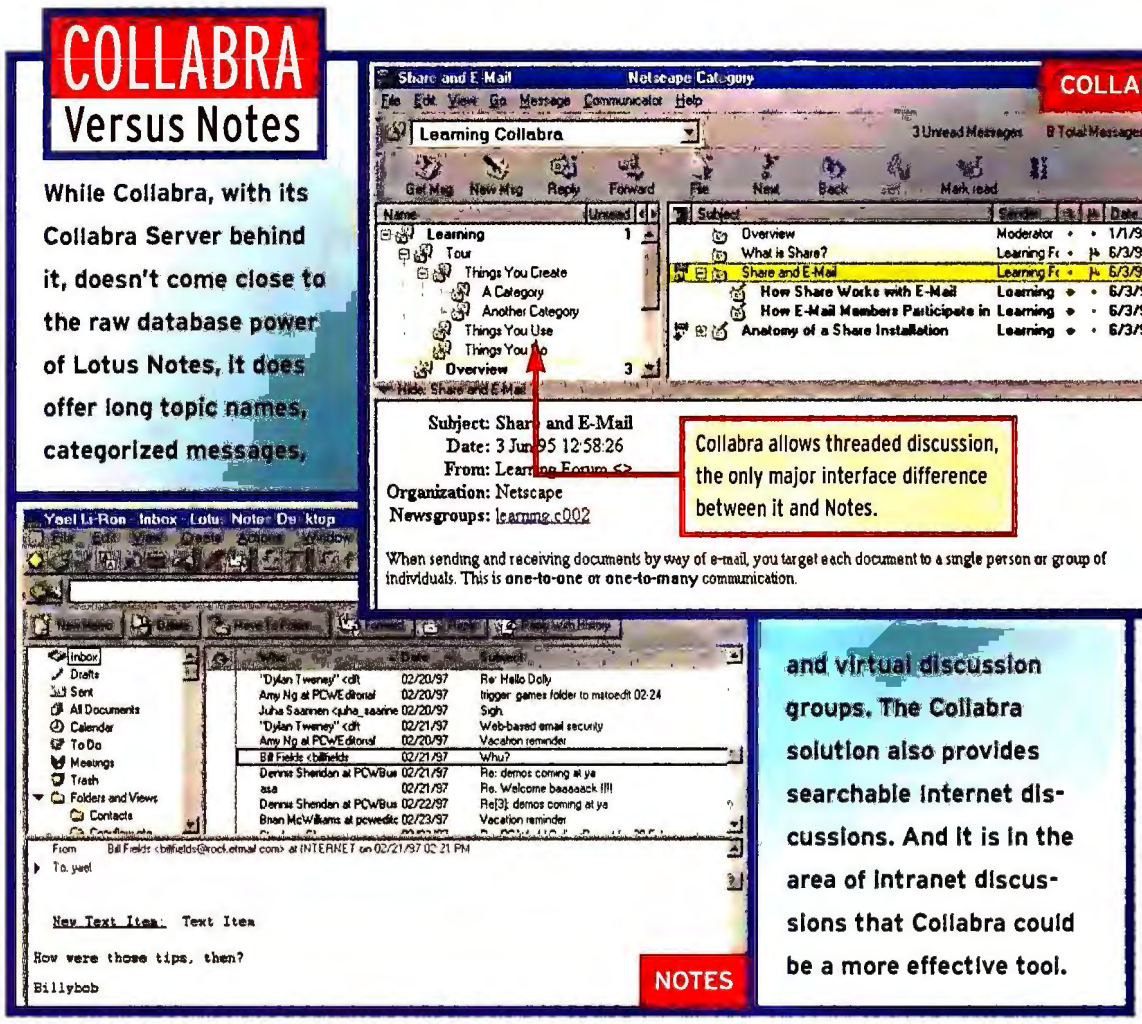
As long as the recipients of your e-mail use Messenger or other HTML-aware e-mail clients, they can view your HTML messages in all their intended glory. Otherwise, they get a MIME-encoded attachment, which they will need to decode before they can view any images or formatted messages. If you fear irking HTML-challenged recipients, you can send the message as plain text.

If you're serious about creating Web pages, we can name at least ten authoring tools that run JPEGs around Composer. (Visit the online version of this article at http://www.pcworld.com/may97/communicator for links to some of the best Web authoring packages around, most available as shareware.) Aside from the Publish feature—an option for uploading pages to Web servers that's been around since Navigator Gold—Composer satisfies only the most basic authoring needs. You can insert images, create non–drag-and-drop tables, and insert your own tags manually, but little else.

BETTER MAIL HANDLING

THE MAIL RULES and filtering options in Netscape's e-mail program are much better, and are now almost as powerful as Eudora Pro's. Messenger can move or copy messages to a folder, delete them, mark them as read, and change their priority. Another powerful new feature is the address book's name lookup based on the Lightweight Directory Access Protocol. Type someone's name, choose a lookup server such as Four11 (http://www.four11.com), click Search, and you get a list of their e-mail addresses, which you can add to your personal address book with a mouse click. One thing Messenger still can't do is handle multiple e-mail accounts simultaneously. You have to exit Messenger and then log back in under another name every time you want to retrieve mail for a different account. Eudora Pro, in comparison, lets you retrieve mail from multiple accounts in one session.

Netscape didn't forget e-mail security, always a concern. If you trade e-mail with other Communicator users, you can take advantage of Navigator's new support ▶



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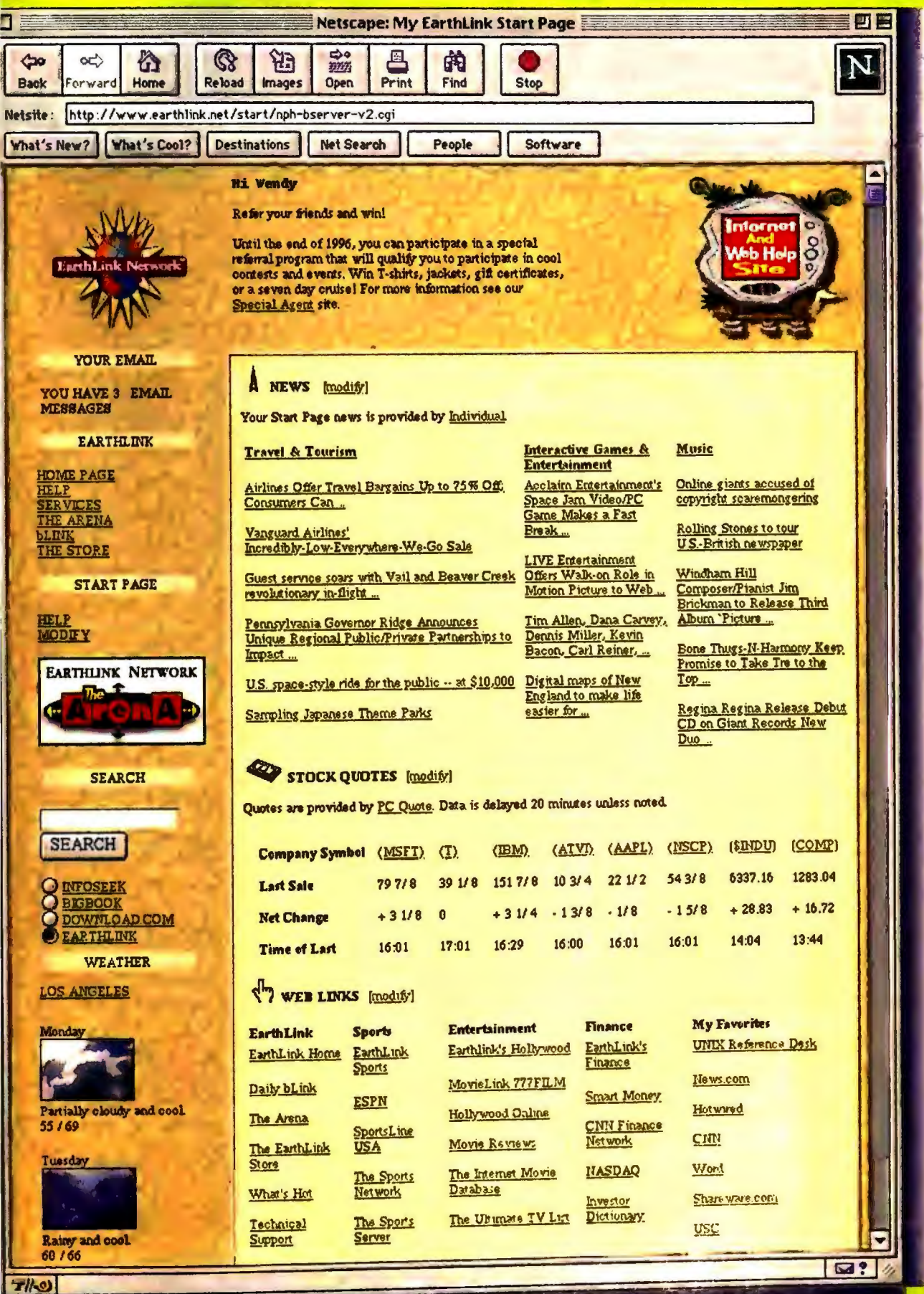

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for S/MIME, which encrypts your messages. If you don't know anything about e-mail security features, the new Security Advisor screen can help.

Message Center has even more features, but you'll need to install Netscape's extra-cost Collabra Server software before you can use them. We didn't test Message Center with this server software for our preview, but once it's under the hood, the Collabra news reader should spring to life in its true role, serving as a place to conduct discussions over your intranet. According to Netscape, discussion participants can create friendly names for themselves instead of being limited to the Internet's cryptic log-in IDs. Users can easily assign forum or moderator duties to trusted participants, something Lotus Notes doesn't allow. What's more, e-mail authors can edit messages after they've posted them, and Internet news- ▶

From Super Browser to Operating System

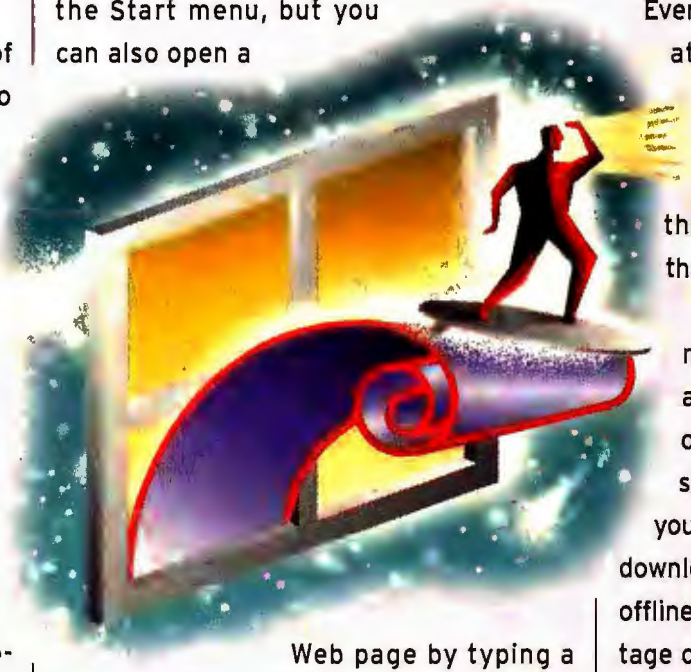
IE 4.0 Plans to Do It All

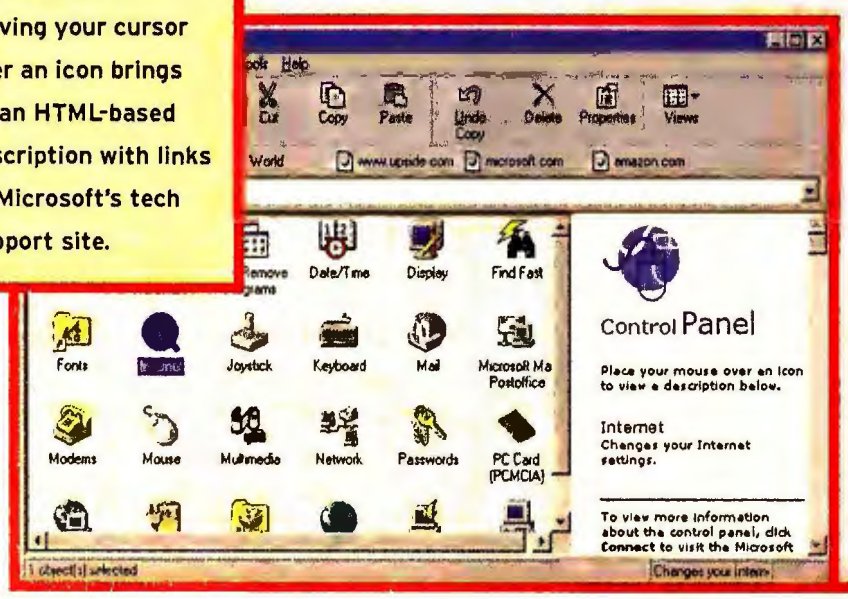
WHAT DO YOU GET when you cross a browser with an operating system? Answer: an operating system that can browse the Web—and give you an HTML-based view of your local files.

Microsoft is counting on its integration of the Web with its Windows desktop to woo users away from Netscape. Judging by a still-evolving platform preview release of IE 4.0 that we saw at press time, it has a fighting chance.

Building on Windows. By the time you read this, a public version of IE 4.0 should be available for downloading from Microsoft's Web site, http://www.microsoft.com/ie/. If you use Windows 95 or NT 4.0, you can let IE 4.0 upgrade your operating system by picking the Total Shell Integration option during installation. If you use Windows 3.*x*, or you prefer not to replace your desktop shell just yet, you can still use the browser and the other free applications by choosing the standard installation.

Based on what we saw in the demonstration, IE 4.0 does an excellent job of expanding the familiar Windows interface to let you browse the Web as well as local files from your desktop, something Netscape's Constellation may not do (see "Constellation: Out of This World, or Lost in Space?"). Access to the browser is built into the Start menu, but you can also open a Web page by typing a URL into an address field on the Windows Taskbar. Whether you open a local file or a Web page, the window displays the appropriate toolbar and menu—a Windows interface for a local file, the IE interface for a Web page. You can also create QuickLinks to Web sites by dragging a site's icon to the QuickLink Toolbar. IE 4.0 adds multiple toolbars to Windows 95. Three come standard, but you can easily create more.





IE 4.0's Total Shell Integration blurs the line between the desktop and the Internet. You can view the Control Panel from within the browser window; moving your cursor over an icon brings up an HTML-based description with links to Microsoft's tech support site.

Another substantial improvement: IE 4.0 lets you control the position of Shortcut icons and folders within the Start Menu. You can drag and drop any of those items wherever you like.

Want to keep an eye on a Web site or part of one, like an updating weather report? With Microsoft's Active Desktop technology, you can drag and drop whole or partial Web pages onto your desktop. Like Netscape's Constellation, IE 4.0 also provides a way for you to receive pushed content from sites.

Even if you don't want IE 4.0 as an operating system, the new browser alone looks promising. You can now see thumbnails of cached sites, and drag and drop Favorites where you want them in the menu, rather than storing them in the default alphabetical list.

Beyond browsing. IE 4.0 can now monitor the sites your Favorites link to and notify you of changes when they occur. Subscribing to a site goes one step further—just tell the browser what you want, when, and how often, and it will download Web pages to your hard drive for offline reading. If Web authors take advantage of the Dynamic HTML enhancements that Microsoft has created for IE 4.0, expect to see more sites with layering and interactive designs.

Like Communicator, IE 4.0 isn't just for browsing. Microsoft upgraded its Internet Mail and News and renamed them Outlook Express. In a new three-pane view, you can read the contents of an e-mail message before opening it. Like Communicator, Outlook Express also supports rich text messages, so graphics and Web pages can be sent and received via e-mail. Outlook Express also lets you read e-mail from multiple accounts within one session.

Whether you want a new way to blend the Web with your desktop, a better Internet e-mail program, or just a top-notch browser, IE 4.0 promises to be an enticing upgrade.

• **Internet Explorer 4.0** free; Microsoft; 800/426-9400, http://www.microsoft.com

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—Carla Thornton

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groups can be integrated into the discussion area with full security. Collabra Server also comes with the Verity search engine for indexing and searching discussion threads.

COMMUNICATOR: WHO NEEDS IT?

SO WHO IS COMMUNICATOR FOR? If all you want is the latest, greatest Navigator browser, adding this package to your Web software collection is a no-brainer. But using Communicator the way Netscape apparently intends—as a communication and groupware suite for the Internet, intranets, and that latest buzzword, *extranets* (two or more intranets connected via the Internet)—presents a bigger hurdle.

For one thing, not many corporations have POP3 servers, required for the Messenger e-mail program. Many are standardizing on Notes servers instead so they can run Lotus's graphically challenged but increasingly popular groupware application. Fewer still may want to invest in Collabra Server, which as a proprietary product is a glaring breach of Netscape's good intentions to maintain open standards. Constellation, Netscape's new desktop environment, is the biggest question mark. Unless Netscape finds a way to make Constellation blend in more smoothly with the Windows interface, Navigator's many devotees may quickly flee to Internet Explorer 4.0, which is free.

The bottom line: Despite Netscape's promise that your workgroup productivity will increase if you use its entire suite and server components, Communicator's programs can happily operate as stand-alone applications. Individual buyers—and even corporate users—are likely to continue using the browser package as just that: a browser and possibly an e-mail client, but nothing more.

And this is where Netscape's agony could kick in.

• **Communicator** Standard Edition $59, Professional Edition $79; 800/638-7483, http://www.netscape.com

READER SERVICE NO. 743

Yael Li-Ron is senior online editor, Eric Hellweg a staff editor, and Carla Thornton a senior editor for PC World. ■

The Bandwidth Blues

NETSCAPE'S CONFERENCE and Microsoft's NetMeeting products both claim to be for business collaboration. However, given the major obstacle they face—bandwidth—it's far more likely they'll be used instead for casual communication over the Internet.

Each of these programs is a Net phone and a whole lot more. Both offer shared whiteboards for annotating shared images, point-to-point file transfer, text chat, and received video (NetMeeting supports videoconferencing, while Conference allows for third-party videoconferencing add-ons). Conference's whiteboard is one of the best in the business, with dual real-time editing, zoom, and capture abilities. Both products support the H.323 specification, which allows conferencing software from different vendors to talk to one another.

But if you've ever tried to videoconference over the Internet, you know it isn't ready as a business tool just yet. We also found that NetMeeting's application-sharing feature slowed performance to such a degree that using it became pointless. The audio quality of both products was so inconsistent it would make even Dilbert throw up his hands. And in Conference, the audio connection runs between two points only.

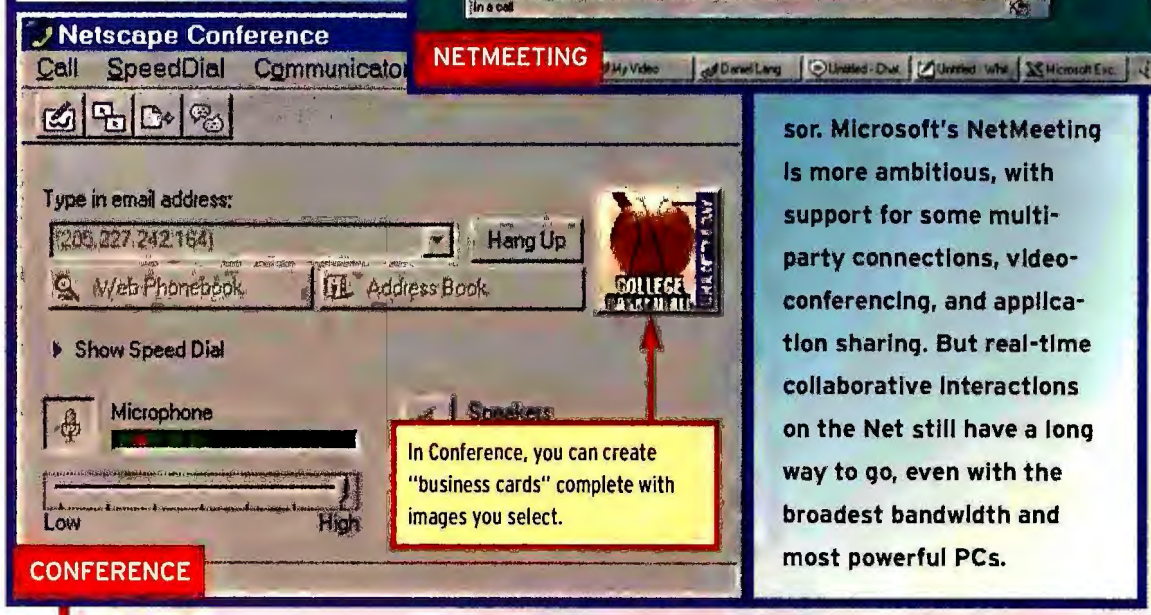
Conference adds a Setup Wizard that helps you get up and running, including testing your system for full-duplex sound card support. NetMeeting's Setup Wizard asks you to speak into your microphone to make sure it's working, a nice touch.

Conference offers *collaborative surfing*, a low-bandwidth approach that works well and lets two connected Conference users surf the Web in tandem, with their browsers. This solution sends a URL from the lead browser to the other. Users can transfer control and turn browser synchronization on and off.

Advances like streaming video will improve some of these products' functions. But only time will tell whether businesses will adopt these collaboration tools. —*E. H.*

CONFERENCE Versus NetMeeting

Although it lacks support for videoconferencing and allows audio connections between only two points, Netscape's Conference, an upgrade of its CoolTalk real-time collaboration tool, offers many improvements over its predecessor. Microsoft's NetMeeting is more ambitious, with support for some multiparty connections, videoconferencing, and application sharing. But real-time collaborative interactions on the Net still have a long way to go, even with the broadest bandwidth and most powerful PCs.



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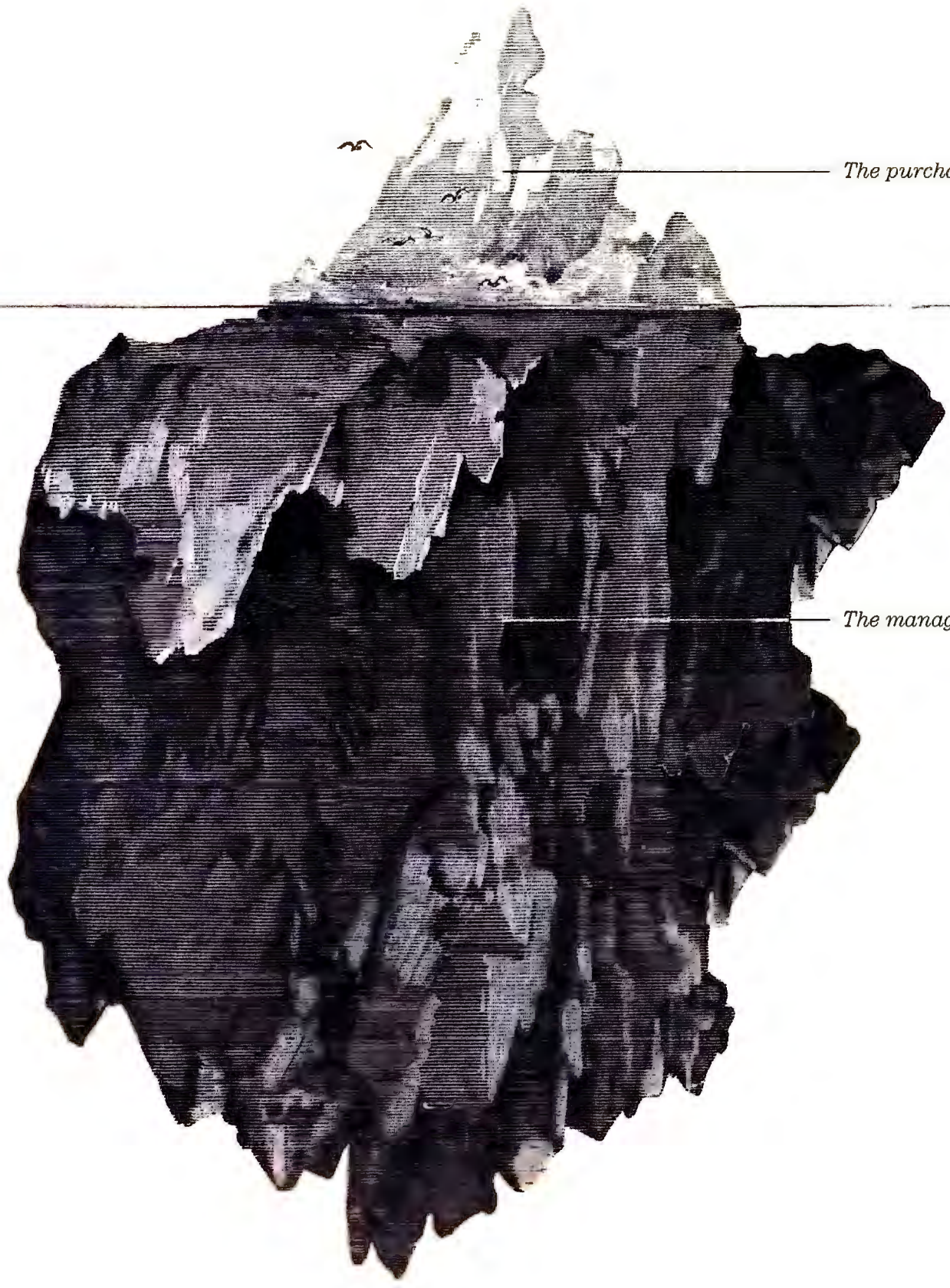

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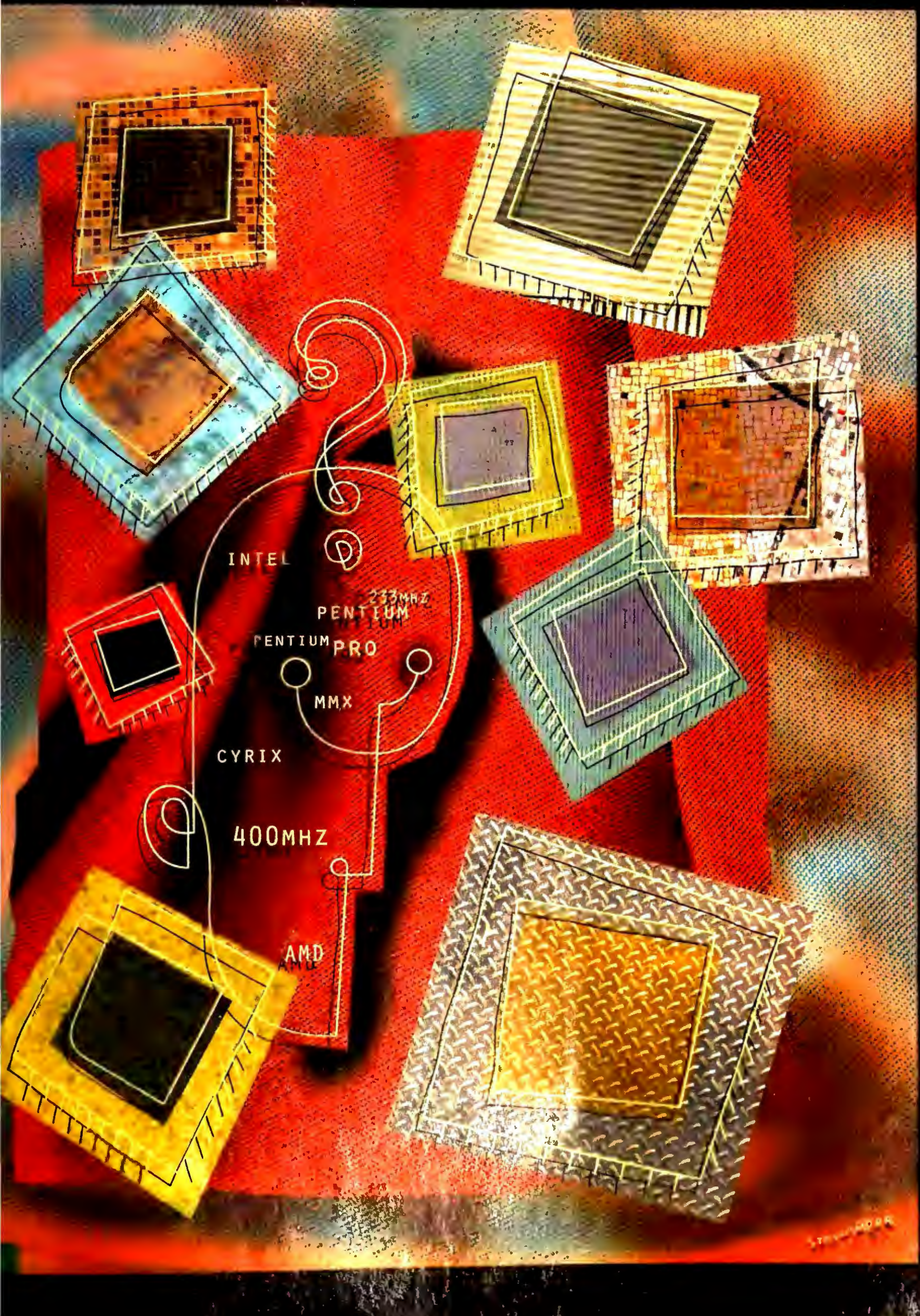
BY KIRK STEERS

FOR A WHILE, EVERYTHING SEEMED TO MAKE SENSE. You knew that a Pentium was faster than a 486, and that a 200-MHz processor was faster than a 133-MHz chip. So if you were shopping for a PC, you simply went for the fastest chip with the highest clock speed you could afford, and went home satisfied.

That's all changed.

Now there's a flood of new CPUs on the market, and plenty more on the way. Thumb the pages of *PC World* and you'll find systems sporting a Pentium, a Pentium with MMX technology, or a Pentium Pro—and perhaps a preview of upcoming Pentium IIs. You'll also find computers using comparable chips from Advanced Micro Devices and Cyrix, most of which have their own clock speeds and characteristics. And there's word of all sorts of new processors, with river- and park-themed code names like Deschutes, Katmai, and Willamette, that ▶

ILLUSTRATIONS BY OTTO STEININGER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will muddy the waters even more.

Collectively, these new chips have confused the rules we use to gauge relative performance. For example, Intel's Pentium MMX is faster than the Pentium Pro when running 16-bit applications, but slightly slower with 32-bit programs. And clock speed is no longer a reliable measure of performance. Witness systems using the Cyrix 6x86-PR200+: They run at 150 MHz but outperform most 200-MHz Pentium-based machines.

Feeling a little dizzy? Relax, take a deep breath, and let us be your guide through the rapids of constantly changing CPUs.

CHIP CHOICES

ONE THING hasn't changed: The name of the PC game is still price and performance. And not only is the CPU a major factor in determining the speed of your PC, it's also one of your computer's most expensive components.

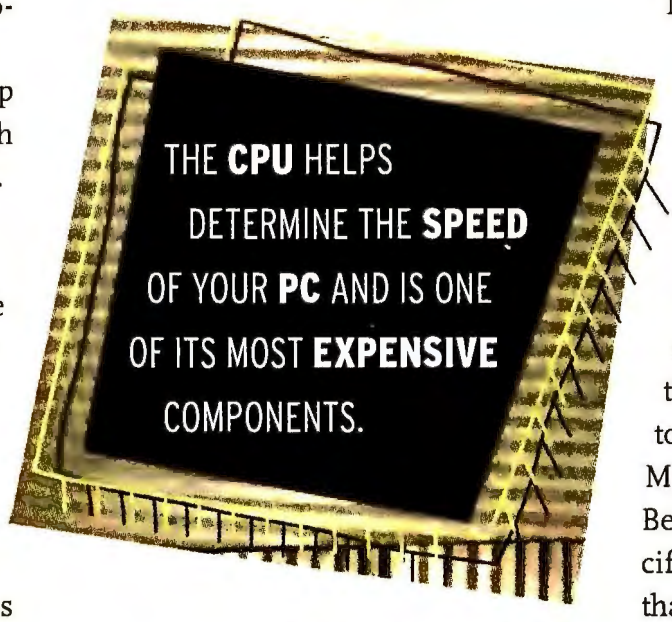
The good news is, all these choices are resulting in some real bargains. As new chips arrive, old ones get cheaper. If you're willing to settle for, say, a 120- or 133-MHz Pentium, you'll find complete systems for very little money. "We'll see very aggressive pricing," says Kevin Hause, an analyst with International Data Corporation in Mountain View, California. "Look for more $1000 Pentium-based systems—and that's with a monitor."

Over the past few months, *PC World* has looked at a wide variety of systems and CPUs and has talked to all the major players and a good many independent analysts about what to expect from upcoming chips. Our conclusions:

■ If price is your number one concern, buy a system that uses AMD's K5, Cyrix's MediaGX or 6x86, or Intel's plain-vanilla Pentium. AMD and Cyrix systems will probably be cheaper, but Pentiums will be available in a wider selection of systems and offer guaranteed compatibility.

■ For a home system you want to have fun with, get a Pentium MMX. Prices are reasonable, and the newest games and multimedia CD-ROMs will fly.

■ If you want speed but couldn't care less about multimedia, consider a Pentium Pro, especially if you're running the latest 32-bit business software.



■ If you must have the latest, greatest technology—and are willing to pay for it—check out Intel's Pentium II, Cyrix's M2, and AMD's K6 MMX. As we go to press, we've tested one prototype system with the K6, and another with the Pentium II; both provided phenomenal performance.

Of course, the real test comes from running your own software on shipping PCs. Before you buy, you need to know a little about what's inside.

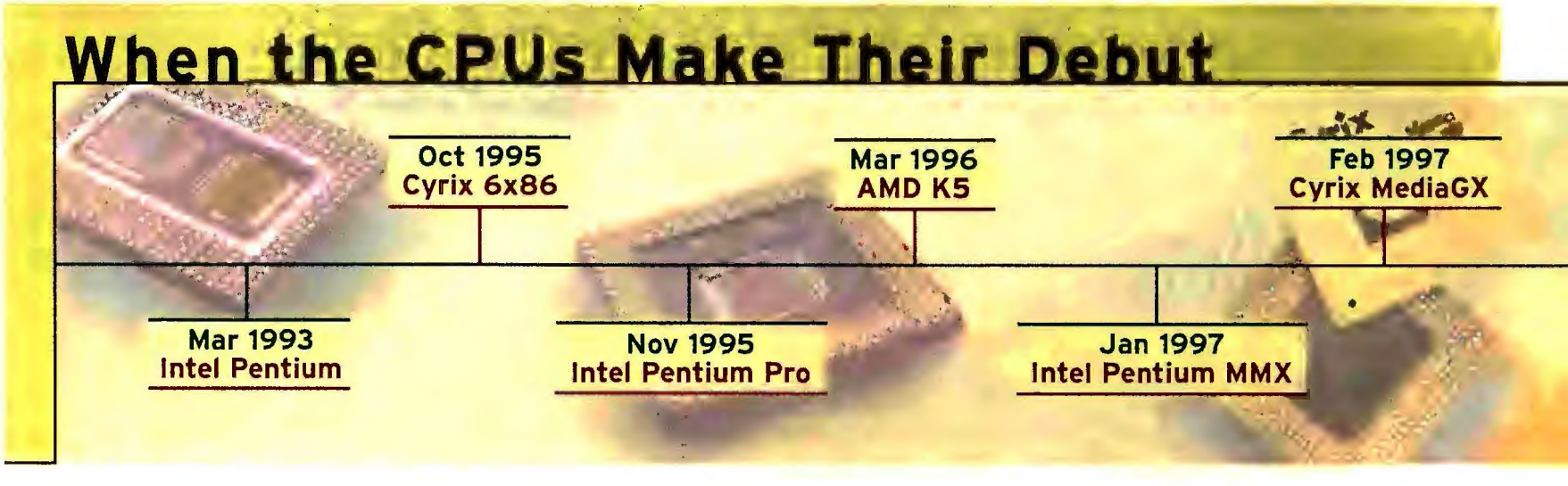
OFF THE OLD BLOCK

SO FAR, THIS YEAR'S biggest CPU news is Intel's introduction of MMX technology. All future Intel CPUs will include MMX, virtually all major PC vendors have introduced MMX versions of their standard desktops, and notebooks are supporting it as well. By midyear the first systems using Pentium Pro–class MMX chips—such as the Pentium II, the K6, and the M2—are scheduled to start trickling out. And the end of the year should see a faster version of the Pentium II, code-named Deschutes.

MMX works its magic by using far fewer instructions for certain jobs than a standard CPU would need. Will it change your life? Probably not, at least in the short term. MMX itself won't boost performance in your average spreadsheet or word processor, although other improvements within the chips will speed up these apps. For instance, thanks mainly to a larger primary cache, Intel's Pentium MMX systems finished our PC WorldBench tests—which do not use MMX-specific commands—7 to 10 percent faster than equivalent Pentiums. Not an earth-shattering difference, but enough to matter if you're trying to squeeze every ounce of performance out of your system.

But an MMX chip will really shine with software that uses the new MMX instructions. When the PC World Test Center ran nine Pentium MMX systems through tests using MMX versions of Adobe Photoshop, Macromedia Director, and Fractal Design Ray Dream Studio, performance improved by 20 to 45 percent. And informal tests involving demanding MPEG-2 video yielded full-screen displays that were actually watchable (although you'll still need an MPEG video card to get a full 30 frames per second).

Unless you spend a lot of time creating Photoshop collages, designing multi-



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media presentations, or hanging out in 3-D VRML worlds on the Internet, you'll initially see most of the power of MMX in games and entertainment software. "At first, MMX will primarily benefit the home user," says Mel Thomsen, an analyst at Pathfinder Research in San Jose, California. "The killer app that will eventually pull MMX into the workplace is videoconferencing. But that's not really here yet."

UNDER THE HOOD

THE CPU ISN'T THE ONLY factor that affects performance. A fast hard drive and motherboard, along with an extra few megabytes of system RAM, can speed up your PC to a startling degree. But you can't base a truly fast machine on a slow processor. And what, besides MMX support, makes a fast CPU?

Clock speed. It's no longer *the* criterion for judging CPU performance, but clock speed still means a lot. Every time the clock ticks (and in a 200-MHz CPU, it ticks 200 million times a second), some little chore gets done. All else being equal, the faster the clock ticks, the faster the chip finishes its work.

Cache memory. Inexpensive system RAM can't always feed a CPU the data it needs quickly enough, and a bit of faster SRAM in between the processor and the main memory improves things considerably.

This *primary* or *level 1* cache is built into the CPU and runs at the chip's own internal clock speed, which makes it as fast as anything inside your computer. Intel and AMD split the primary cache of their processors into two sections—for instructions and data—allowing the CPU to quickly find each. In general, the larger the primary cache, the faster the chip.

Systems typically help the CPU with a larger amount of their own cache memory, called *secondary* or *level 2* cache. In most cases, this cache resides on the motherboard and runs at that board's slower speed. To boost performance, the Pentium Pro comes with a built-in secondary cache, while the Pentium II and future Intel chips will put the cache in a package that bypasses the motherboard.

Architecture. A microprocessor's *architecture,* or structure, determines how it processes instructions and data. Modern CPUs use one or more multistage *pipelines* to process more than one instruction at a time. To keep a pipeline full and processing efficiently, a CPU will guess what instructions to handle next. If it guesses wrong, it must go back and perform the correct operations. The better designed the CPU, the less often this will happen.

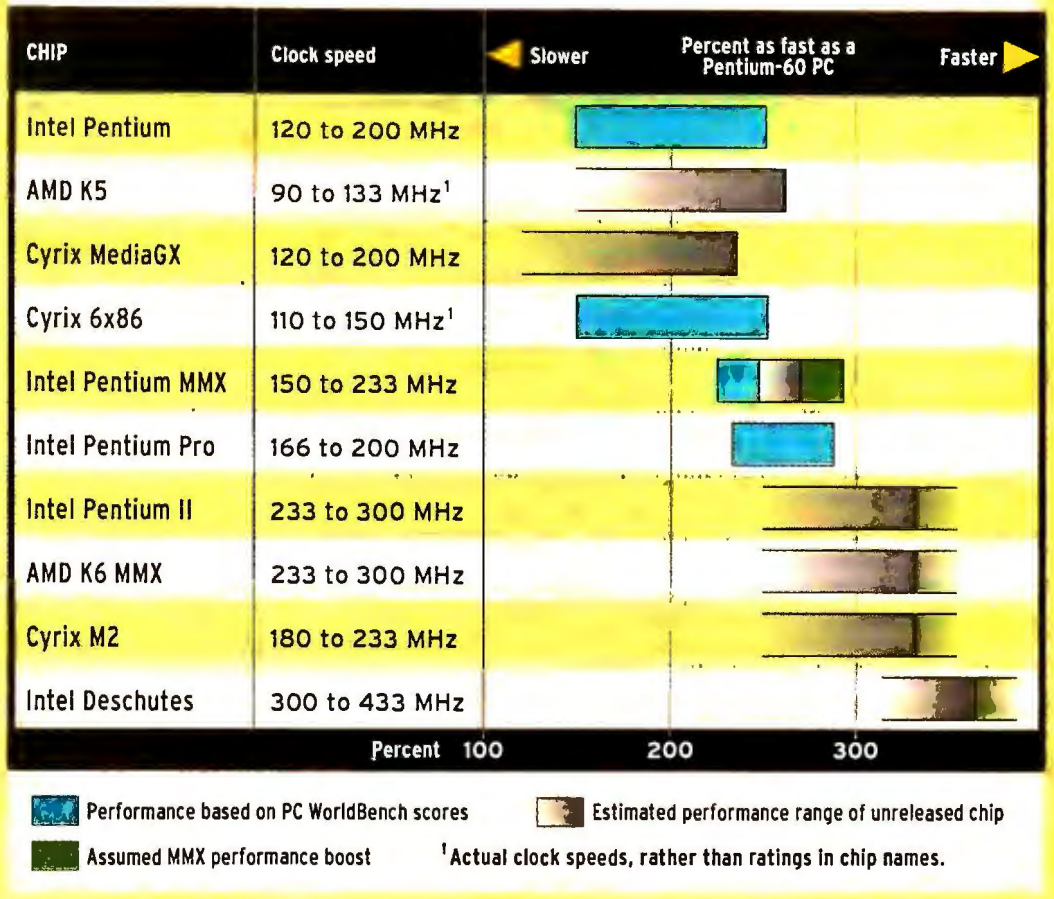
Density. The tighter the transistors are packed, the faster the chip. The CPU needs to synchronize signals traveling among millions of transistors. Reducing the distance between transistors allows the chip to run at higher speeds.

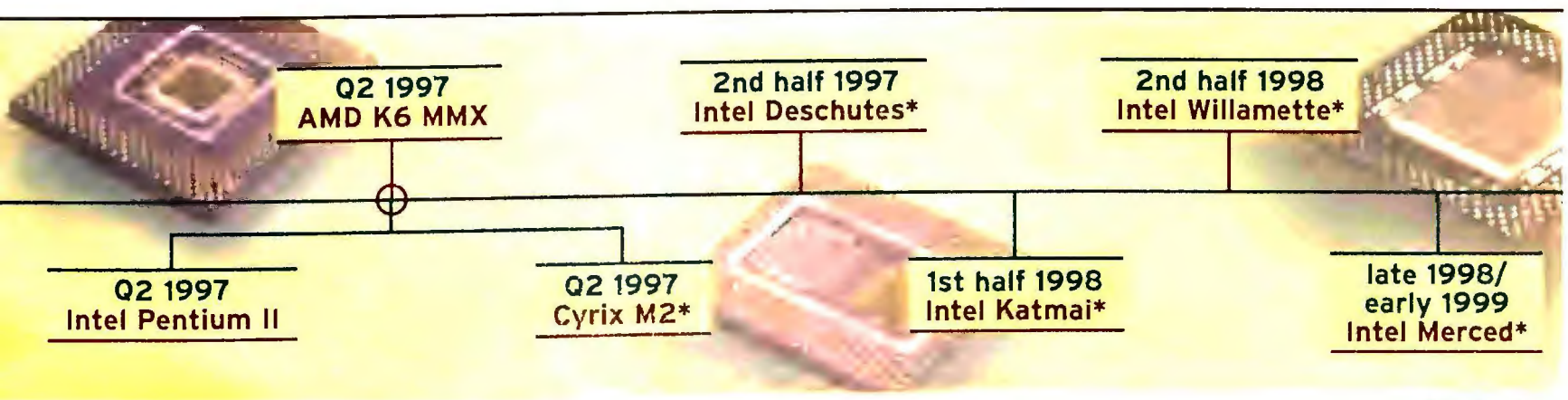
Most of today's processors space their transistors .35 micron apart (a micron is about 1/100th the diameter of a human hair), which effectively gives them a 200-MHz speed limit. Intel, AMD, and Cyrix are all promising faster .25-micron chips by the end of the year.

Tighter design also reduces the amount of silicon needed to produce the chip, which helps keep manufacturing costs down and—theoretically, at least—lowers the cost to consumers. ▶

Where the CPUs Stand

Relative speeds based on tests and projections.





* Code name.

The Contenders

WHICH CHIP IS BEST for you? Here's what we know and what we predict about current and future CPUs.

We've limited the discussion here to *x*86 chips that can run DOS, Windows 3.*x*, Windows 95, Windows NT, and OS/2. There are also some high-end chips available that can run special versions of NT. For a discussion of them, see "NT Spoken Here" on PC World Online (http://www.pcworld.com/may97/cpus).

AVAILABLE NOW

Intel Pentium If the endangered species list included silicon-based life forms, the original Pentium chip would be near the top. But this makes Pentium systems an excellent choice for bargain hunters. At press time complete Pentium PCs costing less than $1000 were just starting to appear. If you're outfitting a small office, use mostly business apps, and are trying to keep costs down, go with a Pentium.

Intel says that it will continue to make Pentium chips as long as there's a demand, and Pentium-based systems will probably be available throughout 1997. After that? One PC vendor who wished to remain anonymous told us, "Intel made it clear that by the end of the year there would be no more non-MMX P-200s shipped to us." Translation: Intel wants an MMX world.

AMD K5 When AMD's Pentium competitor first came out in March 1996, it was almost a year late and performed slower than expected. But AMD appears to have caught up. The one K5-PR166 system that the PC World Test Center has tested, Polywell's Poly500Qx (no PR200 systems are yet available), was very impressive. It not only outperformed most Pentium-166 systems—its score was just shy of the average for similarly configured P-200s. (For details, see *Top of the News*, April.) Pretty good for a low-price alternative.

AMD doesn't name a chip by its actual clock speed but by a rating of equivalent Pentium performance (called a P-Rating or PR). For instance, the K5-PR166 actually ticks away at 116.7 MHz. AMD will be shipping the K5 throughout 1997 to Acer, Epson, Everex, Monorail, and Polywell.

Cyrix MediaGX This chip is good news if you need a basic computer for word processing or Web browsing and can't see ▶

TEST REPORT

MMX Boosts Performance

Pentium MMX chips show their stuff with software that takes advantage of their new multimedia instructions.

APPLICATION	Improvement with MMX (percent)
Adobe Photoshop 4.0	44
Fractal Design Ray Dream Studio 4.1	23
Macromedia Director 5.0	32
Non-MMX business applications	7

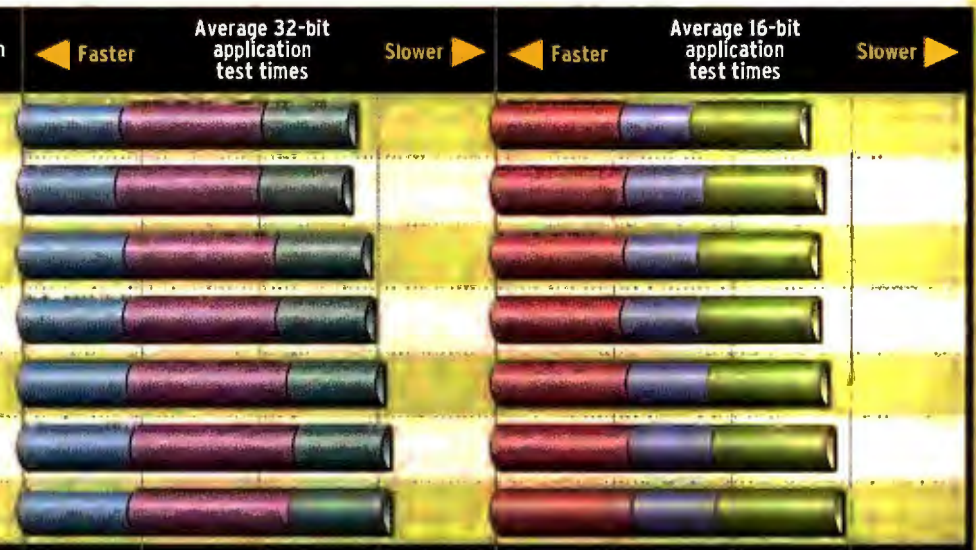
HOW WE TEST We tested 12 systems using MMX-enabled and standard non-MMX business applications, first using a Pentium MMX processor and then a non-MMX Pentium CPU of equivalent clock speed. In Adobe Photoshop 4.0, we timed several image editing operations. In Fractal Design Ray Dream Studio 4.1, we timed how long it took to redraw rendered 3-D scenes at two levels of complexity. In Macromedia Director 5.0, we played a graphics-intensive executable file, recording the number of frames displayed each second. For non-MMX results, we ran our standard PC WorldBench tests.

TEST REPORT

How the Top CPUs Perform

With a 512K cache, the Pentium MMX is the overall winner. But the Pentium Pro is faster with 32-bit apps.

CPU	Secondary cache (K)	Number of systems tested	Average PC WorldBench score
Pentium MMX-200	512	7	231
Pentium Pro-200	256	27	229
Pentium MMX-200	256	3	223
6x86-PR200+	256	6	220
Pentium-200	512	15	214
Pentium-200	256	12	210
K5-PR166[1]	512	1	208



[1] System had only 16MB of RAM.

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST We ran PC WorldBench, PC World's application-based benchmark, on multiple 32MB systems using the most recent AMD, Cyrix, and Intel CPUs. A higher PC WorldBench score is better. For more details on the PC WorldBench tests, see one of the performance charts in this month's system review.

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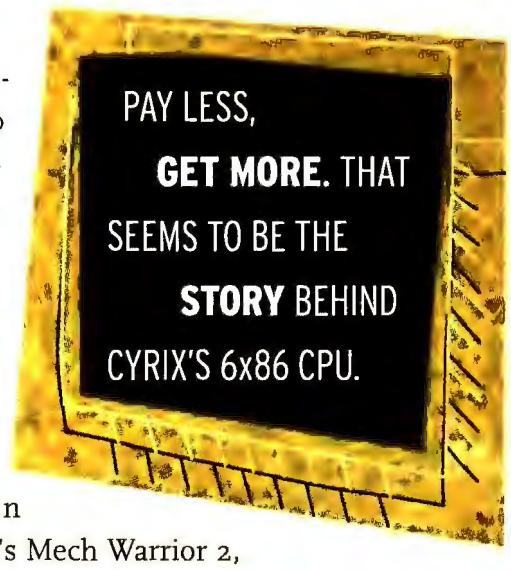
parting with $2000 or more. The MediaGX puts SVGA graphics, Sound Blaster emulation, and memory control on a single Pentium-compatible chip, eliminating the need for a video card or sound board.

The first MediaGX PC we tested, the Compaq Presario 2100, lists at $1298 with a monitor. But complete MediaGX systems may soon sell for as little as $700.

The trade-off is performance. The MediaGX, which will debut in 120- and 133-MHz versions, lacks a secondary cache and puts greater demands on the CPU to handle video and sound. Despite its 133-MHz clock speed, the Presario 2100 performed about average for a Pentium-100. Of course, the slower performance may be due to reasons other than the CPU, and subsequent systems may turn out to be faster. (For more on the Presario 2100, see *New Products*, April.)

Cyrix 6x86 Pay a little less, get a little more. That describes the story of the 6x86. Systems built around this chip are typically about 4 percent faster and $200 cheaper than otherwise equivalent Pentium-based systems.



Compatibility can be an issue with non-Intel CPUs, and Cyrix's chips have had slight problems in the past. Certain games, like Activision's Mech Warrior 2, flash an error message on start-up if they don't find an Intel chip. Most such messages can be ignored, but some games require that you download a patch from Cyrix's Web site (http://www.cyrix.com).

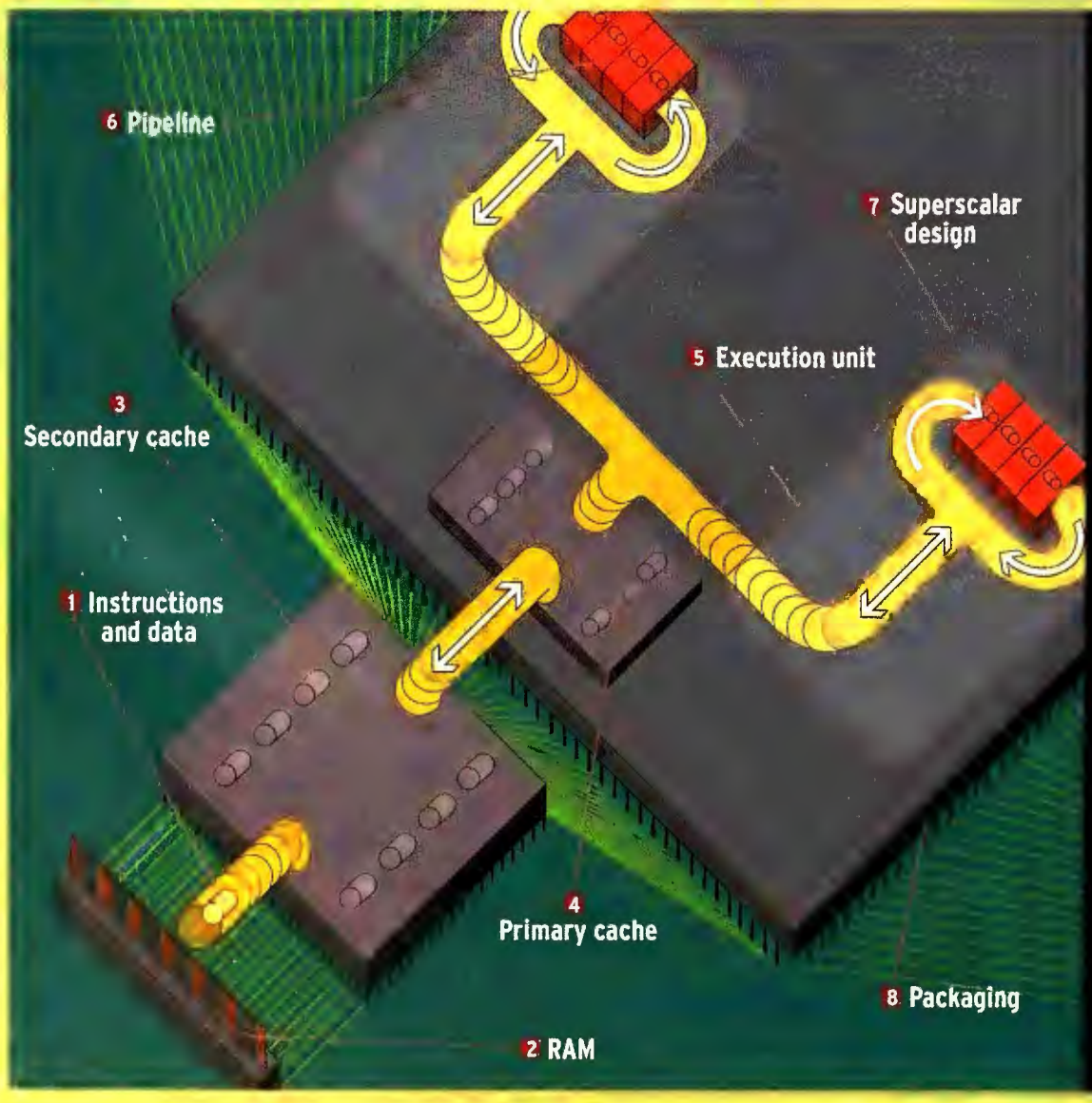
Like AMD, Cyrix labels the 6x86 not with its clock speed but with a Pentium equivalent P-rating. The Cyrix 6x86-PR200+, for example, has a clock speed of 150 MHz, but runs software slightly quicker than the average Pentium-200.

Part of this gain comes from the 6x86's faster motherboard. A 200-MHz Pentium generally runs on a 66-MHz motherboard, slowing down processing outside of the CPU. But 6x86-PR200+ systems use a 75-MHz motherboard, which allows data to move along a little more speedily.

Until recently you could buy PCs directly from Cyrix; one such system graced *PC World*'s Top 20 Power Desktops chart for four months. You can now buy 6x86 systems from CyberMax, Diamond, and Kingdom, and from better-known companies like AST and IBM (which makes its own 6x86 chips from Cyrix's design).

Intel Pentium MMX Saddled with the official name "Pentium With MMX Technology," Intel's latest chip offers more than just MMX. There's a larger primary cache—bumped up from 16K to 32K—and some minor architectural adjustments. These improvements give the Pentium MMX consistently high scores ▶

Anatomy of a Chip



1. Instructions and data. Software is composed of instructions and data. The instructions tell the CPU what to do with the data—as in 'display (the instruction) picture (the data)'. Data and instructions are stored on the hard drive until needed, then moved to RAM.
2. RAM. Stores all the data and instructions for processing. Usually can't feed the CPU fast enough to fully utilize the CPU's speed.
3. Secondary cache. Instructions and data most likely to be needed next are usually stored here in this faster, more expensive kind of RAM. Feeds the CPU much faster.
4. Primary cache. Instructions and data are stored here for even faster CPU access at the CPU's internal processing speed.
5. Execution unit. Each unit executes an instruction and stores the results.
6. Pipeline. An execution unit processes instructions piecemeal, in a multistage pipeline. Since the unit doesn't have to finish with one instruction before starting on the next, it processes instructions more quickly.
7. Superscalar design. Multiple execution units process more than one instruction at a time.
8. Packaging. The ceramic or plastic container holding the silicon. What you see when you look at a chip.

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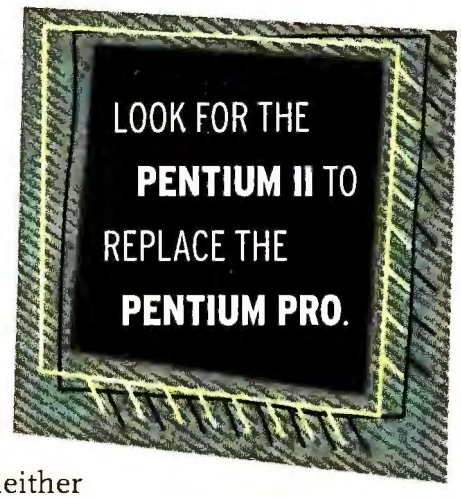
on the PC WorldBench benchmark, which doesn't even test MMX capabilities.

Is the Pentium MMX taking over? "I'd be surprised to see non-MMX machines on the shelves past the end of this year," says Pathfinder's Thomsen. If you're on a tight budget and have no interest in multimedia, you could save a little money by buying a standard Pentium PC at a discount. Otherwise, a Pentium MMX is an excellent first choice for most users.



Although Intel will neither confirm nor deny the rumor, Pentium MMX-233 chips may be available by fall.

Intel Pentium Pro A few months ago, the Pentium Pro was the ultimate CPU, despite its unimpressive performance with 16-bit programs. Now eclipsed by MMX models, the Pentium Pro is still the winner with 32-bit code.

One reason the Pentium Pro is so fast is that the secondary cache is built into the same package as the CPU and thus operates at the chip's 166-to-200-MHz speed rather than the motherboard's much slower 60 or 66 MHz.

Why does this lightning bolt turn into a lightning bug when running old 16-bit software? To minimize the size of the chip, Intel left out certain parts that the chip uses to speed up 16-bit code. If you use mainly 16-bit applications, you won't see much benefit from the Pentium Pro.

Still, says Scott Miller of Dataquest in San Jose, California, "the Pentium Pro addresses a viable market segment." Its fast 32-bit performance makes the Pentium Pro today's chip of choice for servers and high-end workstations. But for how long? Look for the Pentium II to replace it in the long term.

COMING SOON

Intel Pentium II AVAILABLE SECOND QUARTER 1997

Power users who couldn't stomach the Pentium Pro's lackluster 16-bit performance will find its successor more palatable, thanks mainly to MMX technology and a larger 32K primary cache. Just before we went to press, the PC World Test Center tested an early, prerelease Pentium II system. The result was a record-breaking PC WorldBench score of 260 (for details, see *Top of the News*).

What makes this speed all the more remarkable is that Intel has moved the secondary cache off the chip, a cost-saving change that should have slowed performance. The Pentium II's secondary cache sits next to the CPU in a plug-in cartridge dubbed the Single Edge Contact (see "Plug-In Upgrades"), running at a slower speed than the CPU, but faster than a secondary cache on the motherboard. Dataquest analyst Kimbal Brown was right when he predicted that "the larger primary cache and increasing clock speeds will soon make it Intel's fastest chip." ▶

FEATURES COMPARISON

PROCESSOR	Vendor	Introduction date	System price range	Current clock speeds	Possible future clock speeds	MMX	Primary cache (K)	Dual cache [1]	Comments
AVAILABLE NOW									
Pentium	Intel	Mar 93	$1000-$2500	100, 120, 133, 150, 166, 200	none	○	16	●	Now the lowest common denominator. A great bargain while it lasts.
K5	AMD	Mar 96	$900-$2300	75, 90, 100, 90/120 [2], 100/133 [2], 116/166 [2]	133/200 [2]	○	24	●	Late-coming, inexpensive alternative to the Pentium. Fastest models not yet released.
MediaGX	Cyrix	Feb 97	$700-$1300	120, 133	150, 166, 180, 200	○ [3]	16	○	All-in-one chip designed for inexpensive systems. For bargain hunters.
6x86	Cyrix	Oct 95	$800-$2500	100/120 [2], 110/133 [2], 120/150 [2], 133/166 [2], 150/200 [2]	none	○	16	○	A fast, inexpensive Pentium competitor.
Pentium MMX	Intel	Jan 97	$1600-$2800	150, 166, 200	233	●	32	●	The first chip with MMX technology, it is Intel's replacement for the Pentium as most popular chip. Currently the fastest chip overall.
Pentium Pro	Intel	Nov 95	$1500-$4000	166, 180, 200	none	○	16	●	High-end, non-MMX chip is very fast with 32-bit code, unimpressive with 16-bit. Best choice for servers and power users only.
COMING SOON									
Pentium II	Intel	expected 02 97	$3000-$5000	n/a	233, 266, 300	●	32	●	MMX successor to the Pentium Pro promises better 16-bit performance, multimedia support.
K6 MMX	AMD	expected 02 97	$2500-$4500	n/a	200/233 [2], 266/300 [2]	●	32	●	AMD's MMX chip may prove faster and less expensive than the Pentium II.
M2 [4]	Cyrix	expected 02 97	$3500-$4500	n/a	180, 200, 225, 233	●	64	○	Cyrix's answer to the Pentium II may also be a fast yet inexpensive competitor.
ON THE HORIZON									
Deschutes [4]	Intel	expected late 97	unknown	n/a	300, 333, 400	●	unknown	unknown	Little is known about this smaller, faster version of the Pentium II, but it's expected to reach speeds of up to 400 MHz.

● Yes ○ No [1] Separate instruction and data caches. [2] Actual clock speed/equivalent Pentium speed. [3] 200-MHz version will support MMX. [4] Code name.

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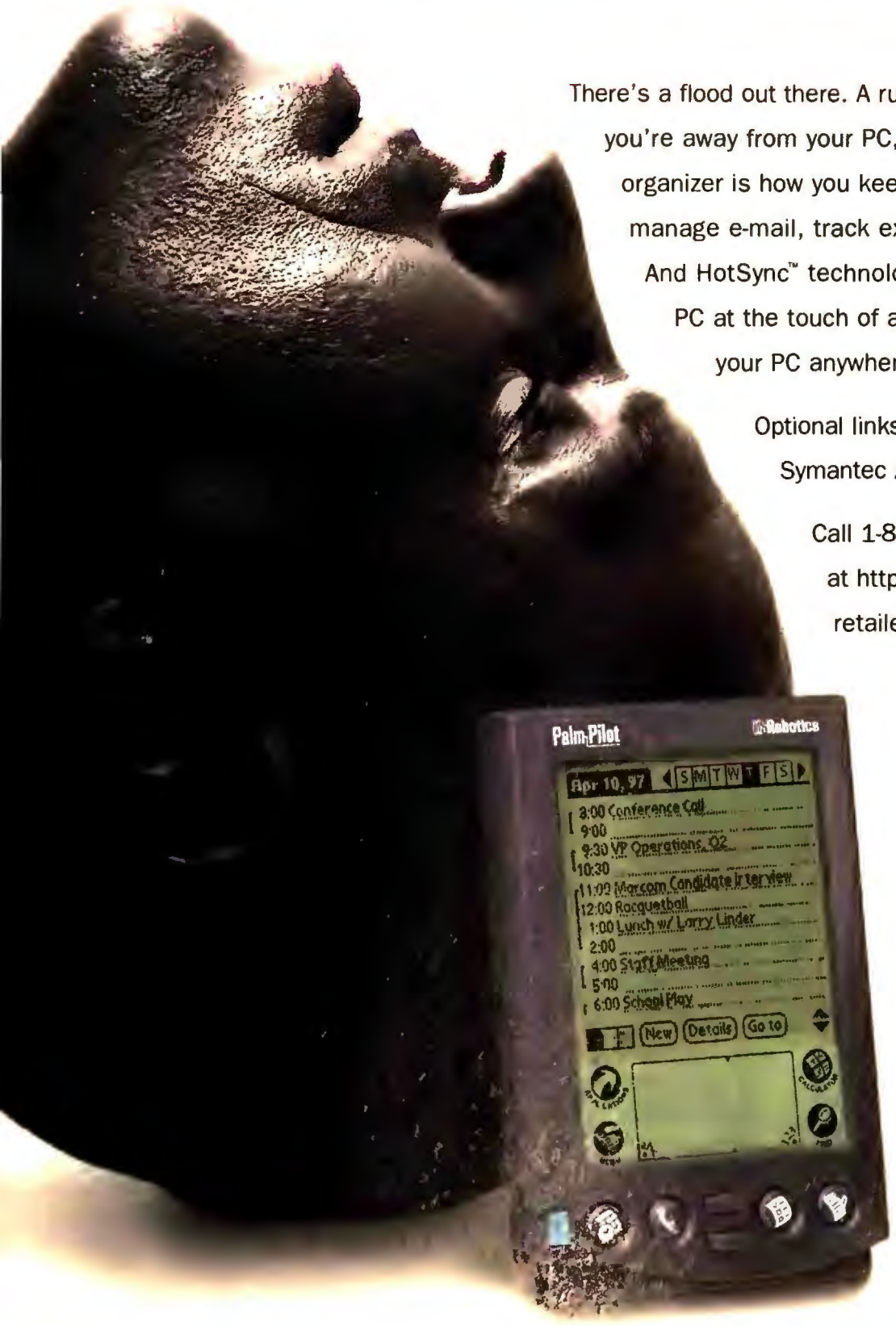

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The first Pentium II chips will run at 233 and 266 MHz. Initially, at least, Pentium II systems will be too expensive for most users' budgets.

AMD K6 MMX AVAILABLE SECOND QUARTER 1997

With all the problems AMD had in getting the K5 up and running, you'd think the company might redesign its next-generation K6 chip from the ground up. It did the next best thing: It bought a company that made one.

When AMD acquired NexGen last year, it got the firm's Nx686 chip (not to be confused with Cyrix's 6x86) as part of the deal. This became the K6, which could be available in PCs as early as May. Judging by what we've seen, AMD got its money's worth. The PC World Test Center tested a prototype system, built by AMD itself, of the K6. The results were phenomenal—a WorldBench score of 251 (for details, see *Top of the News*).

While the K6 may not prove to be as fast as the Pentium II, it will almost certainly be less expensive. While the Pentium II will require a major motherboard redesign, the K6 plugs into the same socket as a standard Pentium, simplifying redesign chores for motherboard manufacturers. How well will the K6 support MMX? Most experts are guardedly optimistic that AMD will be able to pull it off.

At press time AMD had not disclosed which system makers will be offering K6 computers. "It's hard to say who will carry" the K6, says Hal Feeney of Pathfinder Research. "AMD's been playing it close to the vest." Vendors already using the K5 chip—like Acer, Epson, and Everex—are the likeliest candidates. The Pentium II may prove to be king, but the K6 will still be a worthy competitor.

Cyrix M2 AVAILABLE SECOND QUARTER 1997

Cyrix's next chip could also battle the Pentium II for the hearts and machines of power users. Its enhanced design will offer optimized 32-bit and 16-bit performance and Cyrix's own MMX implementation. Cyrix claims that performance will be 150 to 200 percent faster than that of the 6x86. Given the speed of the 6x86 architecture, this could be a successful challenge to the Pentium II.

The M2 will debut in 180- and 200-MHz versions, with a 225- or a 233-MHz model to follow. Curiously, a 225-MHz system could run faster than a 233-MHz version because it would use the quicker 75-MHz motherboard. At press time Cyrix hadn't announced any vendors that had committed to the new chip.

ON THE HORIZON

Intel Deschutes AVAILABLE SECOND HALF 1997

A smaller, faster version of the Pentium II may hit the stores before the end of this year. The Deschutes will use a new production process that shrinks the space between transistors on the chip to .25 micron, allowing for faster clock speeds.

Look for the Deschutes to push clock speeds up to 400 MHz, as well as provide a few other design tweaks. Because of its small size, the Deschutes may prove particularly popular in notebooks.

After Deschutes? There's talk of new Intel CPUs in the works with picturesque code names like Katmai, Willamette, and Merced. But the information we have about these chips—none of which Intel will acknowledge—is still scant.

"New systems in 1996 were boring," points out Dataquest's Brookwood. "We saw the same boxes with slightly faster processors and much lower prices. Not so with 1997." Nor, it appears, with 1998.

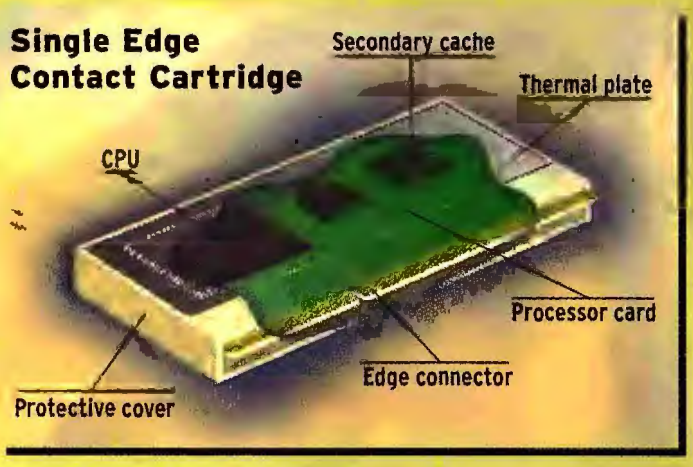
online *Additional information is available at http://www.pcworld.com/may97/cpus. Kirk Steers is a contributing editor for* PC World. ■

Plug-In Upgrades

SO YOU WANT to soup up your old PC with a brand-new CPU? Sorry, but you'll have to wait for special upgrade chips to arrive. While the Pentium MMX, 6x86, and K5 all plug into standard Pentium sockets, different voltage and BIOS requirements keep compatibility at bay for the vast majority of systems.

The good news is that Intel expects to have MMX OverDrive chips available for Pentium motherboards by the time you read this (see April's *Top of the News* for details). Upgrades for Pentium Pro motherboards are due sometime in 1998. Neither Cyrix nor AMD makes upgrade chips, but Evergreen Technologies produces a 6x86 upgrade processor and would be a likely candidate to make an M2 upgrade chip. Kingston Technologies has been in talks with AMD about producing a K6 upgrade by the end of the year.

Meanwhile, Intel's Pentium II will introduce a whole new packaging system for CPUs, which should make them easier to upgrade. Instead of the familiar square ceramic chip that drops into a socket, the Pentium II's Single Edge Contact packaging puts the processor on a small card in a cartridge that plugs into a special slot on the motherboard. The secondary cache is next to the CPU on the same card, allowing it to run at much higher clock speeds than conventional caches on the motherboard. (It will still be slower than the Pentium Pro's secondary cache on the CPU itself, however.)



SEC systems may eventually make upgrades easier. With conventional chip packaging, swapping CPUs is a hair-raising experience—if you misalign the sides of the chip, you fry several hundred dollars' worth of CPU. With SEC, you just slide in the cartridge, much as you would a video card or modem.

Of course, we can't say for sure yet whether SEC CPUs really will be easier to upgrade. We'll have to wait until Pentium II chips become old and slow before we have a real answer to that one.

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100MB Iomega Zip drive
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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
Multimedia Xcitement Pak: POD, Adobe PhotoDeluxe, Billboard Music Guide, Blockbuster Entertainment Guide and Eraser Turnabout
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32MB EDO RAM
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64MB EDO RAM
9GB Fast SCSI-2 hard drive
17" Micron 17FGx, .26dp (15.8" display)
Microsoft Office CDs

$4,099
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512KB pipeline burst cache, flash BIOS
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 card 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
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16MB EDO RAM
2.1GB EIDE hard drive
15" Micron 15FGx, .28dp (13.7" display)

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32MB EDO RAM
4.1GB EIDE hard drive
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SELECT FEATURES

512KB pipeline burst cache, flash BIOS
12X EIDE CD-ROM drive, 3.5" floppy drive
16-bit stereo sound card and speakers
PCI 64-bit 3D video, MPEG, 2MB EDO RAM
Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD
Microsoft Works CD
5-year/3-year limited Micron Power warranty

MICRON MILLENNIA PRO2 200

Intel 200MHz Pentium Pro processor
16MB EDO RAM
3.1GB EIDE hard drive
15" Micron 15FGx, .28dp (13.7" display)
Microsoft Office CDs

$2,199
Bus. lease $75/mo.

Intel 200MHz Pentium Pro processor
32MB EDO RAM
4.1GB EIDE hard drive
17" Micron 17FGx, .26dp (15.8" display)
Microsoft Office CDs

$2,599
Bus. lease $88/mo.

SELECT FEATURES

Supports dual Intel 200MHz Pentium Pro processors
256KB internal L2 cache, flash BIOS
12X EIDE CD-ROM drive, 3.5" floppy 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
5-year/3-year limited Micron Power warranty

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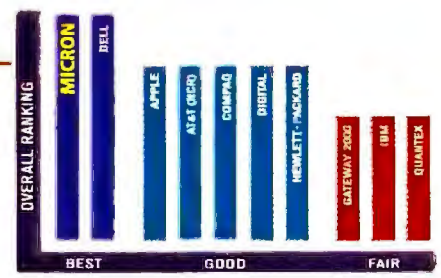

Source. *PC World* best overall PC company for reliability and service, December 1996.

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Finally, we back every machine we make with an industry-leading 5-year warranty. It makes for great computers. And very satisfied customers.

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Intel 200MHz Pentium processor
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17" Micron 17FGx, .26dp (15.8" display)

$2,599

SELECT FEATURES

512KB pipeline burst cache, flash BIOS
12X EIDE CD-ROM drive, 3.5" floppy drive
100MB Iomega Zip drive
32 voice wavetable stereo sound card in P200
Advent AV270 2x25 watt stereo speakers in P200
16-bit stereo sound card and speakers in P166
33.6 fax/modem, speakerphone, voice mail
Microsoft Phone telephony software
Internet ready: SPRYNET Internet trial membership, Microsoft Internet Explorer
America Online and CompuServe trial memberships
PCI 64-bit 3D video, MPEG, 2MB EDO RAM
Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD
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

STORAGE/MEDIA OPTIONS

Adaptec 2940U Ultra SCSI Fast-20 controller $100
(upgrade from system with standard Ultra SCSI Fast-20 controller)
Plextor 12PleX 12X 1.8MB/sec SCSI internal CD-ROM drive $200[2]
(upgrade from systems with standard 12X EIDE CD-ROM drive)
Iomega Ditto 3200 (1.6/3.2GB) Travan tape backup with tape $199
Sony 4/8GB SCSI DDS-2 DAT tape backup with tape $999[2]

COMMUNICATION OPTIONS

33.6bd V.34 internal data/fax modem $139[3]
33.6bd V.34 internal telephony data/fax modem with full duplex 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 690c printer - photo-quality color printing for the home, complete with cable $319
HP LaserJet 5L-FS printer - affordable B&W printing, complete with cable $419
HP LaserJet 6P printer - full featured B&W printing, complete with cable $799
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 $69
(available only on desktop and notebook systems with Windows 95)
Quicken Financial Pak: Quicken Deluxe, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer $69
(available only on desktop and notebook systems with Windows 95)

DISPLAY/VIDEO OPTIONS

17" Hitachi SuperScan 1711 (15.9" display) .26dp color monitor $150[5]
21" Hitachi SuperScan (20" display) .26dp color monitor $650[5]
Number Nine Imagine128 series II video card, 4MB VRAM $299[6]
Number Nine Imagine128 series II video card, 8MB VRAM $549[6]

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Optional 1st year on-site service[7] coverage included
Extended 2nd year on-site service[8] coverage for desktop systems (with system purchase) $79
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Extended 2nd & 3rd year on-site service[8] coverage for desktop systems (with system purchase) $99
Extended 2nd & 3rd year on-site service[8] 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® $49
(upgrade from standard keyboard)

[1] Upgrade from systems with standard 16-bit stereo sound card
[2] Requires SCSI host adapter
[3] V.34 modem includes trial memberships to CompuServe and America Online
[4] V.34 modem includes trial memberships to CompuServe and America Online, requires sound card
[5] Upgrade from systems with standard Micron 17" 17FGx color monitor
[6] Upgrade from systems with standard 64-bit 2MB video card
[7] 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.
[8] 2nd year and 2nd & 3rd year offerings are available in the United States only.

Options and accessories available with system purchase only.

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- 3-year limited parts only system warranty
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PC WORLD DECEMBER 1996

PC MAGAZINE EDITORS' CHOICE FEBRUARY 1997 MICRON MILLENNIA MXE P200

By Michael S. Lasky and Harry McCracken

PUT A PC IN YOUR POCKET

The latest palmtop computers handle everything from Windows word processors to e-mail and voice memos. Are they finally worth the price? PC World editors Lasky and McCracken tried 'em all. Here's their take.

THE AVERAGE NOTEBOOK weighs about 50 pounds, is the size of a footlocker, and runs for five minutes on a battery charge. We exaggerate, of course. But that's what it can feel like after lugging a laptop around for a few days.

And if all you do on the road is crunch a few spreadsheet numbers, send e-mail, and keep to-do lists, carrying a notebook can really feel like a waste of energy. Do you need a Pentium processor, a big color screen, and built-in speakers just to check your appointments and messages? Probably not. If your portable computing needs are fairly simple, it might be time to try a palmtop. It won't replace a PC, but it can be convenient when you don't need notebook power.

Palmtops—also called personal digital assistants (PDAs), handheld PCs (HPCs), organizers, or pocket PCs—are terrific traveling companions. Most of these devices weigh less than a pound, fit in a pocket, and last for up to two months on a couple of batteries. ▶

The latest palmtops, while best for organizing, now run a wider variety of business applications than before—from word processing and spreadsheets to e-mail messaging and Web browsing. Exchanging data with desktop PCs has become much simpler, with appointment calendars that synchronize simultaneously on PC and palmtop. Some new devices even run a "pocket" Windows 95 operating system called Microsoft Windows CE.

We reviewed eight palmtops to see how much improvement you can expect from devices in the marketplace at press time. We judged each palmtop on size, usability, applications, price, and learning curve. Ultimately, though, choosing a palmtop is a very personal decision, so we decided that two *PC World* editors—that's us, Michael and Harry—should look at each device. We used all eight palmtops over a period of eight weeks to do as much of our out-of-office computing as possible.

When it was all over, we found we didn't always see eye to eye on the features we liked, but we did agree on one thing: There is still no one palmtop we can unanimously recommend as a one-size-fits-all choice. That said, we found the Psion Series 3c the best all-around palmtop for just about everything but synchronizing information from your personal information manager with your desktop PC. U.S. Robotics' PalmPilot is indispensable for taking notes, keeping contacts and to-do lists, and reconciling them all with your matching desktop files.

Of the shipping Windows CE handheld computers we looked at, we grudgingly picked the NEC MobilePro 400 as the best so far. This first version of Windows CE isn't as polished yet as the proprietary operating systems found on the other palmtops.

12 CLOWNS IN A VOLKSWAGEN BUG

EVERY PALMTOP manufacturer takes a different approach to the challenge of squeezing a lot of functionality into a small package. Conventional wisdom would dictate that the bigger the palmtop, the easier it is to use, but that's not always the case. For instance, the best palmtops we looked at, including the Psion Series 3c, are about the size of an eyeglass case or smaller. The videocassette-size MessagePad 130, the biggest palmtop here, had a nice screen, but Apple didn't bother to build in a keyboard, which we would have preferred for some tasks. Here's what you can expect to get in a typical palmtop:

■ **Screens.** Palmtops vary in size and quality, but they're all monochrome LCD affairs that don't come close to matching the legibility of a color notebook screen, even when they're equipped with backlighting. Since backlit displays are notorious power hogs, none of these devices has full-time backlighting—you press a button to turn it on temporarily.

■ **Data input.** Every device here except the MessagePad and PalmPilot comes with a miniature QWERTY keyboard. Most also include a pen stylus you can use as a mouse by tapping the touch-sensitive screen. We both found the Psion's keyboard to be the most tolerable—the keys felt the most like those of a regular keyboard and responded nicely. But no palmtop offers touch typing.

The MessagePad and PalmPilot, on the other hand, rely on handwriting recognition—you write on their screens with a pen, and they attempt to convert your penstrokes into editable text.

■ **Power.** All these pocket PCs use readily available AA or AAA batteries with lives that would do the Energizer Bunny proud. Vendors' battery-life claims range from 15 to 100 hours of continuous use, but these estimates are based on different assumptions about what type of work you'll be doing with your palmtop. If you use a PC Card modem with your palmtop, get an optional AC adapter because most modems suck batteries dry in minutes.

■ **Speed.** Palmtops store data in volatile RAM rather than on a hard disk, so loading and saving data files is particularly quick.

All these pocket PCs use readily available AA or AAA batteries with lives that would do the Energizer Bunny proud. Vendors' battery-life claims range from 15 to 100 hours.

FEATURES COMPARISON

PALMTOPS	Street price (2/19/97)	Dimensions when closed (inches)	Weight including batteries (oz.)	Screen dimensions (inches)	Backlit display	Batteries needed	Total RAM/ available RAM	Expansion slots (number and type)
Apple MessagePad 130	$699	4 x 7.9 x 1.2	19	3 x 4	●	4 AA	2.5MB/1.4MB	1 PC Card Type II
Casio Cassiopeia	$499	6.9 x 3.5 x 1	13.8	4.6 x 2.4	●	2 AA	2MB/1.5MB	1 PC Card Type II
Compaq PC Companion	$499	6.9 x 3.5 x 1	13.8	4.6 x 2.4	●	2 AA	2MB/1.5MB	1 PC Card Type II
Hewlett-Packard OmniGo 100	$249	6 x 3.7 x 1	11.6	2.5 x 2.5	○	2 AA	1MB/379K	1 PC Card Type II
NEC MobilePro 400	$649	6.9 x 3.7 x 1	8	4.6 x 2.4	○	2 AA	4MB/3.5MB	1 PC Card Type II
Psion Series 3c*	$499	6.5 x 3.4 x 0.9	9.7	5 x 1.9	●	2 AA	2MB/1.7MB	2 Solid State Cards
Sharp Zaurus ZR-3500X	$499	6.3 x 3.5 x 1	11.8	3.5 x 2.3	●	2 AA	1MB [4]/650K	–
U.S. Robotics PalmPilot Professional*	$399	3 x 4.8 x 0.6	5.7	2.3 x 2.3	●	2 AAA	1MB/0.8MB	–

* Best Buy ● Yes ○ No

[1] Includes calendar, address or contact book, calculator, and either word processor or notepad. Other included software noted on chart.

[2] Backup software only.

[3] Extra-cost option.

[4] Additional 1MB flash built-in.

Psion Series 3c and U.S. Robotics PalmPilot

NO SINGLE PALMTOP is the perfect desktop replacement, but the $499 Psion Series 3c comes closest. It's the clear leader for all-around computing. The Psion is the only pocket PC with a screen wide enough to handle imported files without having to reformat them. Although its PIM synchronization is lame, we were awed by its responsive multitasking and the quick processing of its multitude of built-in apps.

What the Psion can't accomplish with calendars and contact lists, the $399 U.S. Robotics PalmPilot does with aplomb. For appointments, to-do lists, simple note taking, and contacts, the pen-only U.S. Robotics PalmPilot is your best bet. It can synchronize and reconcile data with all the major desktop PIMs, and the interface is well thought out. Our only beef is its Graffiti handwriting recognition system: It can be difficult to learn, making PalmPilot input slow going for some people.

Illustrated stylus pens are from the DigitalWriter PDA pen line of A.T. Cross Co. (800/510-9660).

PSION SERIES 3C

U.S. ROBOTICS PALMPILOT

With no major boot-up process, all the palmtops here spring to life as soon as you power on, returning to the application and data file you used in the previous session.

■ **Software.** All palmtops come with the basics: an address book and calendar, a notepad, and a calculator. The best-equipped units—the Windows CE devices, the Psion Series 3c, and the Sharp Zaurus ZR-3500X—go far beyond that with word processors, spreadsheets, databases, and even games like Solitaire. Since palmtops must jam all this built-in software into no more than a few megabytes of ROM, the applications don't come close to having all the advanced features found in programs like Microsoft Office 97, for example.

The availability of additional software varies from model to model. Commercial packages such as Symantec's Act and Microsoft's Automap, in addition to shareware, are available for Apple's MessagePad or Psion's Series 3c. The selection is skimpier for the HP OmniGo 100, the PalmPilot, and the Zaurus. Ultimately Windows CE units will probably enjoy the biggest variety of third-party software.

■ **Synchronization.** If you use a palmtop in conjunction with a desktop PIM such as Lotus's Organizer or Microsoft's Schedule+, synchronization features reconcile individual appointments and address book entries *in both directions*, so both the palmtop and the desktop PIM reflect changes no matter where you made them. Some palmtops do, however, require third-party software to accomplish this.

				STANDARD SOFTWARE [1]				
IrDA infrared port	Input devices	PC cable and connectivity software	Fax	Spreadsheet	Database	Sketching	E-mail	Web browser
●	pen	●[2]	●	○	○	●	○[3]	○[3]
●	pen, keyboard	●	●	●	○	○	●	●
●	pen, keyboard	●	●	●	○	○	●	●
○	pen, keyboard	○[3]	○	●	●	●	○	○
●	pen, keyboard	●	●	●	○	○	●	●
●	keyboard	○[3]	○	●	●	○	○[3]	○[3]
●	pen, keyboard	●	●	●	●	●	●	●
○	pen	●	○	○	○	○	○	○

SERVICE AND SUPPORT: All palmtops come with a one-year manufacturer's warranty. All come with unlimited free phone support except the Apple MessagePad 130, which has 90 days of free phone support. Each vendor varies days and hours of support.

ARE PALMTOPS RIGHT FOR YOU?

PALMTOP PRICES RANGE from about $250 to $700; that's without "extras" like data synchronization, e-mail, or compatibility with other desktop packages (see "How Much Do Palmtops Really Cost?").

Once you've made up your mind to buy one, hands-on experience is the only way to know whether you'll swear by a particular palmtop or swear at it. Most vendors offer decent service and support, but the amount of free time and actual hours of tech support availability vary widely, so be sure to check before making a purchase. If a palmtop does fit your needs, you'll probably be able to tell fairly quickly—and you may wonder how you ever lived without it. ▶

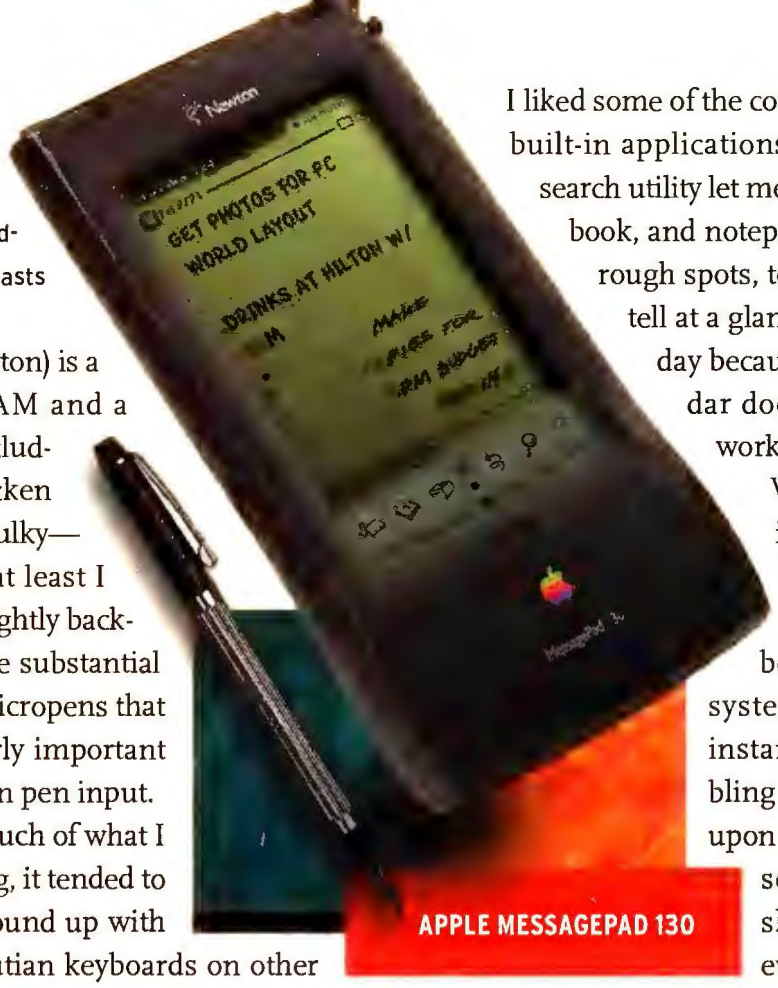
APPLE MESSAGEPAD 130

PRO: Easy-to-read screen, powerful search feature, lots of third-party software available

CON: Large size, no built-in keyboard, no spreadsheet or e-mail software, free phone support lasts for only 90 days

HARRY The MessagePad 130 (aka Newton) is a pricey $699 unit with 2.5MB of RAM and a smallish collection of applications, including a Newton version of Intuit's Quicken personal finance program. While it's bulky—roughly as large as a videocassette—at least I didn't have to squint to read the big, brightly backlit screen, and the stylus felt a lot more substantial in my hand than the twiglike plastic micropens that other palmtops have. That's particularly important since the keyboardless Newton relies on pen input.

The Newton flawlessly interpreted much of what I wrote, but when it got something wrong, it tended to get it really, really wrong. Overall, I wound up with more errors than I did with the lilliputian keyboards on other devices or the Graffiti handwriting system on the OmniGo and PalmPilot. An optional $90 external keyboard makes accurate input easy, but it's larger than the MessagePad itself.



APPLE MESSAGEPAD 130

I liked some of the conveniences of the MessagePad's built-in applications. The extremely handy global search utility let me quickly locate calendar, address book, and notepad entries. However, there were rough spots, too. For instance, it was tough to tell at a glance what I had scheduled for the day because the default view of the calendar doesn't squeeze an entire 9-to-5 workday onto one screen.

While the MessagePad 130 is definitely an acquired taste, and the handwriting recognition needs work, I had *fun* using it, in part because the Newton operating system has a sense of humor. For instance, you delete items by scribbling across them vigorously, whereupon they vanish in an animated on-screen burst of smoke. Call me shallow, but this amused me every time it happened.

MICHAEL Harry, you're shallow. I want a good pocket PC—not a souped-up Etch A Sketch. Being a Windows 95 user, I was at first confounded by the Newton's simple, write-on-me interface. I ▶

WINDOWS CE Windows 95 Gets Small

MICROSOFT says *CE* stands for nothing in particular. The company is positioning the software for handhelds as a PC "companion." We liked CE's similarity to Windows 95 and the range of programs that HPCs should be able to use soon, but Microsoft could do a better job with some of the built-in apps.

HARRY Windows CE really does look and act a lot like Windows 95: It's got a Taskbar, Start button, Control button, and Shortcuts, among other Win 95 features.

But overall, I found that what works for a desktop operating system doesn't always adapt well to the diminutive realm of palmtops, especially when the screens on most CE machines have just a 480 by 240 resolution that forces reformatting of wider-resolution desktop files. As familiar as the interface is, the sophisticated, Win 95–like use of text and icons is often too small to decipher easily on an itty-bitty screen.

MICHAEL Itty-bitty I can put up with. But less glare-ridden displays than those found on the first units are a must for them to be truly useful.

HARRY As with Windows 95, it's a double-clicking world in Windows CE, which requires tapping the pen twice against the screen with just the right timing. It's difficult to master—I found myself quadruple- and quintuple-clicking, and wishing that Windows CE used single clicks, like other palmtops do.

MICHAEL I know what you mean. At one point I thought I'd be better off clicking *my heels* together three times while chanting, "There's no place like home."

WINDOWS CE LOOKS LIKE Windows 95, but it has far fewer features than the desktop version.

HARRY Windows CE comes with palmtop versions of several Microsoft desktop applications, including Pocket Word and Pocket Excel. They look more or less like miniature versions of their desktop counterparts, so they're easy to learn and use. But the "Pocket" is a tip-off that they're short on features.

MICHAEL You can say that again—they're particularly "lite" when compared with similar apps on the Psion. Word files can be saved only in "pocket" or plain text format; on the Psion, you can save text in Rich Text Format, saving a conversion step on the PC.

Microsoft also skimped with printing from Windows CE—you can't. Instead, you have to copy files to your desktop PC and print from within the desktop applications.

HARRY Microsoft was Net-minded enough to make Internet features a standard part of Windows CE, with built-in TCP/IP connectivity, Pocket Internet Explorer, and Inbox electronic mail (which allows messaging but no document attachments). Pocket Internet Explorer is the first palmtop Web browser I've seen that handles graphics—albeit in rudimentary, monochrome fashion—and Inbox can handle Internet mail, Exchange mail downloaded from a desktop PC, or even wireless mail (using third-party services such as WyndMail and Zap-It).

See Windows CE palmtop reviews, page 166.

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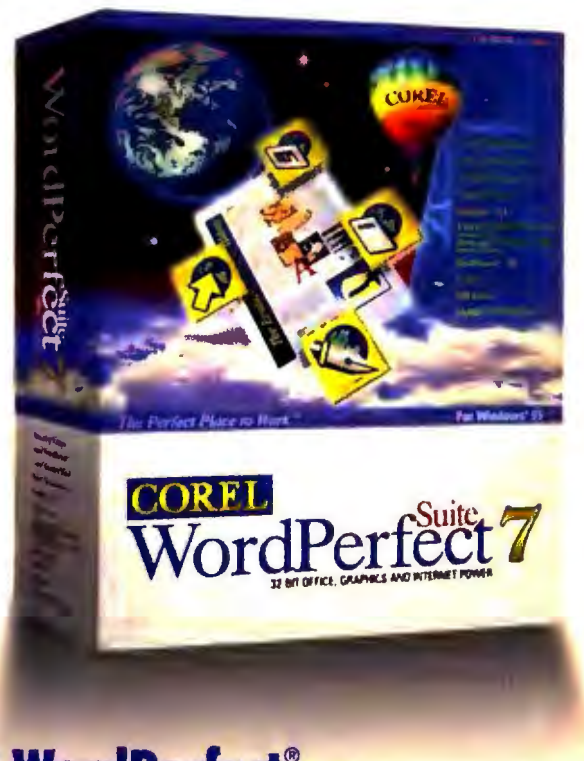

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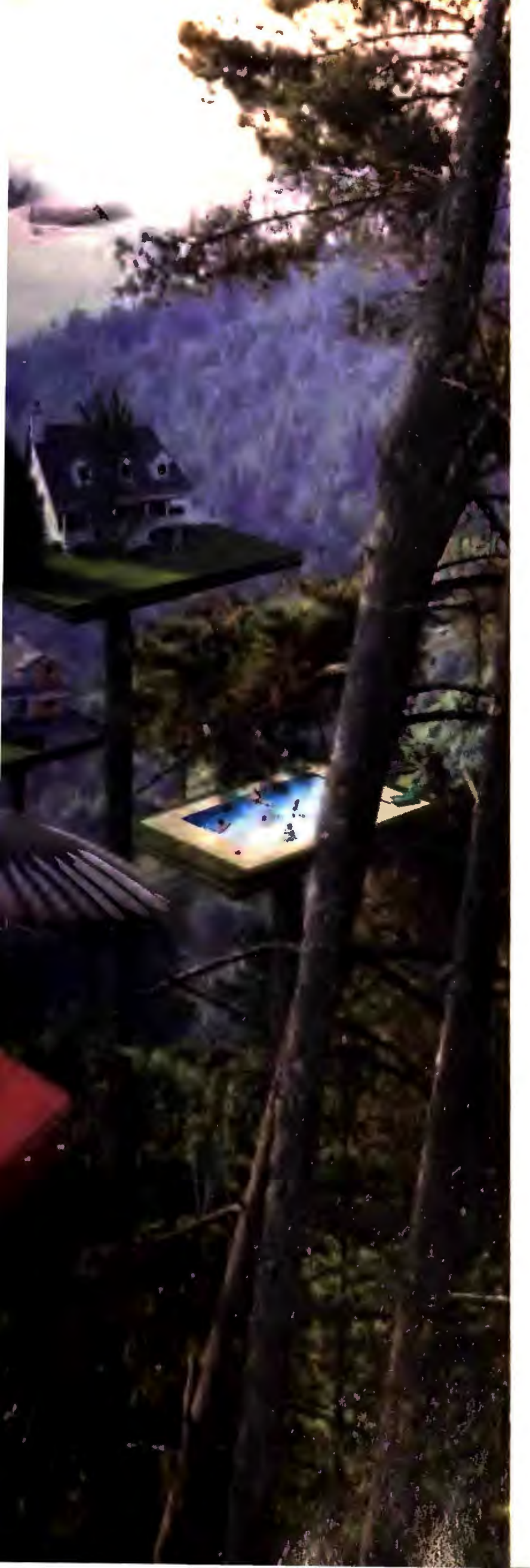

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still can't figure out how to delete a contact record I made, and when I tried the "vigorous scribble" it was interpreted as input, not a cue to erase. I now have a contact that looks like it was finger painted. Duh!

I will concede that I liked the MessagePad's handwriting recognition system, especially compared with Graffiti on the PalmPilot and the OmniGo. And yes, the third-party application support is great, but to what avail? You're still putting that software on a stylus-dependent device on which you have to tap more than Fred Astaire. As far as pocket PCs go, this 1.2-pounder is a great fit—if you're a kangaroo. *Apple Computer, 800/364-0766, http://www.info.apple.com/newton*

READER SERVICE NO. 709

HEWLETT-PACKARD OMNIGO 100

PRO: Inexpensive, one of a few palmtops with a database program, flexible input options

CON: Few connectivity and communications options, small screen with no backlighting, paltry third-party software

HARRY At first blush, HP's $249 OmniGo 100 looks like a good low-cost alternative to the Psion, the Zaurus, or a Windows CE palmtop. But there's a reason why HP touts this device as an "organizer plus" and not a pocket PC. In addition to an address book and calendar, the OmniGo comes with a lot of built-in software applications, but they don't do much.

Even by palmtop standards, the OmniGo 100's 2.5-inch-square screen is small, and more prone to glare than most. (An upscale model, the $349 OmniGo 120, has a somewhat more legible display.) The OmniGo 100 does score points for its versatile approach to input: As with the Zaurus and the Windows CE machines, you can open its clamshell case and type on its tiny keyboard, while tapping on the touch screen using a pen as a mouse substitute.

But you can also flip the screen back a full 180 degrees and use the OmniGo as a pen-only device. In this case, you enter text and numbers using Graffiti, a handwriting recognition program in which you write simplified versions of most characters. Graffiti can be quick and accurate, but I found it more tedious than just using the keyboard. It can be daunting to learn as well. I forgot how to enter some of the special penstrokes unless I used the OmniGo frequently.

Unlike the PalmPilot, the OmniGo comes with a good selection of on-board applications, including an address book and calendar, word processor, spreadsheet, database, stopwatch, and calculator. All the software is easy to use, but the programs are slow and have few advanced features: The word processor has no spelling checker, and the address book provides only a few fields. The database is an exception—it's a surprisingly powerful app with basic database features such as the ability to create drop-down pick lists.

The OmniGo's real weaknesses revealed themselves when I tried to use it for anything other than an "organizer plus." Little commercial software is available, and HP doesn't sell a modem or even an AC adapter for the OmniGo. Even HP's $49 Connectivity Pack seems incomplete: You *might* be able to swap address books with your current desktop PIM by using intermediary data formats such as comma-separated values, but there's no way at all to exchange calendars, spreadsheets, or even plain text files. The software moves files between the palmtop and your PC, but only if they don't have to be converted. I've heard rumors that better connectivity software is in the works, but HP wouldn't confirm this at press time. To be fair, online discussion groups such as CompuServe's HP forum are full of messages from resourceful tinkerers who have gotten the OmniGo to work with PC Card modems and run a variety of shareware. But who wants to go to all that trouble?

MICHAEL I found so many of its features difficult to use, I wanted to rename this device the OmniStop. Its diminutive design was my first obstacle: Even with my glasses, I felt I needed a magnifying glass to read the minuscule text on the postage stamp–size, glare-ridden screen. And I can see why the handwriting recognition program is called Graffiti—that's what my chicken-scratching attempts to master it looked like. (I still think the best place for Graffiti is walls, not computer screens.) *Hewlett-Packard, 800/443-1254, http://www.hp.com:80/handheld/organizers*

READER SERVICE NO. 710

How Much Do Palmtops Really Cost?

MODEL	Base unit with 2MB of RAM	AC adapter	PC connectivity cable and synchronization software	14.4-kbps modem	Internet e-mail/ Web browser	Total
Apple MessagePad 130	$699 [1]	$30	cable included/software $69	$120	$70/$50	$1038
Casio Cassiopeia	$499	$35	included	$120	included	$654
Psion Series 3c	$499	$20	$99 for both	$199	$49 for both	$866
Sharp Zaurus ZR-3500X	$499 [2]	$7	included	included	included	$506

[1] 2.5MB of RAM. [2] 1MB of RAM and 1MB of flash memory.

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PSION SERIES 3C

PRO: Powerful dynamo has Windows-compatible apps, zippy multitasking, extensive expandability, best palmtop keyboard

CON: Poor PDA-to-PC agenda synchronizing, PC and modem connectivity are expensive extras, short technical support hours

MICHAEL I'm writing this on an overnight business trip. My hotel room has become my office away from the office, thanks to the 9.7-ounce Psion Series 3c. Right now I have my calendar, word processor, spreadsheet, and spelling checker open simultaneously and I can move between each application as quickly as flicking a light switch. The Psion's responsiveness, bantam weight, miserly battery consumption, and no-brainer compatibility with popular Windows apps have sold me on the virtues of palmtop computing.

"I prefer the Psion for many reasons—its pocketable size, its quick multitasking between applications, and its great backlighting to read the screen in dark places."

BOB HARRIS, film archivist

Not that the Psion doesn't have its share of flaws, mind you—I'm sure you'll bring them up, Harry. But despite that, I have bonded with it. None of the palmtop keyboards are for touch typists, but I found the Psion's the most responsive. The screen doesn't have the eye-straining glare of other palmtops, and it's wide enough (5 inches) to display a formatted document from Microsoft Word properly, something that other palmtops can't do.

Though the Psion makes life easy for Windows users by providing direct file compatibility with Windows standards such as Rich Text Format for word processing documents and Lotus's .WKS for spreadsheets, its icon screens bear only a faint resemblance to the familiar Windows interface. But that didn't get in my way. I was hip to working on the Psion in the shortest time of any palmtop I used. What helped, no doubt, were the nine buttons on the keyboard that let me jump directly to the most frequently used applications on board. My favorite app is a digital sound recorder that lets me play .wav files and record voice memos; a 10-second message consumes about 82K. The selection of third-party software for the Psion is broad, including Symantec's Act, Microsoft's Automap, and lots of high-quality shareware.

While the Series 3c sells for about $499, you must add $99 to the bill for PsiWin 1.1, which includes a serial cable and excellent software for exchanging data with a wide variety of Windows word processors, spreadsheets, and PIMs. For connecting to your company's cc:Mail or Microsoft Mail system, figure another $149 for a single-user version of PsiMail; an Internet mail/browser add-on is $49 more. And then there's a modem: Psion's external 14.4-kbps Travel Modem is pricey at $199. There is no built-in PC Card slot, but the Psion does have two slots for proprietary, matchbook-size memory cards and application cards.

One other thing: The Series 3c's backlit display is bright enough to let me stay productive in my poorly lit hotel room. In fact, I turned it on in the middle of the night to illuminate my way to the bathroom. How's *that* for utilitarian?

HARRY I heartily second your praise for the Psion's speed, friendliness, and overall utility, Michael—this British palmtop may be the most helpful transplant from England since Batman's butler, Alfred. I was initially taken aback by the lack of a pen, but that's one less thing you have to fumble with, and you can navigate menus efficiently from the keyboard. The software does have a couple of weak spots, though: The address book is on the crude side, and the synchronization software that comes with PsiWin 1.1 needs a great deal more polish before it can compete with the Windows CE devices, the Zaurus, and the PalmPilot. *Psion, Inc., 800/997-7466, http://www.psion.com*

READER SERVICE NO. 711

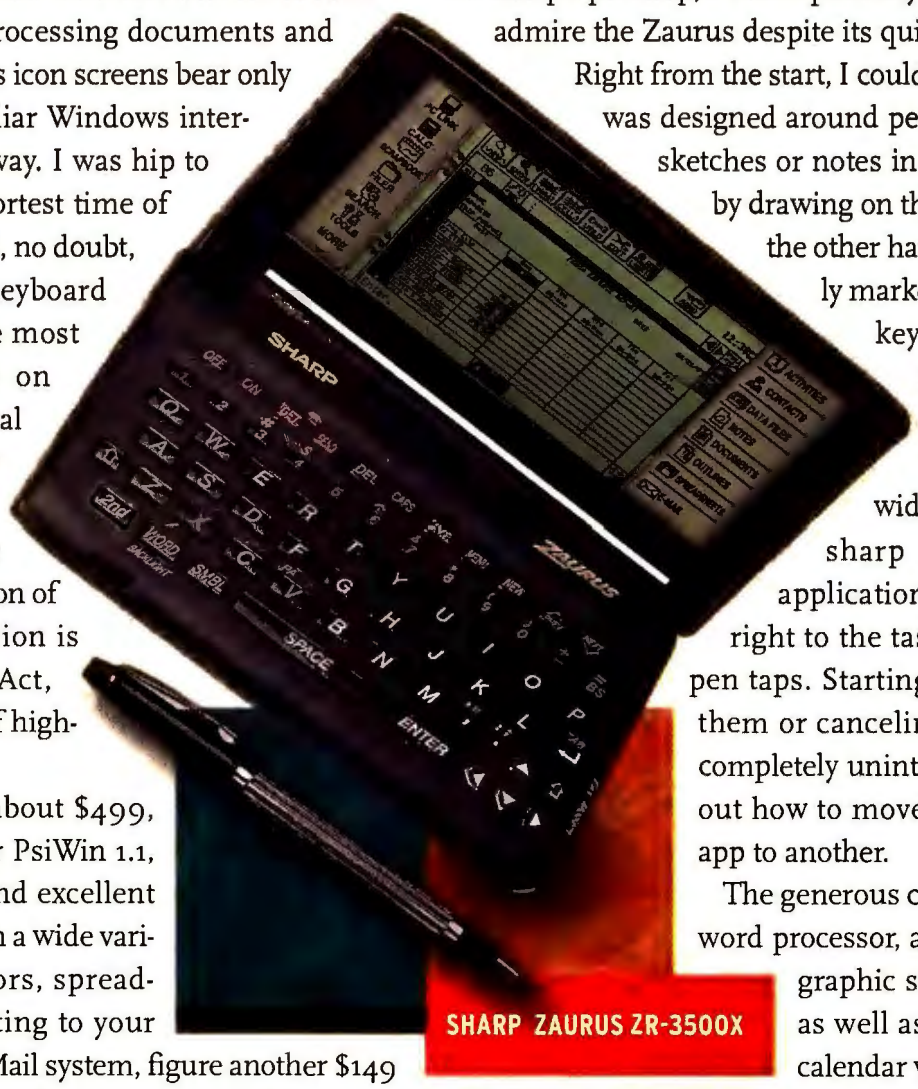
SHARP ZAURUS ZR-3500X

PRO: Easy-to-read screen, built-in modem and e-mail support, file linking between PIM and other apps, comparatively inexpensive

CON: Hard to learn, poor keyboard layout, meager third-party software

MICHAEL If I could only figure out how to use all the features on Sharp's palmtop, I would probably love it. As it is, I reluctantly admire the Zaurus despite its quirky user interface.

Right from the start, I could see this $499 palmtop PC was designed around pen input—it's easy to insert sketches or notes in almost any document just by drawing on the screen. The keyboard, on the other hand, is laid out with obscurely marked function keys; the <Tab> key is contrarily on the right; and the keys themselves have little give.



SHARP ZAURUS ZR-3500X

The Zaurus's 3.5-inch-wide by 2.3-inch-long screen is sharp (no pun intended), and application-specific buttons take me right to the task I want with a couple of pen taps. Starting apps is easy, but closing them or canceling actions within them is completely unintuitive. I could never figure out how to move back and forth from one app to another.

The generous collection of apps includes a word processor, a spreadsheet, a database, a graphic scrapbook, and an outliner, as well as a contact manager and a calendar with daily, weekly, monthly, and even yearly views. A file-linking feature lets me attach any file, such as a spreadsheet or word processing document, to ▶

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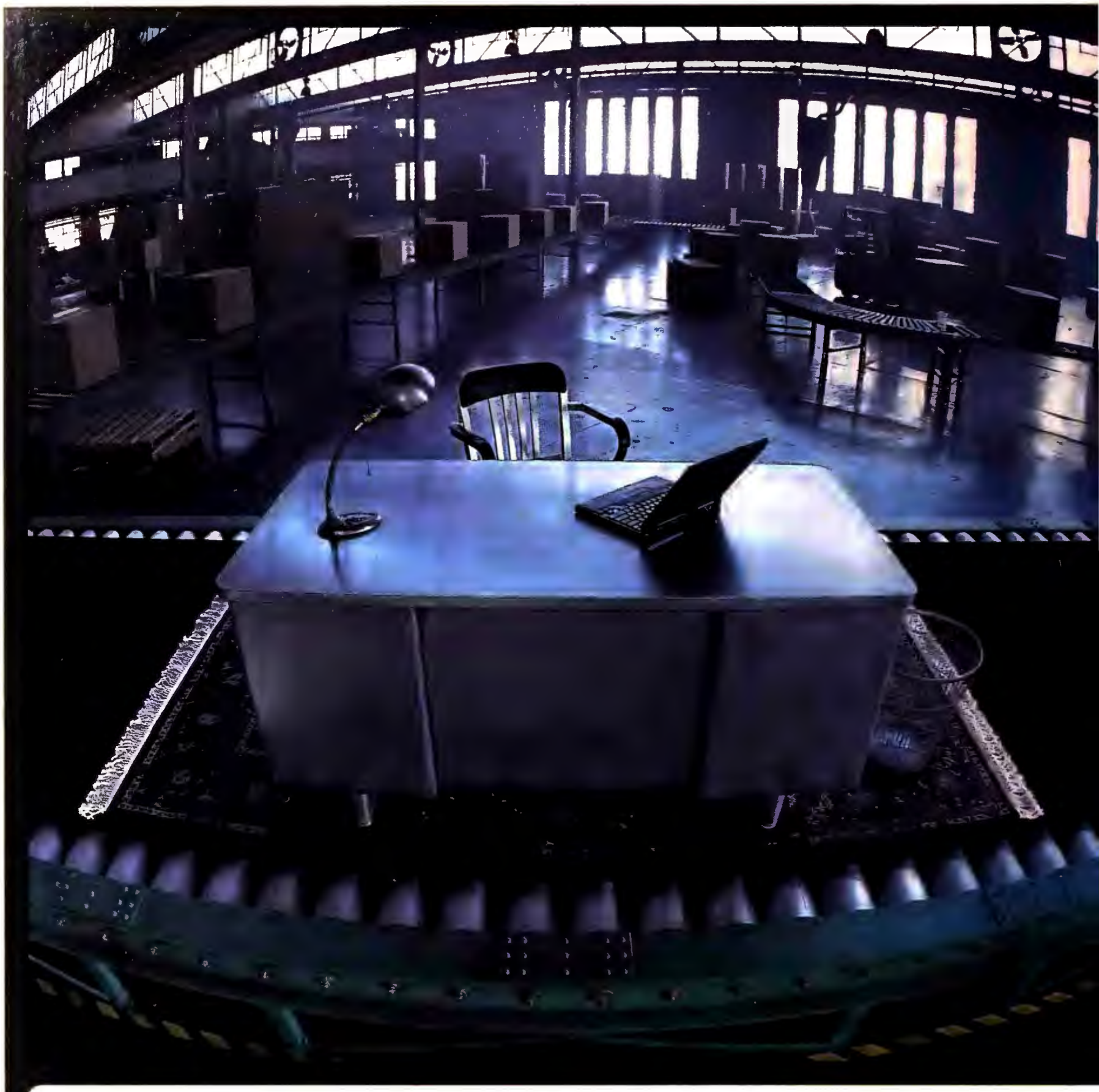

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an appointment or a contact name; when I call up either the contact or the document, the other file is just a touch away.

Although the ZR-3500X doesn't have a PC Card slot (a larger, more expensive model, the $750 ZR-5800FX, does), it comes with 1MB of RAM, of which 350K is reserved for system files and 650K is available for user data, more than sufficient for most uses. Unlike the other palmtops we tested, the Zaurus comes with a modem: a built-in 14.4/9.6-kbps data/fax-modem, with software for Internet e-mail, faxing, and CompuServe.

The catch to all these features is that it takes so long to learn how to use them. I had to refer to the Zaurus documentation constantly—even deleting files or undoing a previous action left me stumped. Ultimately this PDA is probably worth learning, but I found the Zaurus so off-putting, I renamed it the *Tsuris*—that's Yiddish for trouble.

HARRY No doubt about it, learning to use the Zaurus can be daunting, especially in comparison to the familiar environs of Windows CE and the sleek simplicity of the Psion Series 3c. As a southpaw, I also felt like the Zaurus's pen input was designed with the right-handed majority in mind—my hand kept covering the screen as I reached for an icon or menu option. Even so, I'm impressed by how much value Sharp has packed into this midprice palmtop. Feature for feature, it has the richest software applications of any palmtop here. The bundled file transfer and synchronization software also works well. If I could convince my employer to buy me a palmtop, I'd probably ask for a Psion, but if I were spending my own money, the Zaurus would be a real contender.

Sharp, 800/321-8877, http://www.sharp-usa.com/zaurus

READER SERVICE NO. 712

U.S. ROBOTICS PALMPILOT

PRO: Lightest, one-touch palmtop/PC synchronization, inexpensive

CON: Requires learning a handwriting recognition language, difficult to hold without smudging screen

MICHAEL If all you want from a palmtop is hassle-free management of your calendar and contacts, U.S. Robotics' PalmPilot is the most indispensable device here. Yes, that's a big statement. Here's my evidence.

First, it's by far the smallest, easiest-to-carry palmtop we tested—it's about the size of a deck of playing cards and weighs less than 6 ounces, so it fits comfortably in my shirt pocket. Second, synchronizing the PalmPilot with my desktop PC's PIM really is a one-button process. The PalmPilot comes with an unobtrusive desktop cradle that connects to my system's serial port: I simply stick the PalmPilot in the cradle, press a button on the device, and the bundled HotSync software automatically launches on my desktop computer and shuttles updates to my calendar and address book in both directions. The PalmPilot works with popular PIMs such as Microsoft Schedule+ and Lotus Organizer.

I used the $399 PalmPilot Professional Edition, a 1MB version that handles a whopping 2400 appointments (four years' worth), 4000 addresses, 750 to-dos, and memos and e-mail. There's also a $299 512K Personal Edition without e-mail. Either version's power consumption would delight Scrooge: two to three *months* of daily use on a couple of AAA batteries. Both versions include an expense tracker applet and backlighting. An optional $129 14.4-kbps external modem is needed to connect to e-mail.

"The PalmPilot is the only thing that's allowed me to keep a balanced checkbook. Besides, carrying a small computer all the time looks geeky."

JULIE STRIETELMEIER, software engineering technician

As ingenious as the PalmPilot is in most respects, mastering its Graffiti handwriting recognition software was an arduous process. Good thing there's an on-screen keyboard.

HARRY Call me fussy, but I've always believed that a computer should adapt to my way of doing things. The problem with Graffiti is that it demands that I learn a new way of writing. I also found it hard to hold the tiny PalmPilot without smudging the screen with thumbprints, and whenever I took the unit out of my pocket, the wheel that controls screen contrast got shoved to the lowest setting. These reservations keep me from giving the PalmPilot an unqualified rave, but this palmtop's price, size, and effortless desktop synchronization are all hard to beat. If U.S. Robotics starts making them with real keyboards, I'll be in palmtop heaven.

U.S. Robotics, 800/881-7256, http://www.usr.com/palm

READER SERVICE NO. 713

CASIO CASSIOPEIA

Windows CE

CASIO CASSIOPEIA

PRO: Includes additional fax and e-mail software

CON: Mediocre keyboard and backlighting

HARRY Just as with desktop PCs that run Windows 95, much of the personality of the new Windows CE palmtops is defined by the operating system rather than the hardware features. Casio's palmtop has all the pros and cons of Windows CE we discussed earlier. Casio hasn't added much other than an off-the-wall model name.

The Cassiopeia's ergonomics are so-so at best. Even by palmtop standards, its keyboard is no pleasure to use, mainly because the keys have almost no travel—I often couldn't tell

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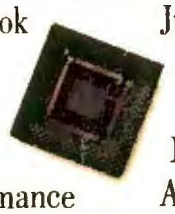

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760MT	166 MHz	1.3GB	12.1" TFT	$3,299

All models are Microsoft® APM 1.2 compliant

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Designed for Microsoft Windows '95

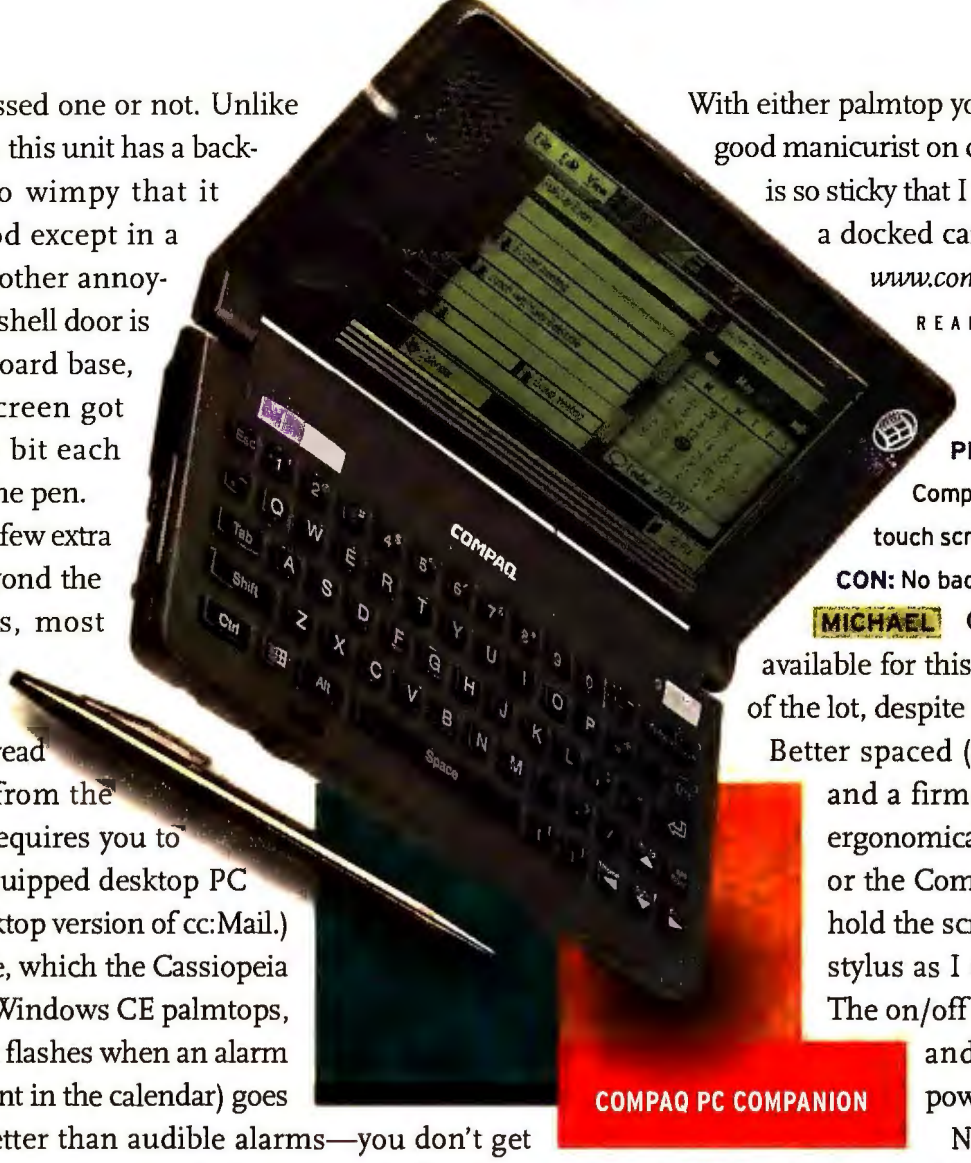
Circle 64 on reader service card

whether I'd really pressed one or not. Unlike NEC's MobilePro 400, this unit has a backlit screen, but it's so wimpy that it doesn't do much good except in a pitch-black room. Another annoyance: Because its clamshell door is heavier than the keyboard base, the out-of-balance screen got nudged backwards a bit each time I tapped it with the pen.

Casio does include a few extra software packages beyond the Windows CE applets, most notably a simple fax utility and a program that lets cc:Mail users read and write messages from the palmtop. (The latter requires you to dial in to a modem-equipped desktop PC that's running the desktop version of cc:Mail.)

One inspired feature, which the Cassiopeia shares with the other Windows CE palmtops, is an external light that flashes when an alarm (such as an appointment in the calendar) goes off. I like this a lot better than audible alarms—you don't get funny looks because your coat pocket is ringing. *Casio, 800/962-2746, http://www.casiohpc.com*

READER SERVICE NO. 714



COMPAQ PC COMPANION

COMPAQ PC COMPANION

PRO: Additional e-mail and utility software included; seven-day, 24-hour support

CON: Mediocre keyboard and poor backlighting feature

MICHAEL The Compaq PC Companion is really a Casio Cassiopeia in Compaq clothing. They are the same machine, both cosmetically and internally, so what you read for the Casio above applies here as well.

What differentiates the two machines are software and service. Compaq includes River Run Software's Mail on the Run, which offers direct and remote access to popular corporate e-mail systems such as Microsoft Mail and Lotus cc:Mail. Also included is DataViz's Desktop to Go for Windows CE, a utility that lets you synchronize, import, and convert files from popular PIMs, spreadsheets, and word processors.

Compaq's support policies are also better than Casio's. Casio limits telephone tech support to 11 hours on weekdays and doesn't offer any type of online support. You can call Compaq's technical support around the clock, and get online support as well.

With either palmtop you'll want to make sure you have a good manicurist on call—the lever on the PC Card slot is so sticky that I nearly broke a nail trying to release a docked card. *Compaq, 800/345-1518, http://www.compaq.com*

READER SERVICE NO. 715

NEC MOBILEPRO 400

PRO: Better keyboard layout than Casio or Compaq, good counterbalance for top-heavy touch screen, good screen contrast control

CON: No backlighting, no third-party apps bundled

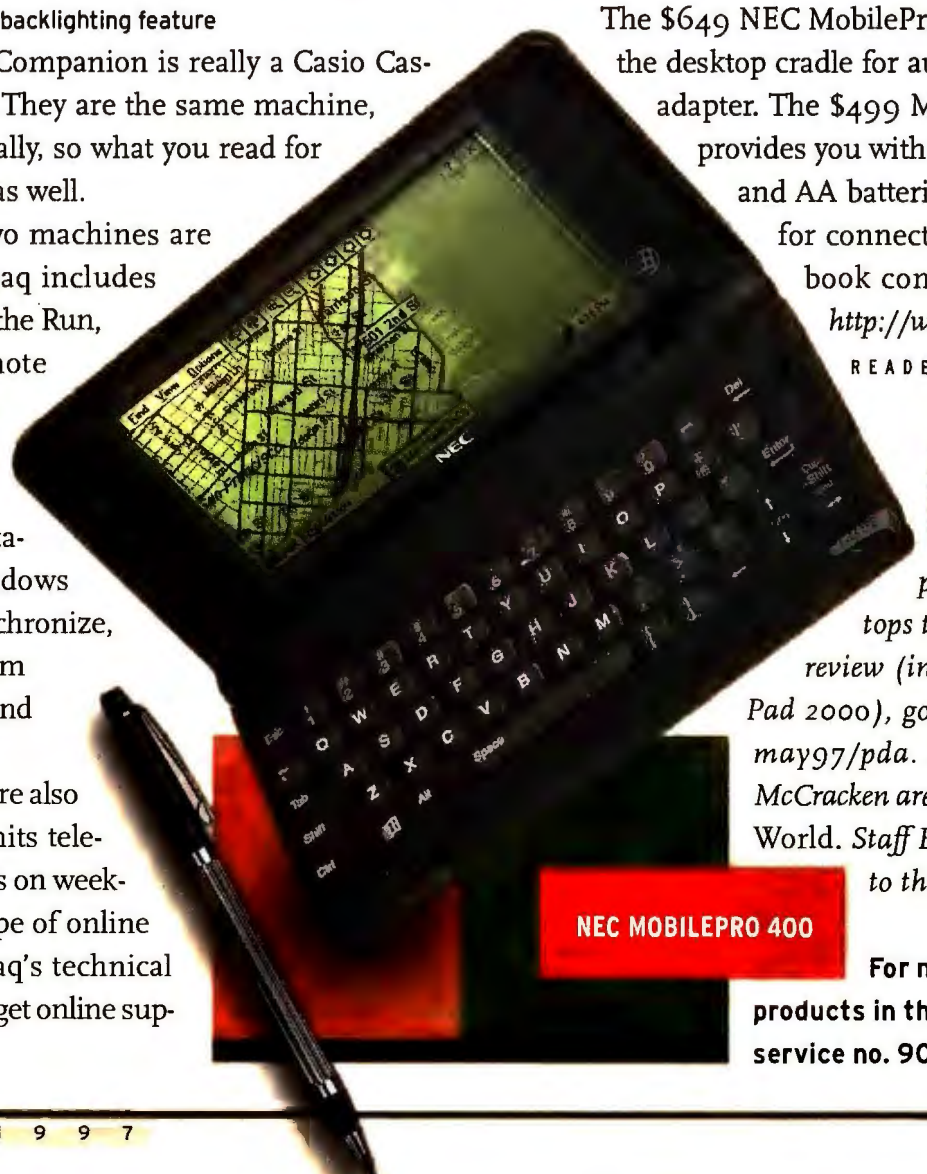
MICHAEL Of the three Windows CE devices available for this review, the NEC seemed the best of the lot, despite its lack of backlighting.

Better spaced (if slightly rubbery feeling) keys and a firmer feeling chassis made it more ergonomically satisfying than either the Casio or the Compaq devices. I also didn't have to hold the screen when I tapped on it with my stylus as I did with the Casio and Compaq. The on/off switch doubles as the alarm light and flashes even if the palmtop is powered off.

NEC is the only Windows CE vendor to include a desktop docking cradle with the purchase of one of its palmtops. (The other vendors offer docking cradles in various forms as extra-cost options only.) The cradle's streamlined, high-tech design makes it easy to slip the palmtop in place. The serial cable fits in either the palmtop itself or in the docking station—another nice feature for different work styles.

The $649 NEC MobilePro 400 features 4MB of RAM, the desktop cradle for automatic syncing, plus an AC adapter. The $499 MobilePro 200, the base unit, provides you with 8MB of ROM, 2MB of RAM, and AA batteries. You also get a serial cable for connection to your desktop or notebook computer. *NEC, 800/632-8377, http://www.nec.com*

READER SERVICE NO. 716



NEC MOBILEPRO 400

online *For an expanded version of this review, plus evaluations of preproduction versions of palmtops that didn't ship in time for this review (including Apple's new MessagePad 2000), go to http://www.pcworld.com/may97/pda. Michael S. Lasky and Harry McCracken are senior associate editors for* PC World. *Staff Editor Eric Hellweg contributed to this article.*

For more information about all products in this article, circle reader service no. 908. ■

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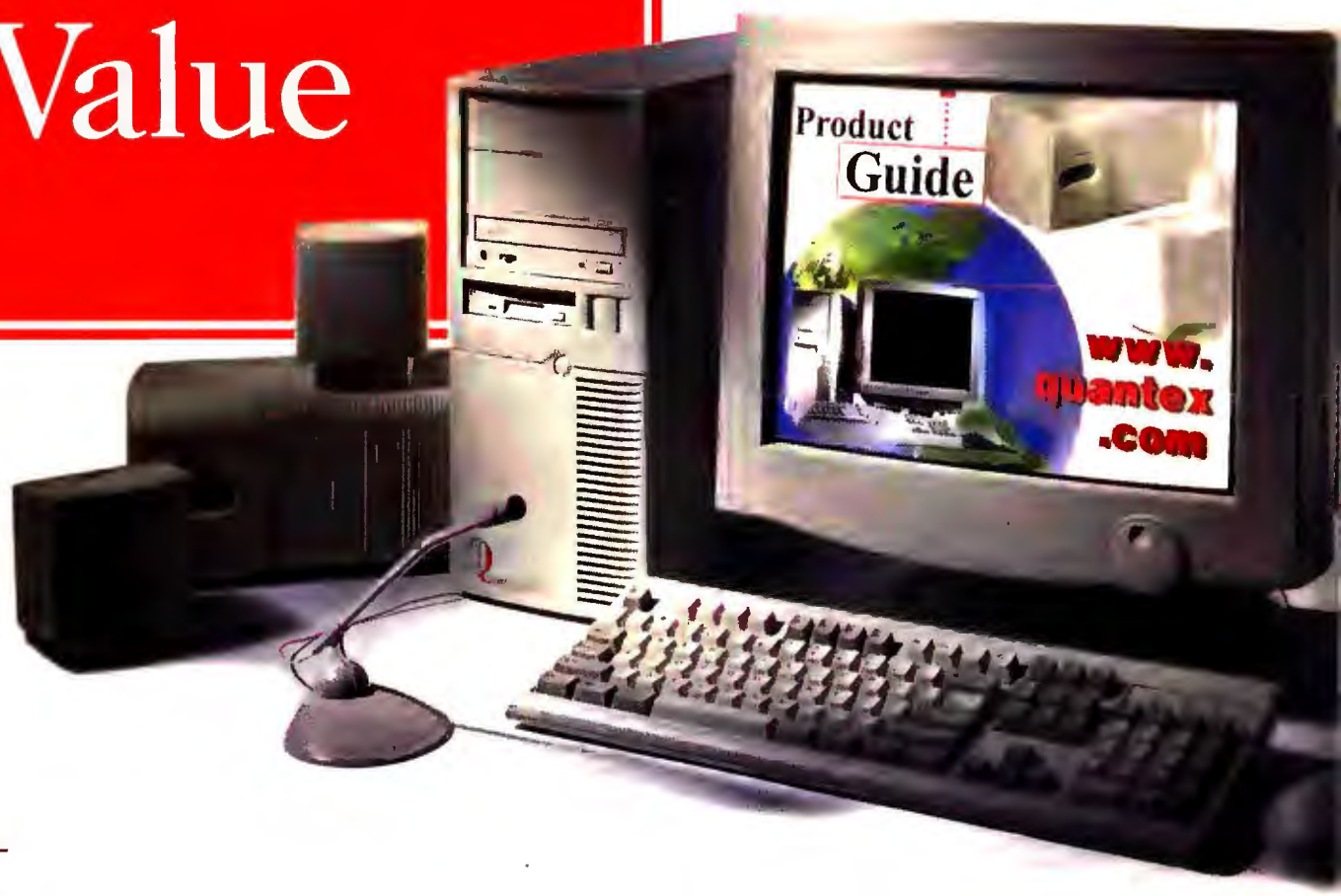

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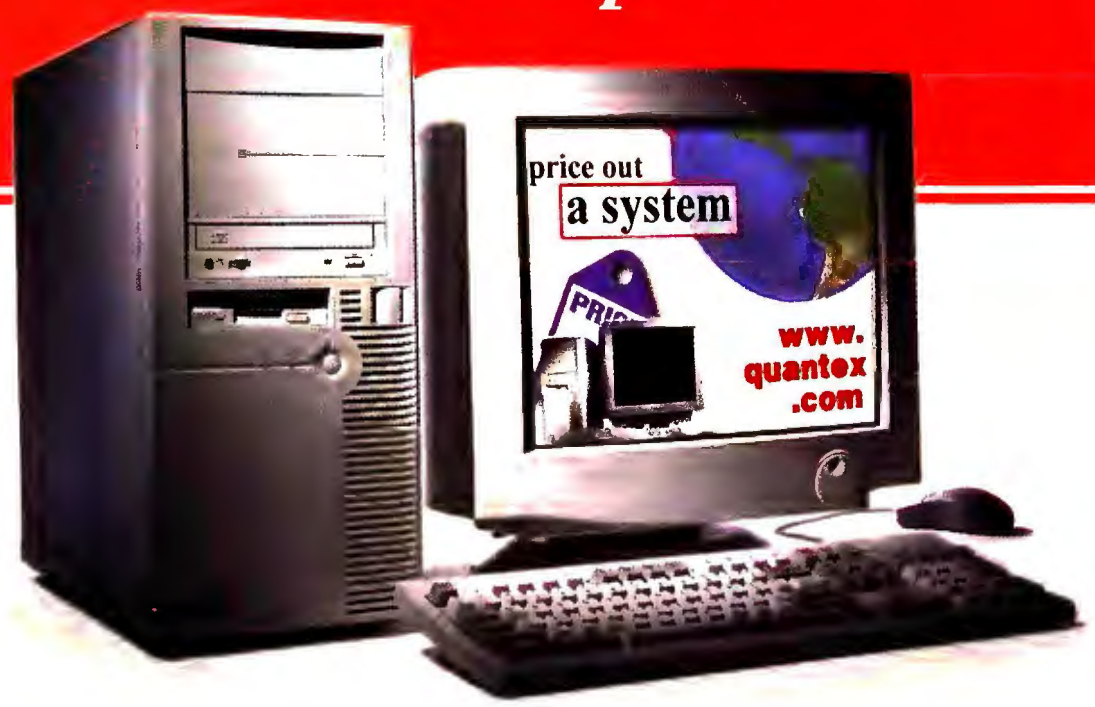

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- Toshiba 16X Max 95ms EIDE CD-ROM Drive
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- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows NT 4.0 Workstation
- 3-year limited Warranty, 24-hr. / 7-day Technical Support

QP5/200WS-3.....$2249
QP5/200 WS-3 (w/MMX™Technology).$2449

QP5/120 WS-1 $1249

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- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
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- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
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Get-rich-quick offers, pyramid schemes that promise easy money, miracle medical cures for a fee—con artists are taking to the Internet with a vengeance.

Don't let them take you.

CyberScams

BY MIKE HOGAN

DANIEL DEANE HAS HAD a rough couple of years. Laid off from his job as an aircraft welder, the 42-year-old Chattanooga resident gave up hope of returning to his trade when he learned he had degenerative arthritis of the spine.

Down but not out, Deane turned to the Internet in search of new opportunities. There he discovered ad after ad for Computer Business Services Inc.'s "turnkey" home businesses. CBSI claimed Deane could buy into a "proven business" and earn up to $4000 a month from home using a computer. It sounded like just what he needed.

It wasn't. By his reckoning, Deane invested more than $16,000 and a year of his life in the venture. He ended up with little more than $2000 worth of outdated PC equipment.

Deane isn't alone. The Federal Trade Commission filed a complaint against the company for false advertising and came away with $5 million to distribute to 15,000 former CBSI "Business Center owners" like Deane.

It's not the first big recovery for the FTC, and the way fraud is growing on the Internet, it won't be the last. People like to think of the Net as a glittering highway to personal enrichment and financial reward. Unfortunately, the bad guys are just as enthusiastic, but they like to think of it as Dodge City—before Marshal Dillon.

Would-be Net crooks roam the Internet, running various confidence games off Web pages, e-mail lists, and online services. Some of the scams were hatched in the online world, but most are simply old scams in new clothing.

Small-time crooks may be after your password to America Online. They might send Instant Messages claiming they work for AOL and need your account information. Or they may send e-mail offering free pornography. When you download the attached file, it grabs your password and ships it to the crook. Or the free porn requires you to download a special "viewer," which hijacks your phone line, disconnects your modem, and dials a foreign country. A federal judge in New York shut down ▶

such an operation in February after victims discovered long-distance charges on their phone bills for calls to Moldova, a small country in the former Soviet Union—at $3 a minute.

Bigger operators are looking for more than a free tour of AOL or a $50 phone call—they're looking to empty your bank account. They'll lure you in with work-at-home schemes, pyramids, charities, fake securities, or miracle cures.

DANIEL DEANE sunk $16,000 and a year's work into CBSI's "guaranteed" home business.

"The Internet is just a new medium for advertising," says FTC Senior Attorney Randy Brook. Even the laws are the same. The crime in the majority of fraud cases—perpetrated by mail, by phone, or over the Net—is false advertising.

But false advertising isn't covered by a single jurisdiction. Depending on the case, each state has various business, criminal, and civil codes that may apply. On the federal level, the FTC has a set of regulations, the Securities and Exchange Commission has another, and the Justice Department yet another. A crime perpetrated over the Internet is particularly difficult to prosecute because—without a geographical location—it's harder to determine who has jurisdiction.

The FTC, along with other federal and state regulatory organizations, considers early detection of unsavory business ventures on the Internet absolutely necessary.

This is no easy task, though; the Net offers huge advantages to swindlers. And its sheer size makes monitoring a nightmare. The number of users flocking online in recent years lets scammers reach a lot more people with a lot less effort. Operating a fraud on the World Wide Web is also cheap. "It's clearly the wave of the future in terms of fraud," says Bill McDonald, chief of enforcement for the California Department of Corporations, a securities regulator. Fraud not only looks legit for less on the Internet but it gains a certain technological mystique. People expect a degree of truth from advertising. That expectation of truth extends to advertising on the Internet. A slick, well-produced Web page can win the trust of an unwary consumer.

And plenty of folks fall prey to that ad. Although no data about Internet fraud is available, a Harris Poll commissioned by the National Consumer League in 1992 (when Internet travel was rare) found that 9 out of 10 Americans had been approached by a fraudulent operator at some point in their lives, and that 29 percent of those had expressed interest in the scheme.

NO-PLACE-LIKE-HOME SCAMS

As with many scams, common sense should have warned Daniel Deane that CBSI's promise was too good to be true: "Earn Potentially Up To $4,000 Per Month From Your Home With A Computer!" But he wanted to believe.

For $16,000, Deane got a 486 PC, a 1200-bps modem, a small monitor, and several proprietary software packages. Then he and his family spent a year trying to make a go of CBSI's automated time/weather service and phone reminder business. They mailed out business cards and put flyers on cars. They spent $150 a month from Deane's $750 Social Security check.

Deane is exactly the kind of guy that purveyors of get-rich-quick and work-at-home schemes look for—vulnerable but motivated, looking for a better life, undergoing a change in circumstances.

"CBSI advertised on their Web page that they had thousands of people earning $4000 a month," says Catherine R. Fuller, lead attorney in the FTC's Chicago office. "Few people made enough money to even recoup their investment."

Fuller won $5 million in the FTC's suit against CBSI, and CBSI president Andy Douglass faces yet another suit brought by the Indiana attorney general on similar grounds. Douglass hasn't shut down

PHOTOGRAPH: TAMARA REYNOLDS

A Quick Look at Internet Fraud

A lineup of common online scams, and ways you can avoid them.

WORK-AT-HOME SCHEMES You're promised fantastic returns from proven businesses anyone can ply. Up-front fees range from a few bucks to thousands. Work-at-home businesses are not illegal, but making false claims about how much money they can bring in *is*.

PYRAMIDS The most common type of online scam, a pyramid makes money principally by recruiting others into a venture with unclear business goals and a confusing compensation plan. Watch out for any venture whose focus is signing up new distributors who kick in an entry fee.

CHARITY PYRAMIDS A noble cause diverts attention from the mathematical mumbo-jumbo of a run-of-the-mill pyramid. Participants seem more willing to be fleeced if the cause is noble.

PONZIS Much like pyramids, except early entrants are actually paid fantastic returns—supposedly from some innovative investment. In reality, the money comes from newcomers.

BOGUS SECURITIES Don't know the difference between an inter-American hard-currency bond and a prime bank security? No one

operations at "CBSI Plaza" in downtown Sheridan, Indiana, though. The $4000-a-month promise is gone, but a glossy Web page remains.

Douglass disputes the FTC's accusation and insists that the FTC is making CBSI a scapegoat.

The Council of Better Business Bureaus received more than 215,000 inquiries about work-at-home ads in 1995. Data for 1996 isn't available yet, but with the burgeoning of the Internet, no one anticipates a decline. Unlike some frauds, though, these businesses themselves aren't illegitimate, explains Fuller. It's only the deceptive advertising claims that are illegal.

More insidious—and more prevalent—is the pyramid scheme, says the National Fraud Information Council.

COMPUTER BUSINESS SERVICES INC.

CHANGED TACTICS: In addition to paying out $5 million in redress to failed business owners like Daniel Deane, CBSI had to modify its advertising. Gone are the guarantees of $4000 a month. In fact, you'll find very few promises here. Rather, you're encouraged to submit your name and address, so CBSI can send you information by mail.

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With more and more Americans jumping off the corporate ladder and into home-based careers of their own, now is the time to explore the issue with George and Jeanie Douglass, America's experts on working from home.

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HELPING OTHERS HELP YOU

PYRAMID SCHEMES seem innocuous enough. You get a letter asking for a small investment and promising huge returns when your name gets to the top of the distribution list. Recast this exercise as a business venture in which you recruit investors and they recruit more, and you could be on the wrong side of the law.

That's just what happened to Chuck Humphrey and about 25,000 others who got an e-mail promising $5250 a month for each $250 invested. The offer came from a New Age "personal co-op" called the Fortuna Alliance. Returns were supposed to flow from the mystical wonders of Fortuna's "Explosive Mathematical Formula." Fortuna even offered a double-your-money-back guarantee.

The Bellingham, Washington company amassed nearly $12 million in $250 to $1750 chunks from unsuspecting investors. Humphrey expected to do better than most because he got in shortly after Fortuna's November 1995 debut. "But I could never get information on just where I was in their matrix," reports the Denver resident. After a couple of months of double-talk about "the unending ratio," Fortuna's principals simply quit returning Humphrey's calls.

A short time later, the FTC sued Fortuna's principals for "false and misleading" advertising. Senior Attorney Brook obtained federal injunctions freezing Fortuna's assets and putting the company under control of a court-appointed receiver. The FTC has since won a settlement in which Fortuna must reimburse all participants.

What is remarkable about this scheme, says Brook, is how little time it took to fleece so many people. The FTC closed down Fortuna about six months after it opened its doors. But Fortuna grew so quickly that the group didn't even have time to bank all its proceeds. The FTC found about $2 million in money orders lying around Fortuna's offices, and another $5.6 million in a bank in Antigua, West Indies.

Pyramids are banned under most state business codes because the math never works out. An FTC economist followed Fortuna's complicated "Fibonacci Sequence" to its mathematical conclusion and found that at best, Fortuna would leave 95 percent of participants with a loss and the other 5 percent with a profit of about $6 for every $250 invested.

FEEL-GOOD FLEECING

ALOFTY PHILOSOPHY often ensures victims' loyalty even after the Feds unmask a scam, says Brook, who reports receiving hundreds of letters from ▶

does, because they don't exist. Rule of thumb: If your broker has never heard of it, it probably doesn't exist.

ILLEGAL STOCK MANIPULATION Don't bite on anything you pick up in an online chat room or newsgroup until you know what's in it for your source. There are a lot of phonies on the Net—some want to push a price up, others want to bat it down.

TAKING ADVANTAGE OF THE SICK Desperate people often throw common sense and caution to the wind when they read about a "miracle cure" on the Internet. Scammers have repackaged classic snake-oil pitches to be Web savvy. Stick to proven methods of treatment that are available in pharmacies, and that have clinical research to back up their claims.

LONG-DISTANCE SCAM Be careful when downloading software from strangers. Promising free pornography, fraudulent Web sites instruct you to download viewing software. Once you download the file, the program silently disconnects you from your Internet service provider, then dials in to an offshore site, racking up enormous long-distance fees.

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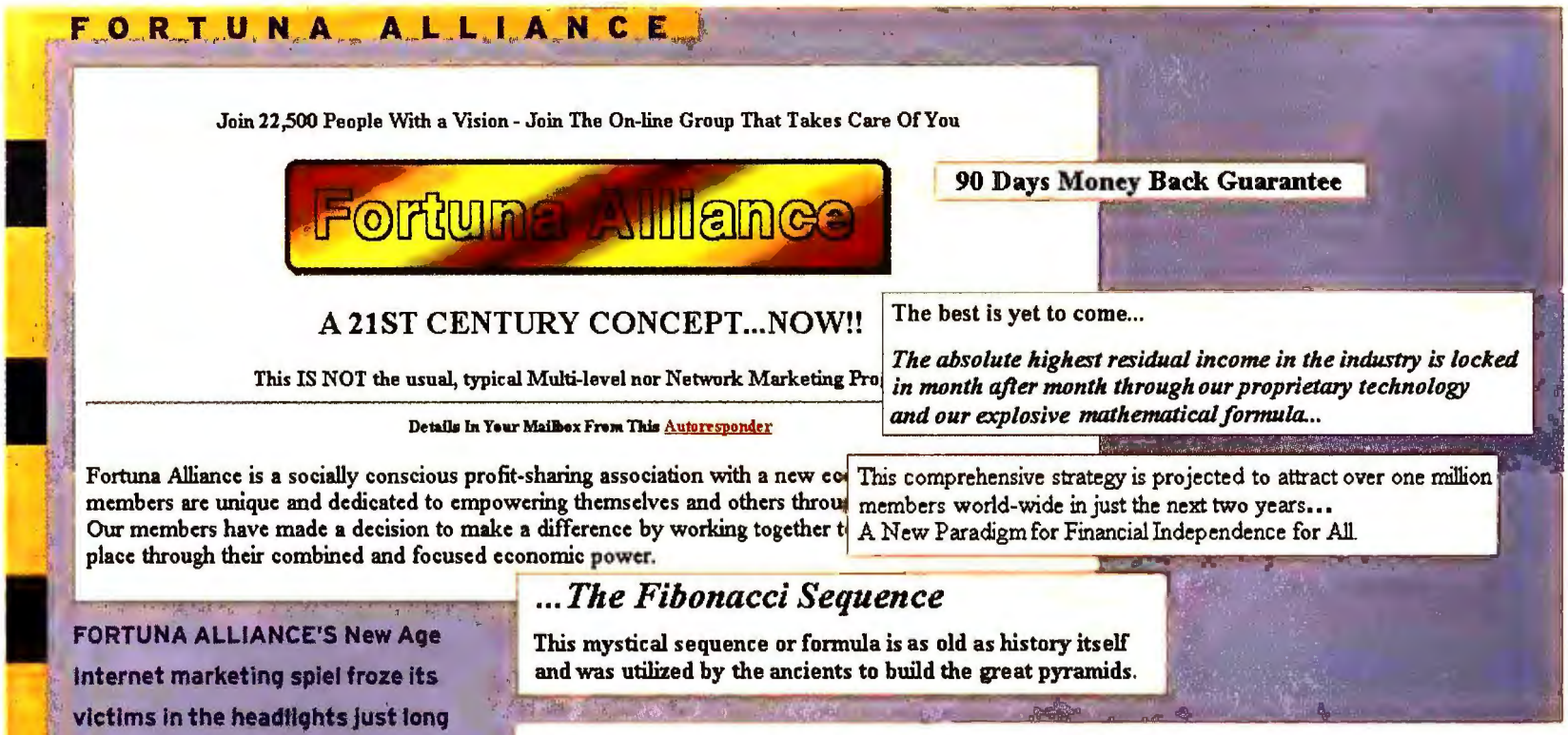

FORTUNA ALLIANCE'S New Age Internet marketing spiel froze its victims in the headlights just long enough for the company to pick their pockets. The Federal Trade Commission shut the company down, and won a settlement in February that ordered the Alliance to refund money to those who invested.

people mad at him for busting Fortuna. "The most successful operations create a following of true believers, [who are convinced] that this is somehow different," says Brook.

Such was the case with Mentor Network. The FTC describes the Newport Beach, California, company as another hit-and-run pyramid. The agency went to court and shut down Mentor in November 1996 after an estimated 2300 subscribers contributed more than $1 million.

But don't tell Mike Stauffenberg that Mentor's a sham. The Knoxville, Tennessee, contractor has a photo of Yeng Moonsaena, the 5-year-old Thai girl his contribution was supposed to be supporting. He let Mentor debit his credit card $30 a month for seven months, and he says he is still glad he did.

Stauffenberg noticed when he received Mentor's e-mail solicitation that its investor compensation plan wasn't as lucrative as most. That actually sold him, he says. "They promoted it as a charity venture where you could help people and, maybe, make a little bit of money," says Stauffenberg.

Such loyalty is typical, say FTC prosecutors, who add that many charity scams, including Mentor, often *do* give some money to charity. What they don't do is make good on their advertised promise of huge returns for investors.

MIKE STAUFFENBERG bought into Mentor Network.

What Stauffenberg didn't know was that Mentor founder Parviz Firouzgar had previously paid more than $724,000 to settle a charge by the U.S. attorney's office that he had committed mail and wire fraud in another similar scheme. By Firouzgar's own admission, each subscriber to Mentor would need to recruit 8190 others to realize the financial promises made by the company.

ROBBING PETER TO PAY PAUL

OF COURSE, nothing guarantees loyalty to a business venture like paying off investors. That's the key distinction of Ponzi schemes, which in fact do little more than take one investor's money and give it to another.

They're named after post–World War I financier Charles Ponzi, who got behind in his bookkeeping for legitimate investments and began paying off early investors with money from newcomers.

Today's Ponzis often use Web pages to spread the word. One Web pitch by Western Executive Group of Mesa, Arizona, peddled franchises for automatic teller machines in convenience stores. According to James A. Howell, regional trial counsel for the SEC's Pacific Regional Office, the company promised ATM service charges would pay 100 percent returns on the $25,000 entry fee.

Western Executive sold about 200 ATMs to 141 investors, mostly seniors. At least 40 machines were installed, and money was even paid to early investors. Not good enough, says Howell: "We halted the operation because there was no financial basis for the return they were

PHOTOGRAPH: TAMARA REYNOLDS

paying to people, other than newcomers' money. It was a Ponzi."

Howell got the court to put the company into receivership in October 1996 and freeze its assets. But by January, the ATM Web page had shifted routines and, under the name Bountiful Living, promised that the ownership of an ATM offered investors the potential to "Tax Shelter Over $18,000 in Income This Year." The principals of the organization were not available for comment.

Like a pyramid, a Ponzi is a mathematically impossible proposition whose collapse is inevitable. But the large payouts to early investors often complicate the job of prosecution and redistribution of refunds to victims.

INSECURE INVESTMENTS

INVESTING IN SECURITIES is a tempting and usually legal way to make a buck. But it's not legal to hawk shares in something that doesn't exist. Some of the biggest Internet rackets involve imaginary securities investments that sound like the real thing.

Many who saw the Web page and newsgroup postings of Renata Haag of Haag and Partner of Egelsback, Germany, took her up on her offer to double their money in four months. The investment? "Prime bank securities" from some of the world's "top 50 prime banks." Unfortunately, there is no such thing as a prime bank, much less a prime bank security. This is just another

> "The most successful operations create a following of true believers."
>
> –Randy Brook, FTC

scam, says Richard Jacobson, a branch chief in the SEC's Boston office. Haag and various U.S. distributors collected more than $3.5 million from victims until the SEC stopped them in late 1995 by freezing as much of their money as could be found in the United States. Thus far, Haag has avoided reimbursing her victims by staying offshore.

Stock, bond, and other securities markets are highly regulated, and legitimate offerings require considerable record keeping. Con artists avoid this inconvenience by selling air. They love to string together financial terms that often hook even sophisticated investors.

The SEC has broken up Internet scams selling fake shares in everything from Costa Rican coconut chips to a Dominican Republic ethanol plant. Investors should be particularly wary of securities that claim to be custom-made for the deregulation of the telecommunications industry. The SEC, state securities administrators, and the FTC have brought numerous cases against companies offering fraudulent securities in wireless cable, interactive video, and other ventures. Promoters often claim their investment deals are not subject to securities registration requirements or are somehow approved by the IRS—both false statements.

Such schemes have been unmasked frequently over the years. Nonetheless, John Stark, SEC special counsel for Internet projects, reports that his office gets about 40 consumer complaints every day.

PUMP AND DUMP

EVEN IF A SECURITY is real, you can still be bilked; and here's where the line between fraud and legitimacy becomes particularly blurred.

Forums such as The Motley Fool on America Online and the misc.invest.* newsgroups are hotbeds of tips and information where rising stars such as Iomega Corporation have been discovered. But online forums can also be a happy hunting ground for promoters and corporate insiders who seed ▶

Do's and Don'ts

Internet fraud is complex. Here are some fraud-busting suggestions to help you avoid the hazards.

BE SUSPICIOUS of any offer that sounds too good to be true. Fraud fighters say that it probably is.

DO YOUR OWN RESEARCH using the extensive free resources on the Web pages of law enforcement and regulatory agencies.

DON'T BUY STOCKS BASED ON A CHAT ROOM TIP, a slick Web page, or the recommendation of an online newsletter. Be sure a security is registered with NASDAQ or another legitimate market maker. Check out company data at the SEC's Web site (http://www.sec.gov), or investigate a broker through the NASDR (http://nasdr.com/).

DON'T JUMP ON ANY GET-RICH-QUICK OPPORTUNITY based solely upon what you read online. Research the business through the Better Business Bureau, your state attorney general's office, and fraud hot lines.

SHRINK FROM PRESSURE at any stage of a deal. Be suspicious of anyone who pressures you by offering you a "once-in-a-lifetime" or "ground-floor" opportunity.

NEVER GIVE OUT PERSONAL INFORMATION or your online account password to anyone you don't know.

DON'T LOOK FOR A BIGGER SUCKER. Any business that pays more for recruiting new distributors than for selling a product or service is probably an illegal pyramid.

BEWARE OF ANY "MIRACLE" OR "WONDER" PRODUCTS. The only miracle will be the speed with which your hard-earned money disappears. Ask for scientific evidence of performance that you can check out with medical authorities.

DON'T SEND MONEY to any enterprise lacking a street address or a verifiable business history. Entrepreneurs who insist on cash up front usually have travel plans.

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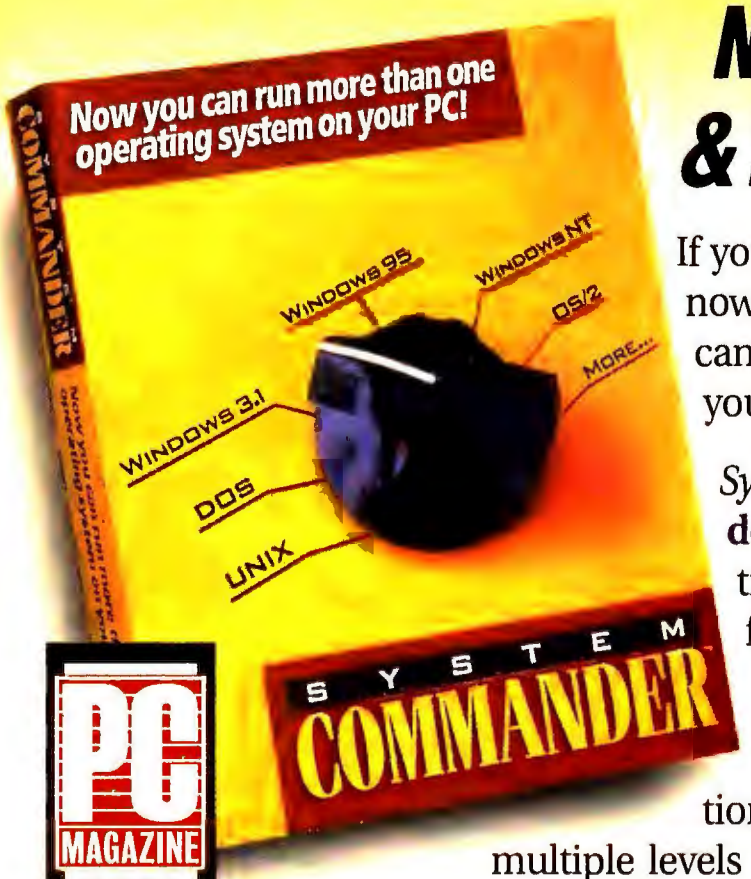

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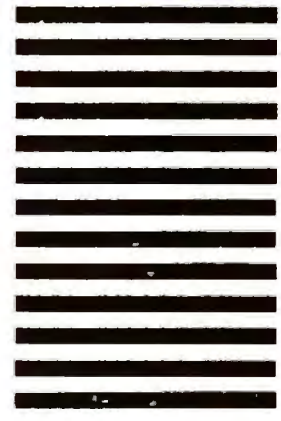

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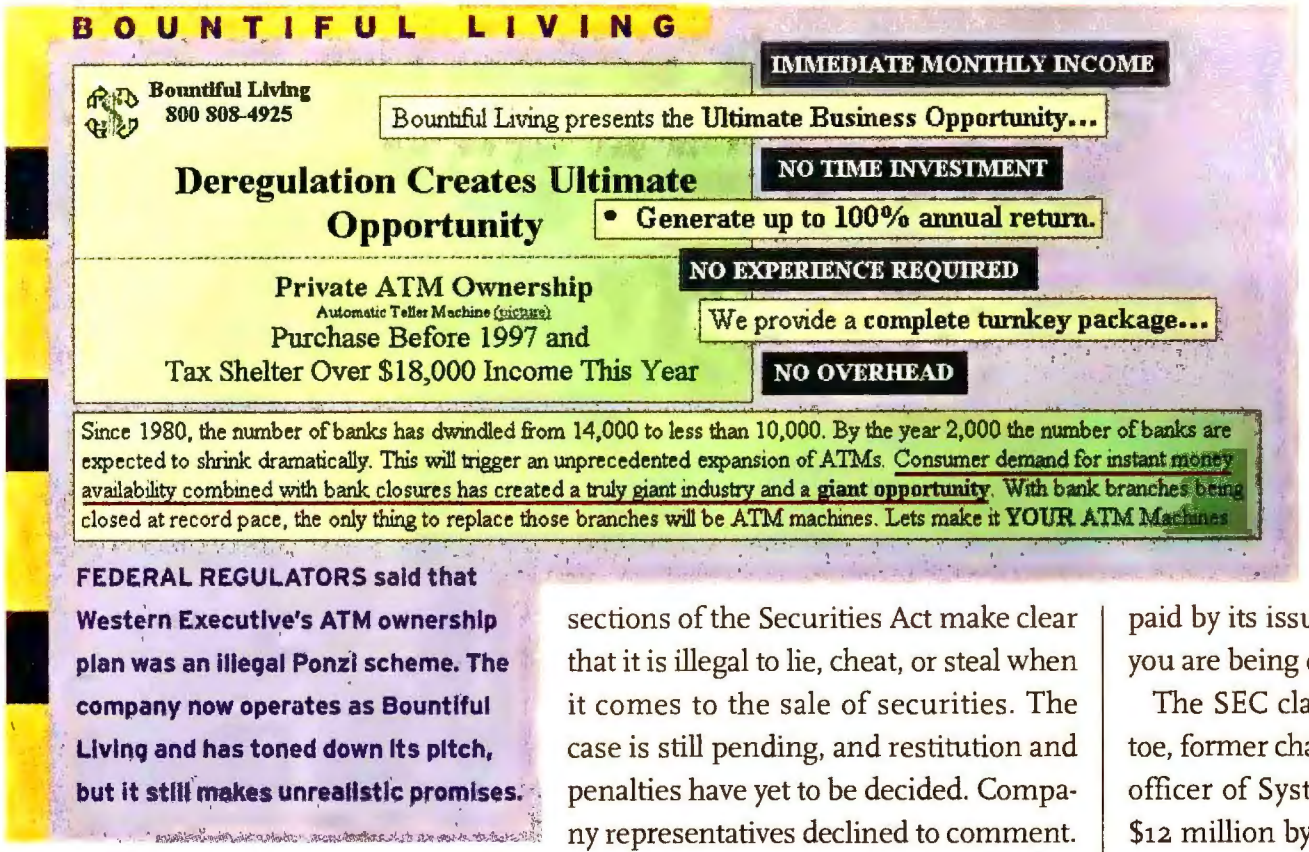
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FEDERAL REGULATORS said that Western Executive's ATM ownership plan was an illegal Ponzi scheme. The company now operates as Bountiful Living and has toned down its pitch, but it still makes unrealistic promises.

The Internet makes research easier than ever. But always be mindful of the source, says John Stark. The latest wrinkle in fraudulent stock promotions is the referencing of online newsletters run by the very people trying to drive up the value of a stock. The Securities Act states clearly that if you discuss a stock and are being paid by its issuer, you must disclose that you are being compensated.

The SEC claims that Charles O. Huttoe, former chairman and chief executive officer of Systems of Excellence, made $12 million by employing others to tout his stock. The SEC alleges that Huttoe distributed millions of shares in the McLean, Virginia, video equipment manufacturer among family members and other corporations he controlled. Then he enlisted the help of SGA Goldstar Whisper Stocks, a Nashville-based Internet newsletter, to spread glowing (but false) reports about the company. Afterwards, all these parties sold their shares into an inflated market. Huttoe pled guilty in federal court in February, was sentenced to nearly four years in prison, and is cooperating with authorities in the prosecution of others involved in the scheme.

rumors to inflate the price of a security.

Mary L. Schapiro, president of the National Association of Security Dealers Regulation, says her organization pursues stock manipulation aggressively. "It's absolutely critical for investors to understand that information in messages posted online should be viewed with caution and a healthy dose of skepticism," she says.

In one case, NASDR temporarily suspended trading in Comparator Systems when its share price jumped from 3 cents to $1.67 in one week, and its daily volume went from 10 million shares to 180 million. The movements coincided with online chat activity and with sales of securities by several insiders at the Newport Beach, California, fingerprint technology developer.

The SEC filed a lawsuit against Comparator and three officers, freezing their assets and alleging that they "sold tens of millions of shares of Comparator stock to investors while making material misrepresentations concerning the financial status of the company." Several sections of the Securities Act make clear that it is illegal to lie, cheat, or steal when it comes to the sale of securities. The case is still pending, and restitution and penalties have yet to be decided. Company representatives declined to comment.

NASDR has enlisted the help of online sysops in its campaign to warn chatroom visitors about the dangers of listening to nameless, faceless online promoters. But swapping stock tips is what these forums are all about, and the government's ability to regulate online speech is limited both by the First Amendment and practicality. Drop in on any chat room, and you'll find a bewildering debate over stocks raging among anonymous users. It's impossible to tell the quality of the information without research; a stock is just as likely to be the target of short sellers trying to drive its price down as touters trying to inflate it.

JOHN STARK prosecutes Internet fraud cases for the SEC.

PICKING ON THE SICK

YOU CAN FIND a cure on the Internet for whatever ails you—cancer, AIDS, or the heartbreak of psoriasis. But some cures are worse than the disease. These touted potions have about as much benefit as a cheeseburger, claims Dr. Stephen Barrett, cofounder of the 1300-member National Council Against Health Fraud.

Barrett has spent 15 years investigating the health claims of companies on and off the Internet. His conclusion: Health products are not marketed honestly. Most of them simply don't work.

Regulators tend to agree. For example, the Illinois attorney general has filed ▶

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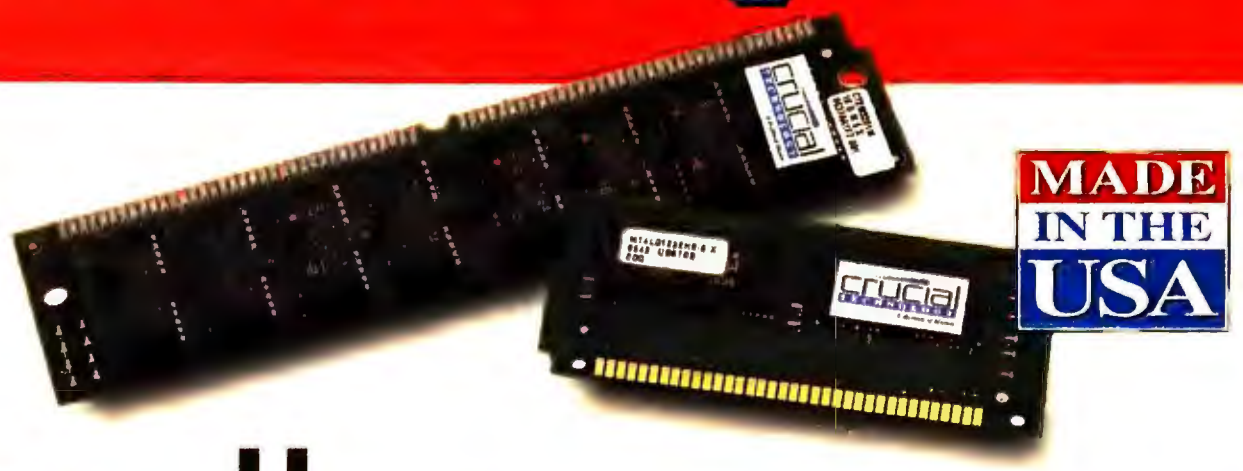

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a case against Westar Nutrition and its pyramid marketing arm, Viva America, both of Costa Mesa, California. The attorney general alleges that neither company can substantiate its online claims that Germanium Sesquioxide will lower cholesterol, reduce arthritic joint pain, or help treat AIDS and cancer. In fact, the FDA banned the import of Germanium after it was linked to irreversible kidney damage, coma, and death.

Of course, stopping fraudulent advertising isn't the same as putting the purveyors out of business.

NO HARD TIME

ONCE THE LAW draws a bead on a scam, it rarely misses. But cybercrooks generally risk little more than civil penalties, which don't result in jail time, and it's not hard for them to reemerge if their "corporate headquarters" is a mail drop.

"Very few states have criminal penalties associated with consumer fraud statutes;" explains Illinois assistant

> "We have all the laws we need. The problem is resources. You can't be everywhere at once."
> —James A. Howell, SEC

Attorney General Lorena Merklin.

Fraud has always been a tough knot for law enforcement, says California regulator Bill McDonald, but the Net makes it even tougher to decide jurisdiction and prove guilt. Con artists operate easily across state and national boundaries.

That's not to say they're likely to run amok. Law enforcement agencies make good use of search engines, e-mail, reverse phone directories, and other tools. For example, the SEC equips its lawyers with state-of-the-art hardware and fast T-1 Net connections and, warns Stark, "We have no problem tracking people down any more."

But, historically, law enforcement has never done more than slow crime down. Cyberspace is no different. "We have all the laws we need," says the SEC's James A. Howell. "The problem is resources. You can't be everywhere at once."

Some in law enforcement, McDonald says, think consumer education and participation might be the ultimate tools for combating fraud. While Stark feels that vigorous prosecution is still the cornerstone of deterrence, he is surprised at how much help he gets from Internet surfers like Mark Taylor, who publishes Fraud Watch, a bimonthly online publication that reports on Internet scams (http://www.silverquick.com). From his vantage point, Taylor can see that law enforcement is making it more difficult to run a scam.

"The marshal hasn't exactly arrived in Dodge City," says Taylor, "but he is definitely riding over the horizon." Ultimately though, the marshal may just turn out to be you.

Mike Hogan is a freelance writer living in Carlsbad, California. ■

Online Protection

The Internet offers numerous useful sites that provide free research on prospective investments, companies, and personalities. Here are a few to bookmark.

CONSUMER WORLD Over 1400 links to the Web pages of various consumer protection and regulatory agencies and informational sites. You'll find a variety of scam alerts and a keyword search engine (http://www.consumerworld.org/; comments@consumerworld.org).

COUNCIL OF BETTER BUSINESS BUREAUS Inquire about a business, log a complaint, or use CBBB's mediation services, all for free (http://www.bbb.org/; ehasychak@bbb.org/; 703/276-0100). BBBOnline, the organization's accreditation service, lets you bring up a business's marketplace record (http://www.bbbonline.org/).

FEDERAL TRADE COMMISSION Sues those it suspects of unfair business practices. Its main focus is obtaining refunds for consumers (http://www.ftc.gov/; consumerline@ftc.gov; 202/326-2222).

NATIONAL ASSOCIATION OF SECURITY DEALERS REGULATION NASDR regulates the activities of more than 5500 NASD member firms and their registered broker dealers in The NASDAQ Stock Market. File a complaint or obtain a free report of a broker's disciplinary history through the NASDR Public Disclosure Hotline (http://www.nasdr.com/; 800/289-9999).

NATIONAL FRAUD INFORMATION CENTER A clearinghouse of antifraud resources drawn from a variety of government and private consumer agencies. It issues daily alerts on new scams and the status of ongoing and past investigations, and contains links to other agencies. You can also call the organization's fraud hot line (http://www.fraud.org; 800/876-7060).

SECURITIES AND EXCHANGE COMMISSION The SEC, prime regulator of security markets, runs a site that's packed with investing advice, information on publicly traded companies, alerts on securities scams, and links to other federal and state enforcement agencies (http://www.sec.gov/; enforcement@sec.gov; 800/732-0330, 202/942-7040).

U.S. DEPARTMENT OF JUSTICE Includes access to 93 U.S. attorneys' offices, which prosecute criminal cases ranging from tax evasion to civil rights violations. A fraud has to be pretty big to get their attention (http://www.usdoj.gov).

U.S. SECRET SERVICE This agency protects the president, but it also has jurisdiction over certain financial crimes, including international frauds. You can call its fraud hot line, but its e-mail address is a secret (http://www.ustreas.gov/treasury/bureaus/usss/USSS.HTML/; 202/435-5490).

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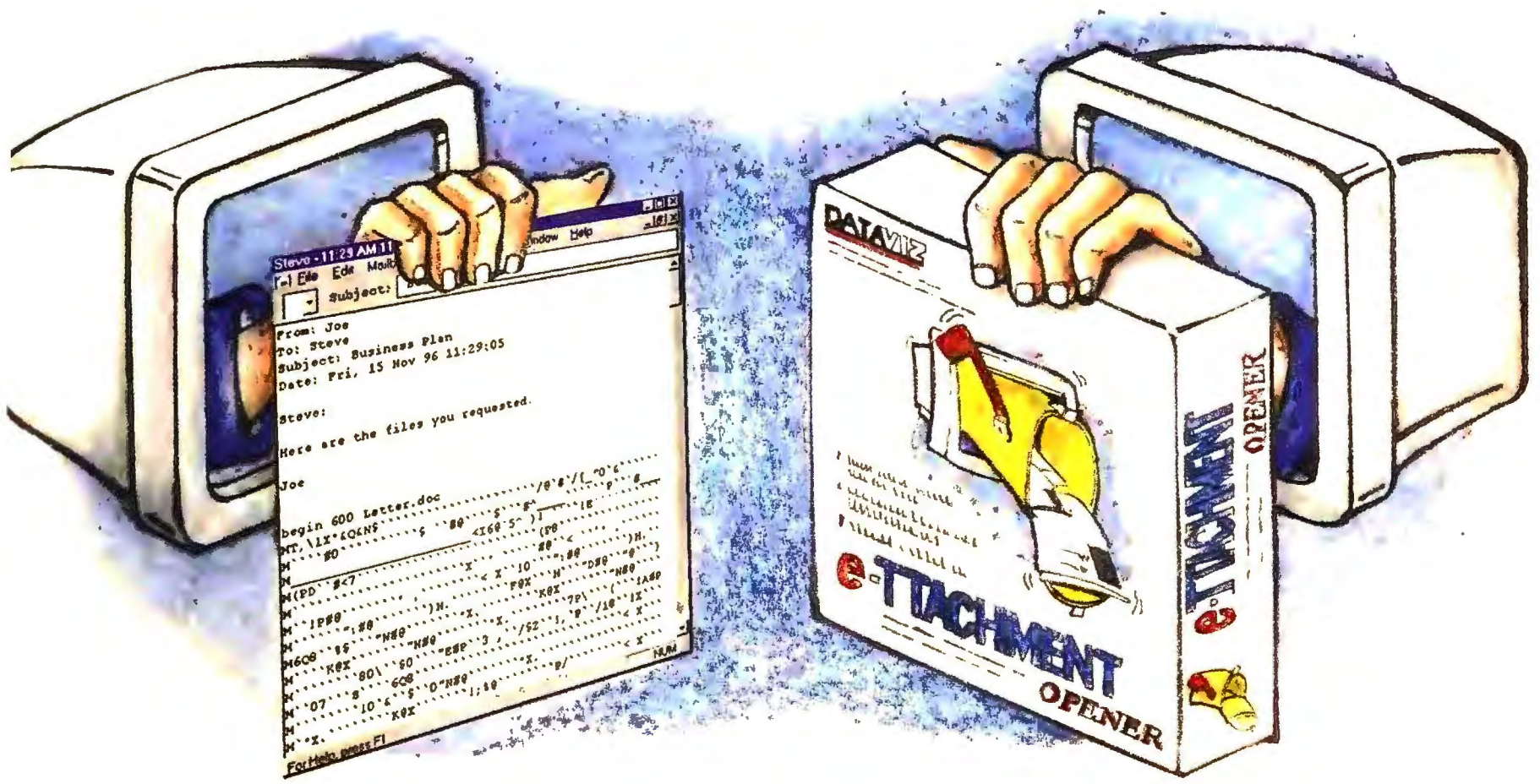

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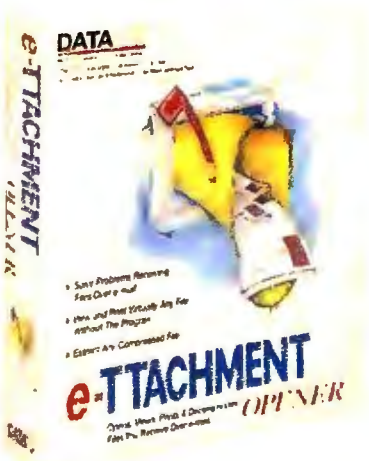

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Federal Computer Week *Feb. 6,1996*

"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*

"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*

"...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*

"LapLink is a powerhouse for, and the granddaddy of, remote computing."

Home Office Computing *May 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.

Designed for Microsoft Windows 95

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® for Windows®95 has racked up more industry awards (fourteen of 'em, at last count) than every other remote access software package. Combined.

So if you aren't yet one of the millions on the move for whom LapLink is the perfect link to the desktop or the network, visit www.laplink.com or call 800-487-4396 today.

We'd be delighted to bring you up to date.

TRAVELING SOFTWARE

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Circle 243 on reader service card

Meet the Newest Member of the Workgroup.

If you think current tape technology is too expensive for your LAN server and workstation backup needs, think about something new–Seagate's TR-4 minicartridge tape drive.

With up to 8 gigabytes of compressed data on a single Travan® cartridge, Seagate's TR-4 provides a high capacity backup solution for servers, workstations and PCs. Add it to your workgroup LAN or workstation and you'll have the confidence of knowing a backup copy of those critical, irreplaceable files is always available.

The TR-4 from Seagate is available with either a SCSI or an ATAPI (Enhanced IDE) interface. Both versions have industry-leading performance; with data transfer speeds of up to 600 kb/sec, the TR-4 rivals the performance of many existing DAT drives! And Seagate's FastSense technology allows the drive to operate at the fastest transfer speed for your system.

When it comes to value, nothing comes close to this combination of capacity, performance, price and industry software support. If your workgroup is ready to welcome a hardworking newcomer, get more information about Seagate's TR-4 tape drive by calling 800-626-6637 or visiting www.seagate.com.

Seagate

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Circle 209 on reader service card

ADRENALINE: *Energy is instantly shot to your brain, muscles and critical organs.*

Heart rate and respiration accelerate for sharper senses and incredible power.

[syncronyzing man and machine]

syncrony
ofcorp

(now there's adrenaline for your computer)

Windrenalin HD™ instantly jump-starts your hard drive. Now you can launch Word®, Navigator™, and your everyday Windows®95 programs up to 180% faster. Multi-task up to 500% faster. And on faster systems Windrenalin **really** performs. Get your shot of Windrenalin from retailers everywhere. Hurry.*

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windrenalin hd

www.syncronys.com

PC WORLD

TOP 100

190 Power Desktops

206 Budget Desktops

216 Notebooks

227 Printers

231 Monitors

235 Graphics Boards

237 Modems

MMX Takes Over

FOR A CHIP DESIGNED by people in metallic clean-room suits dancing to "Play That Funky Music," Intel's MMX Pentium is a pretty serious success. MMX-based PCs, including the number one Best Buy Dell Dimension XPS M200s, have already taken over eight slots on our Power Desktops chart. Most MMX PCs run standard business ▶

EDITED BY JOANNE ROBB

NOT NUMBER ONE, but probably the most fun: The HP Pavilion 7350P.

PHOTOGRAPH MARC SIMON ICONS JEFFERY PELO

software up to 9 percent faster than the non-MMX machines they replace, and for only about $100 more on average. When tested with MMX-enabled programs, MMX PCs perform even better (see *Top of the News,* February). But MMX magic doesn't seem to help system models that have continually suffered from below-average speed, like the HP Pavilion line.

The two new MMX-based HP Pavilions on our Power charts are faster than the non-MMX machines they replace—they fare very well when compared to other home machines (see *Top 5 Home PCs* in this issue). But they're still slower overall than other MMX PCs, just as previous Pavilions were slower than average for their processor class. In fact, the Pavilion 7350P, a Pentium MMX-166, is actually slower than some Pentium-166s we've tested. Why is this? Our best guess is that slow components hold the Pavilions back, no matter what chip they use. The Quantum Bigfoot hard drive used in the Pavilion 7350P, for instance, is slower than the drives some other systems use.

USB OR BUST

FOR THE LAST couple of years, the PC industry has buzzed with talk about Universal Serial Bus, the technology that is supposed to finally make Plug and Play a reality. USB promises to let you install peripherals without rebooting your system and daisy chain up to 60 USB-compliant peripherals together. More Top 20 PCs, like HP's Pavilion 7350P and DFI's Landmarq IHX Prime P150+, are coming with USB ports. There's just one small problem: You still can't buy USB peripherals. They're mothballed on manufacturers' shelves, waiting for a version of Windows that will support them. Microsoft should ship the next version sometime this year.

So is it worth buying a USB-ready PC now? The answer is yes. Think of it as investment protection. A USB port won't add substantial cost to your system, and you'll be ready for USB peripherals when they finally arrive. (For more information, see *Top of the News,* November 1996.)

NEW HP KEYBOARDS let you jump straight to applications.

Should you care that these MMX-based Pavilions don't live up to the MMX standard? Probably not. They've got too much else going for them. Both the 7370V Pentium MMX-200 and the 7350P Pentium MMX-166 are still extremely fast—at least twice as fast as a Pentium-75. And if you want a nicely designed, reliable home system with some of the latest, coolest gadgets, record-breaking speed isn't as important anyway.

Both these Pavilions are souped-up family machines designed for fun: In addition to speakerphones, 3-D sound, and multimedia keyboards, both come with a generous stack of CD-ROM titles. The 7350P has a photo drive and video-capture capabilities, while the 7370V comes with a Logitech game pad and an Orchid Righteous 3D video card.

You'll find more typical MMX performance from three other desktops that make the Power chart this month. IBM's new Pentium MMX-200 is much quicker than a standard Pentium-200 machine—only three systems on the chart are faster. With a sturdy design and useful management and power saving features, the $3927 IBM PC 350 is an excellent—if slightly expensive—corporate buy. DFI's and Polywell's new Pentium MMX-200s also make the chart. But they're a bigger gamble than the IBM or the Pavilion systems. We don't have any survey information on their reliability, and their companies' support policies are among the stingiest that we have seen.

GET CANDID: HP's Pavilion 7350P scans your photos.

It won't be long until MMX-based PCs begin appearing on the Top 20 Budget Desktops chart. The $2199 Quantex QP5/166 MMX we tested this month is priced low enough and performed well enough—11 percent faster than the average Pentium-166—to make the list, but Quantex's poor reliability score kept it off.

CYRIX MEANS BUDGET PRICES

IN THE MEANTIME, PCs based on Cyrix chips are the big news for budget buyers. All three new budget desktops come with the 6x86 chip set. None of them earn a Best Buy, but that's no reflection on their performance: With an average PC WorldBench score of 218, the Cyrix 6x86 P200+ chip performs almost 4 percent faster than the Pentium-200. The Cyrix 6x86 P166+ also has a slight edge over its Intel Pentium-166 equivalent. Cyrix-based systems are cheaper, too. The average Cyrix 6x86 P200+ system with 32MB of RAM, for example, costs $217 less than a comparably configured Intel Pentium-200 PC.

Limited support is one of the primary reason Cyrix-based machines seldom earn Best Buys in our reviews. Companies that use the lower-cost Cyrix chips are usually relatively small vendors, eager to keep costs down. Unfortunately, the cost cutting shows up elsewhere in their operations. Kingdom, CyberMax, and DFI all offer shorter support hours than the companies that receive stellar support ratings on our charts.

MMX GOES PORTABLE

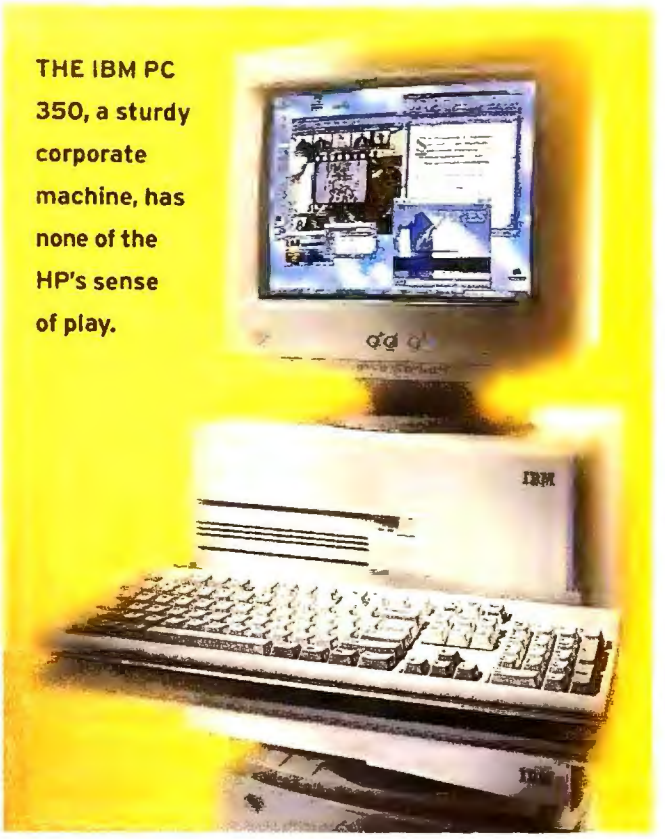
SIX NOTEBOOK SYSTEMS are new to our charts this month, including the first Pentium MMX-166 portable to make our list—Gateway 2000's $4699 Solo 2200.

PHOTOGRAPHS: MARC SIMON

Packed with 40MB of RAM, this Gateway system is the fastest notebook we've ever seen, but the company's poor service record for notebooks holds it back: It places only sixth in our power notebook lineup.

Our new number one power notebook is Dell's Latitude LM P133ST. In its new configuration, it's two places higher than it was last month. With 8MB more RAM and a larger hard drive, the new notebook is slightly faster than the former version and lasts over an hour longer in our battery tests.

Two WinBook systems also earn positions on the power notebooks chart this month. The new WinBook FX improves substantially over the model we saw in December. It's 25 percent faster (with an additional 16MB of RAM) and has a larger hard drive, a faster modem, and a better keyboard. It costs about $600 more than the old FX notebook. We also looked at the first model in the new WinBook LM line. With only 16MB of RAM, the LM system isn't much slower than the fancier WinBook FX, and it outperformed the FX notebook in our battery life tests.



THE IBM PC 350, a sturdy corporate machine, has none of the HP's sense of play.

Deep price cuts bring several previously tested portables onto the budget notebooks chart for the first time, including our new number one Best Buy, the HP OmniBook 5500CS. First tested in January, the 5500CS dropped $750 in price this month and now costs $1710. The new low price makes this fast laptop with good battery life a much better deal. The two new budget notebooks on our list, CTX's EzBook 720CS and the Broadax BSI NP8320T, both cost under $2000, but the P-120 EzBook is a better buy. It's very fast and ships with a game pad, among other accoutrements game players like. Its battery also lasted twice as long as the Broadax's in our tests, and CTX support policies are a little more generous.

JoAnne Robb is an associate editor for PC World. *Editorial Researcher Julie Campagna, Senior Associate Editor Brad Grimes, Staff Editors John Goddard and Eric Hellweg, Associate Editor Melissa Riofrio, and freelance writers Allyson Bates, Geoffrey Coffey, Jon Jacobi, Dan Littman, and Natasha Wanchek contributed to the Top 100. Testing for the Top 100 by Ulrike Diehlmann, Jeffrey Kuta, Kevin Mitchell, Mike Salayko, and Susan Silvius. See page 14 for contact information.*

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 PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell 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 the 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 in relation 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 (http://www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but some extra features you'll want to check out. For one thing, 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, Personal Shopper will find and rank all the machines that fit your specifications.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (2/7/97)	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	$180 off on fast, feature-packed minitower that's easy to open and upgrade.
3	Dell OptiPlex GXpro 200 800/388-8542 www.dell.com	–	NEW	$4260	Pentium Pro-200	Reconfigured with bigger cache, more powerful graphics card.
4	Dell OptiPlex GXi 200 800/388-8542 www.dell.com	5	Apr 97	$3743	Pentium MMX-200	Corporate multimedia machine plugs into a network right out of the box.
5	Micron Millennia Pro2 200 B 888/634-8799 www.micronpc.com	4	Feb 97	$2959	Pentium Pro-200	Fast, loaded minitower, but Micron's reliability rating is down from best.
6	Gateway 2000 G6-200 800/846-2000 www.gw2K.com	7	Dec 96	$2689	Pentium Pro-200	$130 cut; SCSI adapter fit for a workgroup server; different graphics card.
7	IBM PC 350 (Pentium-200) 800/426-2968 www.pc.ibm.com	13	Sept 96	$3353	Pentium-200	Great network PC, improved reliability rating, USB ports; a bit expensive.
8	HP Vectra VA 6/200 MT 800/752-0900 www.hp.com	9	Mar 97	$3474	Pentium Pro-200	Good-quality corporate PC, but support hours are limited.
9	HP Pavilion 7370V 800/724-6631 www.hp.com	–	NEW	$3448	Pentium MMX-200	Pricey, but has a good software bundle and USB ports.
10	IBM PC 350 (Pentium MMX-200) 800/426-2968 www.pc.ibm.com	–	NEW	$3927	Pentium MMX-200	Slightly better configuration than IBM PC 350 P-200; expensive.
11	Micron Home MPC P200 888/634-8799 www.micronpc.com	8	Mar 97	$3148	Pentium-200	Has family-friendly software bundle, but service rating is down.
12	IBM PC 365 800/426-2968 www.pc.ibm.com	15	Mar 97	$5124	Pentium Pro-200	Priciest but has it all, even a rewritable optical drive; reliability ratings up.
13	HP Pavilion 7350P 800/724-6631 www.hp.com	–	NEW	$3048	Pentium MMX-166	Includes PhotoDrive scanner; support policies could be better.
14	Compaq Deskpro 2000 Model 5200/1080 800/345-1518 www.compaq.com	–	Nov 96	$2698	Pentium-200	Clean business PC has no sound; service rating has dropped.
15	HP Vectra VL 5/200MT Series 4 800/752-0900 www.hp.com	11	Sept 96	$2849	Pentium-200	Well-built PC (P-166 version is also good); support hours are limited.
16	Quantex QP6/200 SM-4 800/896-4898 www.quantex.com	–	NEW	$2649	Pentium Pro-200	Fast system includes modem; service policy is slightly improved.
17	Netis N6200PCI 800/577-7526 www.netistech.com	17	Dec 96	$2590	Pentium Pro-200	Huge tower PC can take two CPUs; $260 price cut; faster CD-ROM drive.
18	Royal 3D-MMX 800/486-0008 www.royalcomp.com	–	Apr 97	$2695	Pentium MMX-200	$100 off fast MMX PC with 3-D graphics, one-year parts warranty.
19	DFI Landmarq IHX Pro P200 MMX 800/808-4334 www.dfiusa.com	–	NEW	$2999	Pentium MMX-200	Support policies slightly improved, add-in 3-D graphics board; generic.
20	Polywell Poly 5200 Mx8 800/999-1278 www.polywell.com	–	NEW	$2500	Pentium MMX-200	Plain box is very fast but doesn't come with a modem.

Best Buy See features chart, page 192; performance chart, page 196. 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 April 30).

THREE OF THE NEW SYSTEMS on this month's Power chart come from top-tier system vendors Hewlett-Packard and IBM. But their PCs couldn't be more different. HP's Pavilion 7370V and Pavilion 7350P are fun home systems loaded with family software packages and nifty gadgets. The IBM PC 350, on the other hand, is a serious business machine with management features and a clunky corporate look. Two other PCs at either end of the home/business spectrum did not make the cut. The Sony PCV-120 is a mod-looking home PC, and the Trademark XL Pro-200 would fit comfortably in a business environment. For reviews of these and other systems, visit PC World Online (http://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
94	234/outstanding	best	outstanding	inexpensive	best/best	3494	608
93	230/very good	best	outstanding	average	best/best	3474	609
92	230/very good	best	outstanding	expensive	best/best	–	610
90	225/very good	best	outstanding	average	best/best	3506	611
89	231/outstanding	good	outstanding	average	good/best	3487	612
89	234/outstanding	fair	outstanding	inexpensive	best/best	3458	613
87	215/very good	good	outstanding	average	good/good	3422	–
87	229/very good	best	outstanding	average	good/poor	3496	614
87	222/very good	best	very good	average	good/fair	–	615
87	232/outstanding	good	outstanding	expensive	good/good	–	–
87	216/very good	good	outstanding	average	good/best	3495	616
86	232/outstanding	good	outstanding	very expensive	good/good	3500	–
85	200/good	best	outstanding	average	good/fair	–	617
85	218/very good	good	outstanding	inexpensive	poor/best	3442	618
84	201/good	best	very good	average	good/poor	3421	619
84	230/very good	poor	outstanding	inexpensive	fair/best	–	620
84	230/very good	[2]	outstanding	inexpensive	[2]/fair	3460	621
83	232/outstanding	[2]	outstanding	inexpensive	[2]/poor	3519	622
83	228/very good	[2]	outstanding	average	[2]/poor	–	623
83	234/outstanding	[2]	very good	inexpensive	[2]/fair	–	624
Scorecard weightings ▶	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	902

[2] Insufficient data.

The XPS M200s features the same top-notch design as other Dimension minitowers, including a wide base that keeps it stable and upright. Dell throws in extras like Microsoft Office 95 Professional and Altec Lansing ACS 290 speakers with a subwoofer.

Dell XPS M200s

The machine has a 4MB Matrox Millennium card that 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 $300 less. Keep in mind that the M200s is limited to 64MB of system memory—only half the amount most other PCs can take.

The XPS's case is very easy to open. Give a thumbscrew a few turns, and off comes the side panel to reveal an impeccable interior with plenty of free slots and bays. All the cable connectors sit directly below the drive cage, so they don't obstruct the slots.

Dell's system documentation is thorough and easy to understand, and the company's support policies are superb. Dell's PC reliability also rates among the best, according to *PC World* readers. Of hundreds of fax-back responses we get from Dell PC owners each month, few complain about system problems.

Overall, the M200s is just about everything you could want in a top-of-the-line PC. With its MMX performance, roomy hard disk, 12X CD-ROM drive, and 33.6-kbps fax-modem that also serves as an answering machine, this Dimension should satisfy most users' requirements for at least a couple of years.

This Month's Best Buys

1 DELL DIMENSION XPS M200S

PRO: Extremely fast, 33.6-kbps modem

CON: Maximum RAM is limited to 64MB

The Dimension XPS M200s earns its third month as a number one Best Buy on our Power Desktops chart with a winning combination of speed, high-quality components, a nice design, and good service.

The M200s matches the fastest Pentium Pro we've seen—and is only 1 percent slower than the Gateway 2000 P55C-200M preproduction MMX system, the fastest PC we've ever tested (see *Top of the News*, February). But at only $2699, this MMX system is more than $1500 cheaper than the number three Dell OptiPlex.

2 DELL DIMENSION XPS PRO200N

PRO: Very fast, 33.6-kbps modem, top reliability rating, excellent support

CON: Needs better ventilation

The XPS Pro200n is a powerful machine that would be a superb choice for a Windows NT workstation thanks to its Pentium Pro-200 CPU. But it's a tad slower than the number one Dimension XPS M200s and ▶

TOP 20 POWER DESKTOPS

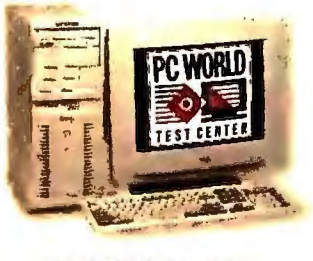
STANDARD FEATURES

	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 Series 2	4/VRAM	17/15.6	.28	12X
3	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	512	3.1	Matrox Millennium	4/WRAM	17/15.75	.28	8X
4	Dell OptiPlex GXi 200*	Pentium MMX-200	32	512	3.2	Number Nine Imagine 128 Series 2	4/E00 ORAM	17/16	.28	8X
5	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	3.1	Diamond Stealth 30 2000	4/E00 ORAM	17/16	.26	12X
6	Gateway 2000 G6-200	Pentium Pro-200	32	256	2.1	STB Velocity 30	4/VRAM	17/15.9	.26	12X
7	IBM PC 350 (Pentium-200)	Pentium-200	32	512	1.6	integrated Trio64V+	2/E00 ORAM	17/15.5	.28	6X
8	HP Vectra VA 6/200 MT	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15.7	.28	8X
9	HP Pavilion 7370V	Pentium MMX-200	32	256	4	integrated	2/E00 ORAM	17/15.6	.28	16X
10	IBM PC 350 (Pentium MMX-200)	Pentium MMX-200	32	512	2.5	Matrox Millennium	4/WRAM	17/15.7	.28	8X
11	Micron Home MPC P200	Pentium-200	32	512	2.5	Diamond Stealth 30/Monster 30	4/E00 ORAM	17/16	.26	12X
12	IBM PC 365	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.7	.28	6X
13	HP Pavilion 7350P	Pentium MMX-166	32	256	2.5	integrated	2/E00 ORAM	17/15.6	.28	16X
14	Compaq Deskpro 2000 5200/1080	Pentium-200	32	256	1.1	integrated Cirrus Logic 5436	2/E00 ORAM	15/14	.28	8X
15	HP Vectra VL 5/200MT Series 4	Pentium-200	16	256	2.5	Matrox Millennium	2/WRAM	15/13.5	.28	8X
16	Quantex QP6/200 SM-4	Pentium Pro-200	64	256	3.2	Matrox Millennium	4/WRAM	17/16.1	.26	12X
17	Netis N6200PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	8X
18	Royal 3D-MMX	Pentium MMX-200	32	512	2.5	ATI 3D Pro Turbo	4/SGRAM	17/16	.25	12X
19	DFI Landmarq IHX Pro P200 MMX	Pentium MMX-200	32	512	2.5	Matrox Millennium/Orchid Righteous	4/WRAM	17/15.7	.28	12X
20	Polywell Poly 5200 Mx8	Pentium MMX-200	32	512	2.1	Diamond Stealth 3D 2000	4/E00 ORAM	17/15.8	.28	8X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Toll call.

costs $300 more, even though it took yet another price drop of $180 this month.

This fast $2999 system has the same minitower case as the M200s. The CD-ROM drive is located at the top of the front panel, making it easily accessible, and the power and reset buttons lie in the center of the panel, well away from the floppy disk eject button. The interior may need better ventilation: The heat sink singed our hands when we touched it, despite the operation of a large cooling fan.



Dell XPS Pro200n

The excellent reliability rating and support policies for this PC mirror those of its XPS M200s sibling.

3 DELL OPTIPLEX GXPRO 200

PRO: Speedy, great design, built-in networking, 33.6-kbps modem

CON: Very expensive

Dell says that its standard OptiPlex GXpro 200 is now slightly different from the still-available configuration that had earned a Best Buy since August of last year. This month we looked at the reconfigured GXpro 200, which has a 4MB Matrox Millennium graphics card (the previous version had a Number Nine Imagine 128 Series 2 card) and a Pentium Pro-200 CPU with 512K of built-in secondary cache (upgraded from its previous 256K). The new GXpro 200 is still a fast and well-designed machine, but at $4260, it costs about $350 more than the older version.

The move to the Millennium card saves you about $300 and delivers performance comparable with that of the Imagine 128 card. However, we question the switch to 512K of secondary cache. A Pentium Pro-200 chip with the larger cache costs about $500 more, but performance increases only marginally. A Pentium Pro-200 with 256K of secondary cache plus the 4MB Millennium card would have been a better balance of cost and performance.

Dell OptiPlex GXpro 200

The GXpro still offers no-fuss upgradability. The desktop's cover is simple to remove, and the internal construction is

		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	desktop	512	512	3	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated	desktop	512	512	3	1/0	5	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 Soundscape Vivo	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy,WWW
–	–	desktop	192	512	4	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16 PnP (OEM)	minitower	192	256	4	2/1	4	3/3	11 [2]	–	AOL, BBS, CIS, WWW
33.6	integrated Yamaha	minitower	128	256	2	2/2	5	1/1	24 [2]	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	desktop	192	512	4	1/1	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
–	–	desktop	512	256	3	0/1	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Yamaha	minitower	128	256	2	1/2	4	1/1	24 [2]	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	compact	128	256	2	2/0	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16	minitower	128	512	4	2/1	4	3/3	11 [2]	–	AOL, BBS, CIS, WWW
33.6	Ensoniq Soundscape Vivo PnP	minitower	128	256	0	3/3	4	3/1	24	Sat., Sun.	BBS, Prodigy, WWW
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS, WWW
33.6	ESS AudioDrive 1868	minitower	128	512	3	3/1	3	1/1	10	Sat.	BBS, WWW
33.6	Sound Blaster 32 IDE PnP	minitower	256	512	2	3/2	4	2/lifetime	9 [2]	–	BBS, WWW
–	Sound Blaster 16 IDE PnP (OEM)	minitower	128	512	5	3/0	5	3/5	12	Sat.	BBS, WWW

modular. Cards plug into a vertical riser plane that slides out at the touch of a lever. Even the power supply swings aside for effortless access to the motherboard.

The GXpro uses dual inline memory modules rather than SIMMs. DIMMs make it easier to add memory without having to remove lower-capacity modules to make room. And the OptiPlex GXpro has four DIMM sockets instead of the usual two, so there's room for lots of RAM upgrades, up to 512MB.

The GXpro will also work well with other PCs—it comes with an integrated 3Com ethernet adapter so you can hook it up to a network. You also get a stand that lets you put the desktop unit upright like a minitower. No matter how you look at this PC, it's an excellent corporate buy.

4 DELL OPTIPLEX GXI 200

PRO: Fast; hot graphics card; top modem; best reliability, service, and support ratings

CON: Expensive, fairly limited expandability, no application software included

Like other PCs in Dell's top-of-the-line OptiPlex series, the GXi 200 is all business. The first MMX OptiPlex, this new system has everything you need in a high-end corporate desktop. And with a blazing Pentium MMX-200 under its hood, it cruised to a PC WorldBench score of 225—just 5 percent behind the fastest PC ever.

Like other OptiPlex models, the $3743 GXi 200 is not for the faint of budget. But the cost isn't surprising since OptiPlex systems are designed with networks in mind. Thanks to its integrated ethernet adapter, the OptiPlex will plug into a local area network right out of the box. And major system components, such as the high-end Number Nine Imagine 128 Series 2 video card, go through extra testing to ensure driver compatibility.

Dell OptiPlex GXi 200

The 17-inch Dell D1728D-LS monitor delivers bright colors and clear, crisp graphics and text. But it isn't Dell's top 17-inch monitor; for an extra $100, you can get a 17HS Trinitron display. The 33.6-kbps U.S. Robotics Telephony modem, however, is one of the best around. The system's built-in 16-bit sound is good for a business ▶

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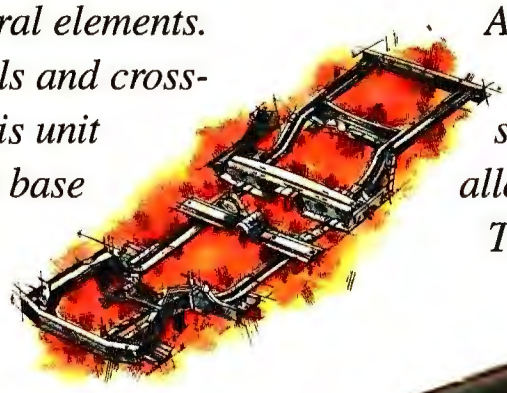

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machine, and Dell also includes a Universal Serial Bus port for hooking up USB peripherals.

The GXi 200 is intelligently designed. The thumbscrew-secured desktop case is sturdy and easy to open. The expansion slots sit on a daughtercard located above the motherboard, making upgrades about as painless as can be (though expansion options are fairly limited). The three available DIMM sockets, sequestered behind snaking cables, are somewhat hard to reach. The system's documentation is nicely illustrated, easy to understand, and well organized.

As with all its OptiPlex PCs, Dell backs the GXi 200 with a three-year warranty on parts and one year for labor. Our readers give high reliability ratings to Dell systems. This is not an inexpensive machine, but if you want a powerful, reliable, no-compromise business PC, there is no better value.

5 MICRON MILLENNIA PRO2 200 B

PRO: Very fast, highly rated modem, second processor socket, good reliability rating

CON: Long waits for technical support

The $2959 Millennia Pro2 200 B slips from fourth to fifth place this month because Micron's service rating fell from best to good. Despite the drop, this system is still an excellent choice if you want a dual-processor upgrade option. ▶

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 GXpro 200*	Pentium Pro-200	32	512	230
4	Dell OptiPlex GXi 200*	Pentium MMX-200	32	512	225
5	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	231
6	Gateway 2000 G6-200	Pentium Pro-200	32	256	234
7	IBM PC 350 (Pentium-200)	Pentium-200	32	512	215
8	HP Vectra VA 6/200 MT	Pentium Pro-200	32	256	229
9	HP Pavilion 7370V	Pentium MMX-200	32	256	222
10	IBM PC 350 (Pentium MMX-200)	Pentium MMX-200	32	512	232
11	Micron Home MPC P200	Pentium-200	32	512	216
12	IBM PC 365	Pentium Pro-200	32	256	232
13	HP Pavilion 7350P	Pentium MMX-166	32	256	200
14	Compaq Deskpro 2000 5200/1080	Pentium-200	32	256	218
15	HP Vectra VL 5/200MT Series 4	Pentium-200	16	256	201
16	Quantex QP6/200 SM-4	Pentium Pro-200	64	256	230
17	Netis N6200PCI	Pentium Pro-200	32	256	230
18	Royal 3D-MMX	Pentium MMX-200	32	512	232
19	DFI Landmarq IHX Pro P200 MMX	Pentium MMX-200	32	512	228
20	Polywell Poly 5200 Mx8	Pentium MMX-200	32	512	234

*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 (http://www.pcworld.com/testing).

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This minitower boasts top-notch components, such as a U.S. Robotics Sportster 33.6-kbps internal modem. Micron also includes a pair of Advent AV007 speakers and an integrated sound chip.

The Millennia Pro2's Intel motherboard includes a CPU socket for adding another Pentium Pro-200 processor—a rare but useful option if you want to upgrade to a multiprocessor NT workstation. The system's DIMM sockets can hold twice as much memory as more-typical SIMM sockets, and the RAM ceiling is 512MB.

The Millennia Pro2's PC WorldBench score of 231 puts it in the upper echelon of high-performance machines. And Micron still rates well for reliability. The Millennia's warranty covers the CPU and main RAM for five years, other parts for three, and labor for one. You also get round-the-clock toll-free tech support; it's good once you get through, although that can take a while.

Micron Millennia Pro2 200 B

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 (http://www.pcworld.com/t20pcs).

9 HEWLETT-PACKARD PAVILION 7370V

PRO: Good software bundle, nice design, excellent documentation

CON: Fairly expensive, slow for its processor class

The Hewlett-Packard Pavilion 7370V is an impressive package: a Pentium MMX-200 processor paired with 32MB of RAM and a 4GB hard drive. What's more, it's an exceptionally user-friendly home system that comes with a slew of family-oriented CD-ROM titles. With speakers mounted on the sides of the monitor, the ensemble has a smooth design with more living-room appeal than the usual putty-colored box. But at $3448 the 7370V can't be called a bargain. And even though it raced across the PC WorldBench finish line with a decent score of 222, that is still the slowest speed we've seen for a Pentium MMX-200 system.

The Pavilion minitower is well designed for the typical home user. HP includes a Logitech ThunderPad game controller. Another great feature is the one-touch keyboard. A set of buttons on the upper right of the outsize keyboard lets you control many of the machine's functions, including an Internet browser and audio CD playback. The system also has a USB port.

HP Pavilion 7370V

The inside is tidy, with easy access to the four free ISA slots and one free PCI slot. But the SIMM slots are buried under a riser card screwed into the motherboard.

HP's documentation is among the best we've seen. Besides the excellent printed manuals, there's also extensive on-screen help. Telephone support is of the 24-hour, seven-days-a-week variety.

10 IBM PC 350 (MMX-200)

PRO: Very fast, good design includes a sliding cover with lock for externally accessible drive bays

CON: Expensive, no modem or sound card, support limited to three-year warranty period

With its Pentium MMX-200 processor, this IBM PC 350 crossed the PC WorldBench finish line with an outstanding score of 232, only two points behind the number one Dell Dimension XPS M200s. It's also 8 percent faster than its sibling, the Pentium-200 version of the PC 350.

These two IBM corporate desktops are practically identical twins. Neither comes with a modem or sound card. Both have a horizontal design and a sliding cover that locks over the externally accessible drives; exceptionally tidy interiors and excellent user manuals; impressive 17-inch IBM G70 monitors with large control buttons on the front panel; and useful power-saving and network management features. And IBM offers an impressive support policy—while it lasts: The all-day, seven-days-a-week phone support is good only for the length of the warranty, which is three years for parts and labor.

IBM PC 350

But the MMX system is definitely the better-configured of the two, with an 8X CD-ROM drive (compared with the P-200's 6X), a 2.5GB hard drive (versus 1.6GB), and a powerful Matrox Millennium graphics card with 4MB of WRAM (compared with an integrated Trio64V+ with 2MB of EDO DRAM). So why does the MMX version rank lower on the charts? Price. At $3927, it costs almost $600 more than its sibling. If you want the unique features of this PC, you'll have to pay a premium for the MMX chip.

13 HEWLETT-PACKARD PAVILION 7350P

PRO: User friendly, PhotoDrive scanner

CON: Slow for its processor class, SIMM sockets hard to access

The $3048 Hewlett-Packard Pavilion 7350P blends ease of use and outstanding multimedia features into a high-quality home minitower. But if you're looking for raw PC power, the 7350P is not your dream machine: Like its sibling, the Pavilion 7370V, it's slow. Indeed, with a PC WorldBench score of 200, the 7350P is the slowest of the Pentium MMX-166 processors we've tested. However, if you're looking for a PC packed with fun extras like a full-duplex speakerphone, video capture, 3-D graphics, and spatially enhanced sound, this Pavilion hits the mark.

HP Pavilion 7350P

Also like the 7370V, the Pavilion 7350P has the standard features that you'd expect to find in a decent system: The monitor is clear, the keyboard comfortable. But it also comes with some great bells and whistles. One of our favorites is the PhotoDrive photo scanner tucked into a single drive bay. You can get really creative with it, scanning images up to 5 by 7 inches to create digital family photo albums or vacation scrapbooks. The Pavilion also comes with over 50 software titles, including ▶

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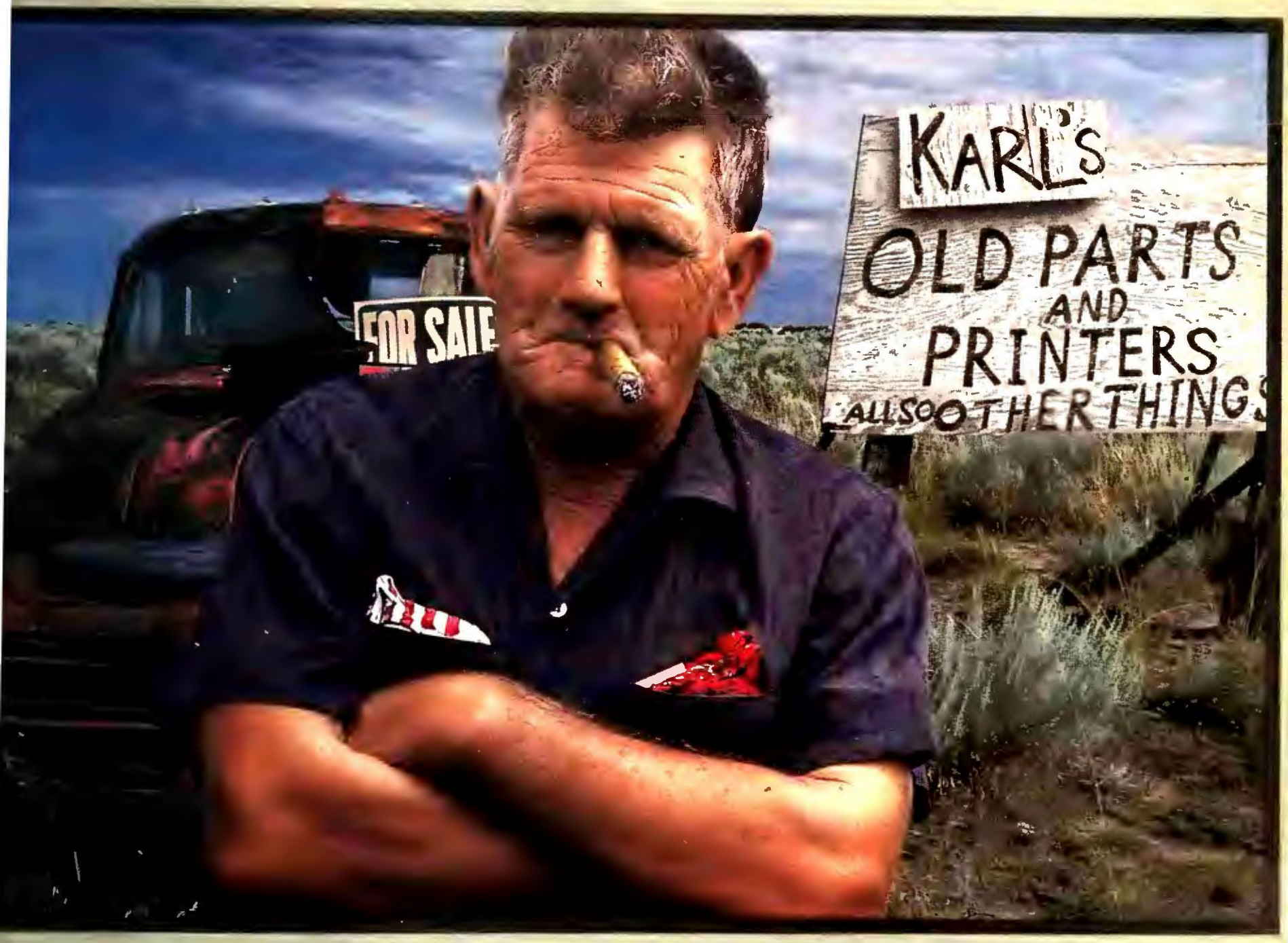

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This Pavilion is a little more fashionable than its 7370V sib. They both have the same one-touch keyboard, but the 7350P's includes an ergonomically designed wrist rest in a mod lavender color.

The system interior offers clutter-free access to the free ISA and PCI card slots; but as with the Pavilion 7370V, the SIMM sockets are buried under a riser card, making them difficult to reach. Fortunately, you also get high-quality documentation and 24-hours-a-day, 7-days-a-week phone support.

16 QUANTEX QP6/200 SM-4

PRO: Excellent graphics board, good software bundle, fast

CON: No free SIMM sockets, poor service and reliability record

If you buy the $2649 Quantex QP6/200 SM-4, you should probably think about putting speed-limit signs in your house. With a PC WorldBench score of 230, this minitower is one of the fastest Pentium Pro-200 systems we've seen.

The Quantex has lots to offer besides speed. Its Matrox Millennium graphics board with 4MB of WRAM is one of the best around. The included 17-inch monitor is clear and has rich color. The 33.6-kbps modem is a nice perk. Along with a 12X CD-ROM drive, you get a first-rate software bundle that includes titles like Corel Print House, WordPerfect Suite 7, and Compton's Interactive Encyclopedia.

Quantex QP6/200 SM-4

The interior is clutter free, but we were disappointed by the paucity of slots available for upgrades. With only one free ISA, one shared PCI/ISA, and two free PCI slots, you'll have to stick with conservative improvements to your system. The four SIMM slots are all filled, but with the included 64MB of RAM, you probably won't need the upgrade space.

The user manual looks sleek, but since it deals only with Windows 95 and other software issues and doesn't touch important topics like system setup, we were disappointed. Also, though Quantex provides important benefits like weekend support, recent feedback indicates that our readers have been less than happy with its service.

19 DFI LANDMARQ IHX PRO P200 MMX

PRO: Powerful graphics card, 33.6-kbps modem, USB ports

CON: No weekend support, SIMM sockets are difficult to access

You can't judge a book by its cover—or a PC by its chassis. Even though the $2999 DFI Landmarq IHX Pro P200 MMX looks like a plain Jane and its PC WorldBench score of 228 is only average for a Pentium MMX-200 processor, this minitower includes some excellent components under its hood.

DFI Landmarq IHX

The most outstanding feature is its video system. Besides the excellent Matrox Millennium card with 4MB of WRAM, the Landmarq comes with an Orchid Righteous card for realistic 3-D gaming. Unfortunately, the included 17-inch Hyundai monitor isn't as high-quality as the graphics boards: It's sharp and sturdy, but the color isn't as rich as on some displays we've seen. Other features are a mixed bag. The 33.6-kbps modem is a nice addition, but the 2.5GB hard drive is small considering the price of the system. The keyboard is solid, and bundled software includes the Lotus SmartSuite 96 office suite.

The Landmarq's interior is basically well designed. With space for four cards and five drives, you'll have plenty of room for expansion. Not everything is as tidy as it could be, though—a tangle of cables blocks access to the SIMM sockets. The Landmarq also includes two Universal Serial Bus ports so you'll be prepared when USB peripherals start appearing in stores.

DFI has improved its support policy slightly: It now offers a three-day turnaround on repairs, rather than five. But there's still lots of room for improvement. You don't get a user manual, the technical support line isn't toll-free, and weekend support is not available.

20 POLYWELL POLY 5200 MX8

PRO: Fast, good software package

CON: No modem, cover is difficult to remove

The Polywell Poly 5200 Mx8 is *fast*. This $2500 Pentium MMX-200 minitower zoomed to a PC WorldBench score of 234, equal to that of the number one Dell Dimension XPS M200s—another Pentium MMX-200 system.

But the Poly 5200 isn't neck-and-neck with the Dell Dimension in most other respects. It costs about $200 less but doesn't include a modem. And its 2.1GB hard disk and 8X CD-ROM drive, although adequate, are only average for a power system at this price. The video subsystem makes images eye-catching: The Diamond Stealth 3D 2000 graphics board with 4MB of EDO RAM shows its stuff on a clear 17-inch Sampo monitor with well-labeled control buttons. The system also comes with a substantial software package, including Microsoft Works and Money as well as several family-oriented offerings.

Polywell Poly 5200 MX8

Getting inside the PC isn't as easy as it should be. To take off the case, we had to remove each side of the cover separately, but there was no outside indication whether we would gain access to the interior boards or run into the backside of the vertically placed motherboard. Inside, the assembly was neat, with clear access to the six upgrade slots. But the carefully tied-off cables did block access to the SIMM sockets.

Overall, the Poly 5200 Mx8 is a good generic machine that offers speed at a reasonable price. ▶

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 (http://www.pcworld.com/t20pcsnaps).

- American Multisystems InfoGold P Pro-180
- CyberMax Intel Promax1
- Sony VAIO PCV-120
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KM-511L	15" / 14.0"	1024 x 768	Digitol	.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-830	20" / 19.0"	1600 x 1280	OSD	.28mm

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1 Other end of connection must also be camera-equipped to see called party. Compatible with any standard H.324 video software. 2. All x2 products are capable of 56 Kbps downloads; however, due to FCC rules which restrict power output, current download speeds are limited to 53 Kbps. ©1997 U.S. Robotics. All rights reserved. U.S. Robotics and the USRobotics logo are registered trademarks of U.S. Robotics and Bigpicture, the bigpicture logo, x2 and RapidComm are trademarks of U.S. Robotics. All other product names are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.Product specifications subject to change without notice. Contact your U.S. Robotics representative for current product information. #2314 3.12.97

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Video Modem & Capture Card
If you already have a great full color camera.

All in one Video Kit
Camera, capture card and video modem. Everything you need to make the Internet truly interactive.

U.S. Robotics®

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	$1779	Pentium-133	Fast; sound and modem are perks at this price; good first PC.
2	Micron Millennia LXA P133 888/634-8799 www.micronpc.com	2	Jan 97	$1599	Pentium-133	As fast as some P-166s, but lower reliability rating keeps it from top.
3	Gateway 2000 P5-133 800/846-2000 www.gw2K.com	3	Nov 96	$1499	Pentium-133	$100 price drop on quick P-133 with fast graphics card; sound costs extra.
4	Dell OptiPlex Gs+ 5200L 800/388-8542 www.dell.com	4	Feb 97	$2137	Pentium-200	32MB of RAM now standard (tested with 16MB); easy to upgrade.
5	IBM PC 350 (Pentium-166) 800/426-2968 www.pc.ibm.com	14	Dec 96	$2225	Pentium-166	Improved reliability rating, $139 price cut on corporate PC; no sound.
6	Gateway 2000 G6-180 800/846-2000 www.gw2K.com	5	Dec 96	$1984	Pentium Pro-180	Faster than a P-200; no modem; small software package; $55 off.
7	Kingdom 6x86 P166+ Super Value 800/385-3436 www.kingdomcomputers.com	–	NEW	$1377	Cx6x86-P166+	Good price for the processor class; 16X CD-ROM drive but no modem.
8	DirectWave Blue Thunder P133 MVP Pro 800/882-8108 www.directwave.com	10	Oct 96	$1499	Pentium-133	Well-built multimedia PC; fast for a P-133; support hours limited.
9	Quantex QP6/200 SM-1 800/896-4898 www.quantex.com	16	Aug 96	$2099	Pentium Pro-200	$100 off on loaded Pentium Pro-200; service policy slightly improved.
10	HP Vectra VE 5/133 800/752-0900 www.hp.com	6	Dec 96	$1986	Pentium-133	Corporate P-133 with clean design; Unified Memory Architecture slows it down.
11	HP Vectra XM 5/120 Series 4 800/752-0900 www.hp.com	7	Oct 96	$1828	Pentium-120	Well-built business PC; great reliability rating; limited support hours.
12	CyberMax Cyrix Max C3 P166+ 800/443-9868 www.cybmax.com	13	Feb 97	$1599	Cx6xB6-P166+	Tested with 24MB of RAM but now sold with 32MB; $50 price drop.
13	Diamond Mid Tower P166 800/989-7253 www.diamondtech.com	17	Apr 97	$1395	Cx6x86-P166+	Bargain generic PC; modem, full multimedia, 3-D; mediocre monitor.
14	Quantex QP5/166 SM-2 800/896-4898 www.quantex.com	9	Aug 96	$2099	Pentium-166	Strong components; service policy is slightly improved.
15	CyberMax Cyrix Max C4 P200+ 800/443-9868 www.cybmax.com	–	NEW	$1999	Cx6x86-P200+	One of fastest on the chart; 17-inch monitor, good sound.
16	ProGen Discover MPEG II P150 888/776-9595 www.progen.com	19	Nov 96	$1349	Pentium-150	$100 off; good option for game players on a tight budget.
17	DFI Landmarq IHX Prime P150+ 800/808-4334 www.dfiusa.com	–	NEW	$1699	Cx6x86-P150+	Generic system with USB ports, modem; slightly improved service policy.
18	Diamond Technologies P133 800/989-7253 www.diamondtech.com	–	Jan 97	$1395	Pentium-133	Very fast and cheap; great features include a 33.6-kbps modem.
19	USA Flex Family Special 800/872-3539 www.usaflex.com	–	July 96	$1599	Pentium-133	$190 price cut on decked-out P-133; sparse documentation.
20	First Computer FCS P-133 800/325-1911 www.fcsnet.com	18	Aug 96	$1399	Pentium-133	Very inexpensive; quick; high-quality graphics card.

Best Buy See features chart, page 208; performance chart, page 210. 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 April 30).

THIS MONTH'S BUDGET CHART reads like a registry for the United Nations of computer listings: Just about every processor is represented, from the Hewlett-Packard Vectra XM 5/120 Series 4's Pentium-120 to the Quantex QP6/200 SM-1's Pentium Pro-200. And for the first time, an MMX PC competed for this chart. The $2199 Quantex QP5/166 MMX is a sturdy system with good features and excellent performance, but with poor reliability scores in our reader fax-back surveys, it needed to be less expensive to make our Budget Desktops Top 20. To find out about this MMX Quantex and other systems that didn't rank, visit PC World Online (http://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
92	average	best	outstanding	188/very good	best/best	3462	625
90	inexpensive	good	outstanding	191/very good	good/best	3479	626
88	inexpensive	fair	very good	192/very good	best/best	3449	627
88	average	best	very good	201/very good	best/best	3501	628
87	average	good	outstanding	197/very good	good/good	3468	–
86	average	fair	outstanding	218/outstanding	best/best	3466	629
85	very inexpensive	[2]	outstanding	197/very good	[2]/fair	–	630
84	inexpensive	[2]	outstanding	194/very good	[2]/good	3469	631
83	average	poor	outstanding	224/outstanding	fair/best	3405	632
83	average	best	very good	166/good	good/poor	3465	633
83	average	best	good	177/good	good/poor	3455	634
83	inexpensive	[2]	outstanding	205/very good	[2]/fair	3511	635
83	very inexpensive	[2]	very good	199/very good	[2]/poor	3512	636
83	average	poor	outstanding	209/very good	fair/best	3404	637
83	average	[2]	outstanding	222/outstanding	[2]/fair	–	638
82	very inexpensive	[2]	very good	183/very good	[2]/fair	3451	639
82	inexpensive	[2]	outstanding	190/very good	[2]/poor	–	640
82	very inexpensive	[2]	very good	185/very good	[2]/poor	3484	641
82	inexpensive	[2]	very good	181/very good	[2]/best	3525	642
82	very inexpensive	[2]	very good	189/very good	[2]/fair	3513	643
Scorecard weightings	Price 25 [illegible]ent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	903

[2] Insufficient data.

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 good 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 performance and features for $1779, $100 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 Vibra 16 sound card—unusual in a bare-bones Dell computer. (Speakers cost an additional $35 to $185.) The system also includes a 36.6-kbps fax-modem.

The 15-inch Dell 15TX Trinitron monitor that came with our test system was a little dark and couldn't be brightened up, unlike other 15TX monitors we've tested. But it did display both crisp images and sharp text.

Dell Dimension P133v

The "v" series PCs are nicely designed and put together. It's easy to open the unit's case via latches and thumbscrews, and the two cooling fans ensure that you don't fry your investment. The system's ports are well labeled. For expanding memory, the P133v uses DIMMs, which hold more memory per module than do SIMMs. The system has only two DIMM 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.

If you have a little more money to spare, another system in the budget Dimension line might be worth a look. With 32MB of RAM, a 33.6-kbps modem, a 2.1GB hard drive, and full multimedia, the $1929 Dimension P200v is nicely set up for the home office. It earned a PC WorldBench score of 213, or 13 percent faster than the P133v's. The P200v comes with a 15-inch Dell 15LS monitor, but if you want the 15-inch Trinitron, just add $49 to the price. The warranty is the same as for the Dimension P133v: three years' coverage on parts and one year on labor.

2 MICRON MILLENNIA LXA P133

PRO: Fast, well built

CON: No modem, no software bundle

With a $50 price drop, the Micron Millennia LXA P133 retains the second-place Best Buy position it has held for the past few months. This $1599 Pentium-133 performs as well as many P-166s; you'll need to add only a modem and applications to make it a complete package.

Micron Millennia LXA

The internal design of this minitower is spare, clean, and open, and the ▶

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	Micron Millennia LXA P133*	Pentium-133	16	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.5	.28	12X
3	Gateway 2000 P5-133*	Pentium-133	16	256	2	Matrox Mystique	2/SGRAM	15/13.9	.28	12X
4	Dell OptiPlex Gs+ 5200L*	Pentium-200	16	256	2.1	Integrated S3 Trio64V+	2/VRAM	15/13.7	.28	8X
5	IBM PC 350 (Pentium-166)*	Pentium-166	16	256	1.3	Integrated S3 Trio64V+	2/EDO DRAM	15/13.7	.28	6X
6	Gateway 2000 G6-180	Pentium Pro-180	16	256	3.2	Matrox Mystique	2/SGRAM	15/13.9	.26	12X
7	Kingdom 6x86 P166+ Super Value	Cx6x86-P166+	16	256	2.1	PCI-60V	2/EDO DRAM	15/13.8	.28	16X
8	DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	1.6	Diamond Stealth 3D 2000	4/EDO DRAM	17/14.3	.28	8X
9	Quantex QP6/200 SM-1	Pentium Pro-200	32	256	2.5	STB Lightspeed 128	2/MDRAM	17/16	.26	12X
10	HP Vectra VE 5/133	Pentium-133	16	256	1.1	Integrated SiS 6205	2/EDO DRAM	15/14	.28	8X
11	HP Vectra XM 5/120 Series 4	Pentium-120	16	512	1.3	Integrated S3 Trio64V+	2/ORAM	15/13.5	.28	–
12	CyberMax Cyrix Max C3 P166+	Cx6x86-P166+	24	512	2.1	STB Lightspeed 128	4/MDRAM	15/13.8	.28	12X
13	Diamond Mid Tower P166	Cx6x86-P166+	16	512	2.1	Diamond Stealth 30 2000	4/EDO DRAM	15/13.9	.28	8X
14	Quantex QP5/166 SM-2	Pentium-166	32	512	3.2	STB Lightspeed 128	2/MDRAM	17/15.9	.26	12X
15	CyberMax Cyrix Max C4 P200+	Cx6x86-P200+	32	512	2.5	Diamond Stealth 3D 2000	4/EDO DRAM	17/15.8	.26	8X
16	ProGen Discover MPEG II P150	Pentium-150	16	512	1.6	ProGen Gold 64V+ PCI	2/EDO DRAM	15/13.7	.28	8X
17	DFI Landmarq IHX Prime P150+	Cx6x86-P150+	16	256	1.6	Cardex S3d Virge VGA	4/EDO DRAM	15/13.7	.28	8X
18	Diamond Technologies P133	Pentium-133	16	512	2.1	Diamond Stealth 3D 2000	2/EDO DRAM	15/13.9	.28	8X
19	USA Flex Family Special	Pentium-133	16	256	1.7	Expert Color 30 Accelerator	4/EDO DRAM	15/13.7	.27	8X
20	First Computer FCS P-133	Pentium-133	16	512	1.6	Matrox Millennium	2/WRAM	15/13.8	.28	8X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Toll call.

motherboard is easily accessible, so adding cards or upgrading memory is a snap. It also comes with plenty of available expansion slots, drive bays, and SIMM sockets. The included Diamond Stealth 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 Vibra 16 sound chip and fair-quality Advent 270 speakers. The system's 2.1GB hard disk should provide enough room for most users.

Besides 24-hours-a-day technical support, Micron provides a three-year parts and one-year labor warranty and a year of free on-site service. Our readers are still satisfied with the reliability of Micron PCs, although they have lately been experiencing long hold times on the toll-free tech support line. Micron hasn't yet joined the growing number of vendors that provide snazzy interactive on-screen help, but its printed manuals are easy to read and contain plenty of diagrams.

Micron offers the same configuration in a Pentium-166 model that costs $100 more and runs about 5 percent faster; that unit is also a good value.

3 GATEWAY 2000 P5-133

PRO: Fast, great documentation, good design, $100 price drop

CON: No modem or sound card included

The Gateway 2000 P5-133 is a dynamite Best Buy for businesses, although it's missing sound and a modem. It's fast and well designed, and at just $1499 it's eminently affordable. A big plus for business buyers is that the low price includes the Microsoft Office Professional suite of business applications. This system is good-looking too, with a clean, angular case style that lends an up-to-date feel to an office. The P5-133 is also speedy: It turned in an impressive PC WorldBench score of 192—6 percent above average—making it one of the fastest Pentium-133s on the chart.

Gateway 2000 P5-133

The unit we tested had a nice-size 2GB hard disk and an 12X Toshiba CD-ROM drive. The 15-inch CrystalScan is a fine basic monitor, but it's not equal to Gate-

		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
–	integrated Vibra 16	minitower	128	512	2	3/1	6	3 [1]/1	24	Sat., Sun.	CIS, WWW
–	–	minitower	128	256	1	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	integrated Vibra 16	compact	128	256	2	0/0	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	desktop	192	512	4	1/1	4	3/3	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
–	Schubert 16Bit SRS 3D	tower	128	512	2	3/3	5	3/1	13	Sat.	WWW
33.6	Sound Blaster AWE32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	256	0	2/1	3	3/1	24	Sat., Sun.	BBS, Prodigy, WWW
–	Sound Blaster 32 PnP	desktop	192	256	4	1/1	3	3/3	11 [2]	–	AOL, BBS, CIS, WWW
–	–	desktop	128	512	4	2/0	4	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	3D Wavetable Sound	minitower	128	512	3	3/1	4	1/1	9	–	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	2	3/2	4	3/1	24	Sat., Sun.	BBS, Prodigy, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	384	512	2	3/2	5	3/1	12	Sat.	BBS, WWW
33.6	Audio Drive 32 PnP	minitower	128	512	2	3/2	4	3/1	9	–	BBS, WWW
33.6	DFI SC-201	minitower	256	512	2	3/2	4	2/lifetime	9 [2]	–	BBS, 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
–	Audio Drive AD32 PnP	tower	128	512	2	3/0	6	1/lifetime	11	Sat.	WWW

way's best, the more expensive Vivitron. The system's 2MB Matrox Mystique video card has ranked on our Top 10 Graphics Boards for several months because of its excellent 3-D performance and quality.

Gateway's support policies are some of the best we've seen, and readers tell us that the quality of service is top-notch. However, they still rate Gateway's PC reliability as only fair.

4 DELL OPTIPLEX GS+ 5200L

PRO: Small profile, fast, built-in networking

CON: No speakers, limited expandability

The slim little $2137 OptiPlex Gs+ 5200L is the entry-level model in Dell's network-ready corporate desktop line. It's a fine choice for the business buyer who needs a low-cost system. Though it's more expensive than the first-place Dimension P133v, in an office setting this P-200 system's space-saving design, built-in connectivity, and management features are worth the extra dollars.

Inside you'll find Dell's usual attention to detail. The system is clean and easy to upgrade. On top of the processor is the largest heat sink 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 the way heat sinks often do. The downside to this computer's low-profile design is that you can't expand all that much: It has only two free add-in card slots and no open drive bays.

Dell OptiPlex Gs+ 5200L

Video is controlled by an integrated S3 Trio64V+ chip with 2MB of VRAM and is displayed on a 15-inch Dell monitor with as nice a picture as you'll find at that size. Our test PC arrived with an integrated Creative Labs Vibra 16 sound card but no speakers (Dell sells a basic set for $49). No modem is included at the $2137 price.

Service and support for this OptiPlex are of the high quality we've come to expect for Dell machines. The company offers a three-years parts and one-year labor warranty and round-the-clock toll-free tech support. Reliability and service continue to get high marks from our readers.

5 IBM PC 350 (PENTIUM-166)

PRO: Networking tools, USB ports

CON: Subpar monitor

A $139 price drop and improved reliability rankings help the P-166 version of IBM's PC 350 jump to a Best Buy position. With this machine, you get a networkable unit for only $2225.

The PC 350 comes with special software tools that allow a network administrator to monitor and work on the system remotely. 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 are not included with the base system, though; token ring and ethernet versions of the cards each cost $120 extra.

IBM PC 350 P-166

The PC 350 also comes with two Universal Serial Bus ports. It has a special port in back for connecting an infrared receiver/transmitter; the optional kit costs $79.

With a PC WorldBench score of 197, the system is an average Pentium-166 performer. Its 15-inch IBM G50 monitor is crisp and comes with great controls, but the colors are dark. ▶

TOP 20 BUDGET DESKTOPS

PERFORMANCE

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension P133v*	Pentium-133	16	256	188
2	Micron Millennia LXA P133*	Pentium-133	16	512	191
3	Gateway 2000 P5-133*	Pentium-133	16	256	192
4	Dell OptiPlex Gs+ 5200L*	Pentium-200	16	256	201
5	IBM PC 350 P-166* (Pentium-166)	Pentium-166	16	256	197
6	Gateway 2000 G6-180	Pentium Pro-180	16	256	218
7	Kingdom 6x86 P166+ Super Value	Cx6x86-P166+	16	256	197
8	DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	194
9	Quantex QP6/200 SM-1	Pentium Pro-200	32	256	224
10	HP Vectra VE 5/133	Pentium-133	16	256	166
11	HP Vectra XM5/120 Series 4	Pentium-120	16	512	177
12	CyberMax Cyrix Max C3 P166+	Cx6x86-P166+	24	512	205
13	Diamond Mid Tower P166	Cx6x86-P166+	16	512	199
14	Quantex QP5/166 SM-2	Pentium-166	32	512	209
15	CyberMax Cyrix Max C4-P200+	Cx6x86-P200+	32	512	222
16	ProGen Discover MPEG II P150	Pentium-150	16	512	183
17	DFI Landmarq IHX Prime P150+	Cx6x86-P150+	16	256	190
18	Diamond Technologies P133	Pentium-133	16	512	185
19	USA Flex Family Special	Pentium-133	16	256	181
20	First Computer FCS P-133	Pentium-133	16	512	189

*Best Buy

Application test times in minutes

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

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 (http://www.pcworld.com/testing).

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Introducing the world's first .28mm, 21-inch (19.7" DVI*) aperture grille monitor.

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Bright, vivid colors with superb contrast. Razor-sharp focus due to Mitsubishi's enhanced electron gun. High refresh rate for flicker-free imagery. On-Screen Display system with intuitive front-panel controls. All in an ergonomic, compact enclosure that fits easily into any workspace.

Best of all, the Diamond Pro 91TXM is available at the estimated selling price of $1,649, including a comprehensive 3-year warranty and support program to keep it working at peak efficiency. The new Diamond Pro 87TXM (17" CRT/16.0" diagonal viewable image) is also available, with an estimated selling price of $829.

Get all the details today–both on-screen and off–by calling Mitsubishi Electronics at **1-800-843-2515** in the U.S. and Mexico. In Canada call **1-800-387-9630**. *For immediate product specifications call Mitsubishi Qwikfax at **1-800-937-2094**.* World Wide Web http://www.mitsubishi-display.com

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Award-Winning DIAMONDTRON Technology

Diamond Pro 91TXM

MITSUBISHI DISPLAY PRODUCTS

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* DVI: Diagonal viewable image

Circle 155 on reader service card

New This Month

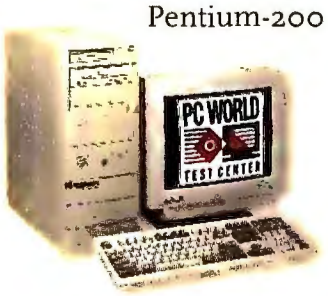
The following PCs made our Budget Desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (http://www.pcworld.com/t20pcs).

7 KINGDOM 6X86 P166+ SUPER VALUE

PRO: Great price, 16X CD-ROM drive

CON: Average performer, difficult to upgrade RAM

Bob Barker would be pleased with Kingdom's 6x86 Super Value PC—at $1377, the price is right. In fact, the Super Value is priced even righter than Kingdom's Pentium-200 Value, a more generously configured $1597 minitower for small offices that ranked eighth on last month's Budget chart.



Kingdom 6x86 P166+

You won't find too many PCs with fast processors priced as low as the Super Value. Kingdom pulls it off by sticking with a very basic configuration, including a Cyrix Cx6x86-P166+ chip that is cheaper than Intel's Pentium-166. Cyrix-equipped systems usually perform better than their Intel-based counterparts, and the Super Value is no exception. Although its PC WorldBench score of 197 is only average compared with other Cyrix 166+ chips, it's a few points higher than the average for an Intel P-166 system. Since the Super Value has two free SIMM sockets, you can increase the 16MB of memory to improve performance. Unfortunately, that's not as easy to do as it should be, because bundled cables hide the available SIMM slots. Accessing the five free card slots is simpler—once you're inside the case, the way is clear.

Kingdom says the Super Value line is geared toward home and family markets, but if you want to surf the Web, you'll have to shell out an extra $95 for a 33.6-kbps fax-modem. The P166+ Super Value comes with less cache memory and a slighter smaller hard drive than the Value. Its software bundle is modest, but it does include useful programs such as Microsoft Works and Money. The only feature that reflects cutting-edge technology is the 16X CD-ROM drive, which is a couple of notches faster than the 12X drive on the Kingdom Value.

We haven't collected enough reader fax-back surveys on Kingdom to evaluate its service or reliability, but the company is now offering free lifetime phone support.

If you're a contestant for a budget system, you could do a lot worse than either the Kingdom 6x86 P166+ Super Value or the Pentium-200 Value. Their prices are enough to make anyone cheer.

15 CYBERMAX CYRIX MAX C4 P200+

PRO: Fast, excellent sound, good price

CON: Obstructed access to SIMM slots, average support policy

You have a fantasy: You want to own the fastest, most souped-up system on the planet. The problem is, you can't afford much. Well, for the bargain price of $1999, you can get a system that crosses the PC WorldBench finish line with a scorching score of 222, making it the second-fastest system on the Budget chart.

But the CyberMax C4 offers more than just speed. Ready for multimedia or the Internet, it has a 33.6-kbps modem, a high-quality Ensoniq sound card, Altec Lansing speakers and subwoofer, and a software bundle with fun titles like Compton's Interactive Encyclopedia as well as useful ones like Quicken. The $1999 price also includes a 17-inch monitor—a size larger than what most budget systems come with. The interior is tidy and generally affords easy access for upgrades, though the SIMM slots and one of the PCI slots are blocked by a mass of cables.

CyberMax Cyrix Max

As far as support goes, CyberMax gets an average score in our reader survey. The company offers free on-site service but no Sunday support. It added fax-back support this month, but it still lacks the online services that many companies provide. Still, if you don't have a lot of money to burn and you crave speed, the C4 P200+ might fulfill your PC fantasy.

17 DFI LANDMARQ IHX PRIME P150+

PRO: Good performance, inexpensive

CON: Poor support policy, unstable stand for mediocre monitor

If you don't go for a lot of bells and whistles, then look into this standard box. For the low price of $1699, DFI's Landmarq IHX Prime P150+ has all you'll need for your computing.

DFI Landmarq IHX

Although this is the only system we've tested with a Cx6x86-P150+ processor, its PC WorldBench score of 190 is higher than that of any Pentium-150 system we've looked at. Most of the Landmarq's features are what you'd expect in a plain-vanilla machine: a 1.6GB hard disk, an 8X CD-ROM drive, and a generic video card with 4MB of EDO DRAM. It does have some standout features: a good keyboard, two USB ports, Lotus SmartSuite 96, and a 33.6-kbps modem. Unfortunately, its 15-inch monitor has a lackluster display. And the monitor itself seems to rock too easily on its stand, as happened when we pressed its brightness buttons.

Inside, there's plenty of room for upgrades, with four free card slots and two free SIMM sockets. The only hitch? A cable snarl blocks any easy access for memory upgrades.

The biggest weakness is DFI's service policy. The company offers only 9 hours of tech support daily on weekdays and none on weekends. And as with many systems, the Landmarq's slim manuals come from the manufacturers of the individual components (such as the hard drive and modem); you don't get an actual user manual. ▶

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 (http://www.pcworld.com/t20pcsnaps).

- **American Multisystems InfoGold P-200**
- **Caliber Voyager 200 MMX**
- **Quantex QP5/166 MMX**
- **Trademark XL-200**

Videogram technology puts people face to face via their PCs.

High-quality, low-cost desktop video is now as simple as sending e-mail.

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

BY GARY FRANK

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.

A simple desktop video solution

Luckily, there's a new technology that makes it all simple. With Alaris QuickVideo™, PC users can import AVI files or capture sound, images, and video from any source—camcorders, TVs, or VCRs. What's more, Macromedia

Director or Adobe Premiere files that have been saved as AVI files can also be used as source material. Then, with Alaris' Videogram™ software, users quickly can create a super-compressed, ready-to-deliver video file. Videogram's proprietary compression algorithm takes an AVI file for a 60-second video clip that might range up to 30MB and compresses it down to less than 1MB. As a result, a Videogram file can be up to 5 times smaller than a comparable MPEG file. All of which means it can be uploaded and downloaded fast, and is small enough to distribute by attaching it to e-mail or putting it on a standard 1.4MB floppy disk—instead of a CD-ROM or Zip drive. A playback utility is automatically embedded, so recipients can play the file without any special hardware or software, just by clicking on the Videogram icon. All that's needed is a 486 or faster Windows PC, and a sound card and speakers to hear audio.

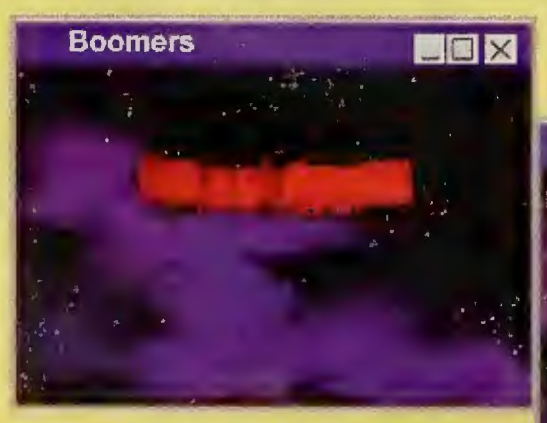
An affordable sales, service, and training tool—ready for just about any Windows PC

Videograms are gaining broad popularity. From on-line training sessions on corporate intranets and realtors giving prospective home buyers e-mail tours, to clips of the new baby sent to grandma, this inexpensive video solution is

Video production firm saves time, cuts costs with Videograms.

NET 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

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 videoconferencing 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).

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.

DV AWARD OF EXCELLENCE

Put A Face With That Name

The fastest and easiest way to get video in and out of your computer is QuickVideo and QuickVideo Pro from Alaris. It's the easiest way to put a face to your e-mail.

You can capture video, audio, and still images from any video source. Then you can send them out by e-mail using Alaris' Videogram technology. You can easily compress a minute of audio and video into a file that's less than 1MB—so small it hardly takes anytime to up- and download by e-mail.

DV Magazine said the QuickVideo Pro "is very slick and easy to use." Bill Machrone of PC Magazine said, "Now I'm itching to send Videograms to friends and associates."

If you want to see what everyone is raving about, get a QuickVideo or QuickVideo Pro. And start putting a face to your e-mail.

Call Alaris at
1-800-317-2348
for more information or the dealer nearest you.

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Technology For Video Communication

Circle 38 on reader service card

PC WORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (2/7/97)	CPU	Comments
1	Dell Latitude LM P133ST 800/388-8542 www.dell.com	–	NEW	$3099	Pentium-133	Old favorite now has more RAM and larger hard drive.
2	Dell Latitude XPi P133ST 800/388-8542 www.dell.com	4	Aug 96	$3099	Pentium-133	Improved notebook reliability rating, big $600 price drop; no CD-ROM.
3	WinBook LM 800/468-2162 www.winbookcorp.com	–	NEW	$3199	Pentium-133	First system in a new line; keyboard quality could be better.
4	Micron TransPort MRX 888/634-8799 www.micronpc.com	2	Apr 97	$3807	Pentium-133	Quicker than the Dells, costs $700 more, includes modem, CD-ROM drive.
5	WinBook FX 800/468-2162 www.winbookcorp.com	–	NEW	$3799	Pentium-133	Better keyboard quality than on last FX notebook; built-in modem.
6	Gateway 2000 Solo 2200 800/846-2000 www.gw2K.com	–	NEW	$4699	Pentium MMX-166	Fastest notebook, held back by reliability and service ratings.
7	AcerNote Nuovo 800/733-2237 www.acer.com/aac	6	Apr 97	$3399	Pentium-133	Stylish; stupendous battery life; one year of free tech support.
8	HP OmniBook 800CT 800/322-4772 www.hp.com/go/omnibook	9	Mar 97	$3420	Pentium-133	Affordable after huge $950 price cut, but few extras.
9	HP OmniBook 5500CT 800/322-4772 www.hp.com/go/omnibook	–	Oct 96	$3555	Pentium-133	$810 price drop on sturdy, fully configured PC with 10X CD-ROM drive.
10	Sceptre Soundx Series 4000 800/788-2878 www.sceptretech.com	–	Mar 97	$3199	Pentium-150	Unbelievable $2350 price cut; good battery life, performance.
	BUDGET NOTEBOOKS					
1	HP OmniBook 5500CS 800/322-4772 www.hp.com/go/omnibook	3	Jan 97	$1710	Pentium-100	$750 off makes this a Best Buy; $375 CD-ROM drive option.
2	Compaq Armada 1130T 800/345-1518 www.compaq.com	2	Apr 97	$1999	Pentium-120	$300 price drop pulls 1130T ahead of sibling 1120, last month's Best Buy.
3	CTX EzBook 720CS 800/888-9052 www.ctxintl.com	–	NEW	$1699	Pentium-120	Comes with game pad and headphones; low screen quality.
4	Gateway 2000 Solo 2100 S5-120 800/846-2000 www.gw2K.com	6	Jan 97	$2399	Pentium-120	$100 price cut; fastest on Budget chart, but battery life is shortest.
5	AcerNote Light Multimedia 373 800/733-2237 www.acer.com/aac	–	Feb 97	$2199	Pentium-133	$200 off sleek notebook with 6X CD-ROM drive and long battery life.
6	Toshiba Satellite Pro 420CDS 800/457-7777 www.computers.toshiba.com	7	Sept 96	$2199	Pentium-100	$99 cut on good-quality multimedia notebook; internal AC adapter.
7	Mega Image MegaBook 911 800/250-1876 www.megal.com	9	Mar 97	$2599	Pentium-133	Very fast for the money; support policies are weak; $100 off.
8	Samsung Sens Pro 500 800/933-4110 www.sosimple.com	–	Feb 97	$2699	Pentium-120	$300 price drop, slightly improved service policies.
9	Toshiba Satellite 110CT 800/457-7777 www.computers.toshiba.com	8	Nov 96	$2099	Pentium-100	Good first notebook if you want active-matrix screen; needs more RAM.
10	Broadax BSI NP8320T 800/872-4547 www.bsicomputer.com	–	NEW	$1945	Pentium-100	Excellent price includes 6X CD-ROM drive and infrared port.

Best Buy See features chart, page 218; performance chart, page 220.

[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 April 30).

SOME HUGE PRICE DROPS helped put several older notebooks on our charts this month. Most improved deal: The Sceptre Soundx Series 4000, now over $2000 cheaper, pulled into spot ten on the Power Notebooks chart. Other notables? The HP OmniBook 800CT and 5500CT had price cuts of $950 and $810, respectively. The Fujitsu 530T LifeBook was a contender this month that didn't make it: Although it is fast, it was too heavy and short-winded to rank. To read about the 530T and other notebooks that fell short, visit PC World Online (http://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
88	186/outstanding	inexpensive	average	very good	above average/good	5:42/very good	heavy	–	644
88	166/very good	inexpensive	average	very good	above average/good	5:20/very good	average	3771	645
87	182/outstanding	inexpensive	average	very good	average/fair	5:46/very good	heavy	–	646
87	187/outstanding	average	average [3]	outstanding	[4]/fair	5:46/very good	heavy	3816	647
87	188/outstanding	average	average	outstanding	average/fair	4:15/good	heavy	–	648
87	218/outstanding	expensive	average	outstanding	below average/fair	3:46/good	average	–	649
86	166/very good	average	average [3]	good	[4]/fair	11:40/outstanding	heavy	3817	650
85	168/very good	average	average [3]	good	[4]/fair	4:07/good	light	3811	651
84	162/very good	average	average [3]	outstanding	[4]/fair	3:50/good	heavy	3825	652
84	185/outstanding	inexpensive	[4]	good	[4]/fair	5:57/very good	heavy	3826	653
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**		
86	152/outstanding	inexpensive	average [3]	good	[4]/fair	4:00/good	average	3807	654
83	140/very good	average	average	good	above average/fair	3:57/good	average	3820	655
82	167/outstanding	inexpensive	[4]	satisfactory	[4]/fair	4:28/good	heavy	–	656
81	171/outstanding	average	average	good	below average/fair	2:15/satisfactory	average	3805	657
81	142/very good	average	average [3]	good	[4]/fair	5:01/very good	average	3828	658
79	142/very good	average	average	good	below average/good	4:02/good	heavy	3771	659
78	165/outstanding	expensive	[4]	very good	[4]/fair	4:38/good	heavy	3813	660
78	152/outstanding	expensive	[4]	very good	[4]/fair	4:52/very good	average	3829	661
76	98/good	average	average	good	below average/fair	3:35/good	average	3792	662
76	126/good	inexpensive	[4]	good	[4]/worst	1:56/satisfactory	heavy	–	663
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:**	**904**

[3] 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 P133ST

PRO: Large, crisp screen; very fast

CON: Short key travel

Like the Dell Latitude LM that placed third in last month's Power Notebooks chart, the newly configured $3099 Latitude LM P133ST—with 24MB of RAM and a larger 1.4GB hard drive—is an excellent deal. With improved performance, its PC WorldBench score of 186 is among the best we've seen from a Pentium-133 portable. And its battery life of about 5.75 hours is also good.

Dell Latitude LM P133ST

This Latitude has the same design as the unit it replaces: a vivid display, well-organized keyboard, and responsive touchpad. At 8.8 pounds, the Latitude LM isn't light, but considering that it includes both floppy and CD-ROM drives, it's not too much to bear. ▶

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 P133ST*	Pentium-133	8.8	24	1440	active	12.1	800 x 600	256	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
3	WinBook LM	Pentium-133	8.6	16	1083	active	12.1	800 x 600	65,536	lithium ion	touchpad
4	Micron TransPort MRX	Pentium-133	9.2	32	1400	active	11.3	800 x 600	65,536	lithium ion	eraserhead & touchpad
5	WinBook FX	Pentium-133	9.4	32	2167	active	12.1	800 x 600	65,536	lithium ion	eraserhead
6	Gateway 2000 Solo 2200	Pentium MMX-166	8.2	40	2160	active	12.1	800 x 600	65,536	lithium ion	touchpad
7	AcerNote Nuovo	Pentium-133	10	16	1400	active	11.8	800 x 600	65,536	lithium ion	touchpad
8	HP OmniBook 800CT	Pentium-133	6.6	16	1440	active	10.4	800 x 600	256	lithium ion	mouse
9	HP OmniBook 5500CT	Pentium-133	9.6	16	1358	active	12.1	800 x 600	65,536	lithium ion	eraserhead
10	Sceptre Soundx Series 4000	Pentium-150	8.8	16	1300	active	12.1	800 x 600	256	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	HP OmniBook 5500CS*	Pentium-100	8	16	1358	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
2	Compaq Armada 1130T*	Pentium-120	7.5	16	1080	active	10.4	800 x 600	256	NiMH	trackball
3	CTX EzBook 720CS	Pentium-120	9.8	16	1084	dual-scan	12.1	800 x 600	65,536	NiMH	touchpad
4	Gateway 2000 Solo 2100 S5-120	Pentium-120	8.2	16	810	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad
5	AcerNote Light Multimedia 373	Pentium-133	7.6	16	1080	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad
6	Toshiba Satellite Pro 420CDS	Pentium-100	8.8	16	772	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
7	Mega Image MegaBook 911	Pentium-133	9.2	16	1374	active	12.1	800 x 600	65,536	NiMH	touchpad
8	Samsung Sens Pro 500	Pentium-120	8	16	1440	active	12.1	800 x 600	65,536	NiMH	touchpad
9	Toshiba Satellite 110CT	Pentium-100	7.4	8	814	active	11.3	800 x 600	65,536	NiMH	eraserhead
10	Broadax BSI NP8320T	Pentium-100	9.2	16	1000	active	10.4	800 x 600	256	NiMH	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] Toll call.

2 DELL LATITUDE XPI P133ST

PRO: Great battery life, large screen, lightweight

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 $3099 Dell Latitude XPi P133ST—at $600 less than last month—is your best choice. It's not as fast as its top-ranking sibling, the LM P133ST, but its PC WorldBench score of 166 is still solid. Plus, the XPi's long 5.3-hour battery life is exceptional, and at 7.2 pounds the system is about 1.5 pounds lighter than the LM.

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 800 by 600 resolution, which is typical for today's power notebooks. The Latitude XPi is sturdy, but its keyboard is cramped and the trackball is a bit unruly. Bundled applications include Traveling Software's LapLink, a file transfer program, and Starfish's Sidekick 95, a personal information manager.

Dell's support policy for the Latitude XPi includes high-quality phone support around the clock and a three-year warranty on parts.

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 (http://www.pcworld.com/t20pcs).

3 WINBOOK LM

PRO: Fast, long battery life

CON: Poor support policies, low-quality keyboard

The $3199 WinBook LM is the first system in a new notebook line from this company. With a PC WorldBench score of 182, it's also one of the faster Pentium-133 notebooks we've seen.

The LM has all the basics you'll need to get your computing done when you're on

		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
6X	–	40	1	●	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	28.8	40	1	●	●	●	1/1	13	Sat.	BBS, WWW
8X	33.6	48	2	●	○	●	3/1	24	Sat., Sun.	CIS, WWW
8X	33.6	40	1	●	●	●	1/1	13	Sat.	BBS, WWW
8X	–	80	0	●	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	28.8	64	0	○	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	48	0	○	●	●	3/3	12	–	AOL, BBS, CIS, WWW
10X	–	64	1	●	●	●	3/3	12	–	AOL, BBS, CIS, WWW
6X	–	40	1	●	●	●	3/3	9	–	WWW
–	–	64	1	●	●	●	3/3	12	–	AOL, BBS, CIS, WWW
–	–	48	0	○	○	○	1/1	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
6X	–	72	2	●	●	●	2/2	24	Sat., Sun.	BBS
8X	–	40	1	●	●	●	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
6X	–	72	0	○	●	●	1/1	24	Sat., Sun.	WWW
6X	–	80	0	○	○	●	3/3	24	Sat., Sun.	–
–	–	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
6X	–	40	0	○	●	●	1/1	24 [2]	–	BBS

the road: a 1GB hard disk, 6X CD-ROM drive, high-quality 12.1-inch active-matrix screen, and 28.8-kbps modem. The keyboard isn't as high in quality as on other WinBook models: Although the keys are big enough, key depression is too shallow. Without the CD-ROM drive, the LM weighs 7.4 pounds, and it has a battery life of 5.75 hours—good for a cross-country flight.

WinBook LM

WinBook doesn't offer any on-site service or Sunday support, but this month readers report improved reliability.

5 WINBOOK FX

PRO: Good performance, excellent keyboard

CON: Poor support policies, heavy

When we last tested a WinBook FX notebook, we were disappointed. But with a better-designed keyboard and a single eraserhead input device (rather than both an eraserhead and a touchpad), the new WinBook FX is definitely an improvement.

With its standard 32MB of RAM, the $3799 FX achieved an impressive score of 188 on the PC WorldBench test. The portable also ships with a 33.6-kbps internal modem. The screen is large, with a crisp display; the unit comes with an 8X CD-ROM drive; and the battery runs for over 4 hours.

Unlike most systems, which can hold only one Type III or two Type II cards at once, the FX will let you run a Type II and Type III card at the same time, so you can use your PC Card hard drive while you're connected to the office network, for example.

WinBook FX

On the downside, this notebook weighs a hefty 9.4 pounds. WinBook's service and support is nothing to cheer about, either: It doesn't provide on-site service or Sunday support, though reliability has improved according to our reader surveys.

6 GATEWAY 2000 SOLO 2200

PRO: Extremely fast, responsive touchpad

CON: Expensive, substandard service and average reliability ratings

With a PC WorldBench score of 218, the new $4699 Pentium MMX-166 Gateway 2000 Solo 2200 is far and away the fastest notebook we've seen. It's even 9 percent faster than its sibling, the Pentium MMX-150 Gateway 2000 Solo 2100 S5-150 that topped the charts last month.

Like the Solo 2100, this unit has a sharp 12.1-inch display, a responsive touchpad, and good-size mouse buttons. Its 8X CD-ROM drive is a notch faster than the 6X that comes with the 2100. Another perk of the 2200: It has NTSC video output, so you can hook this little 8.2-pound notebook to a television set.

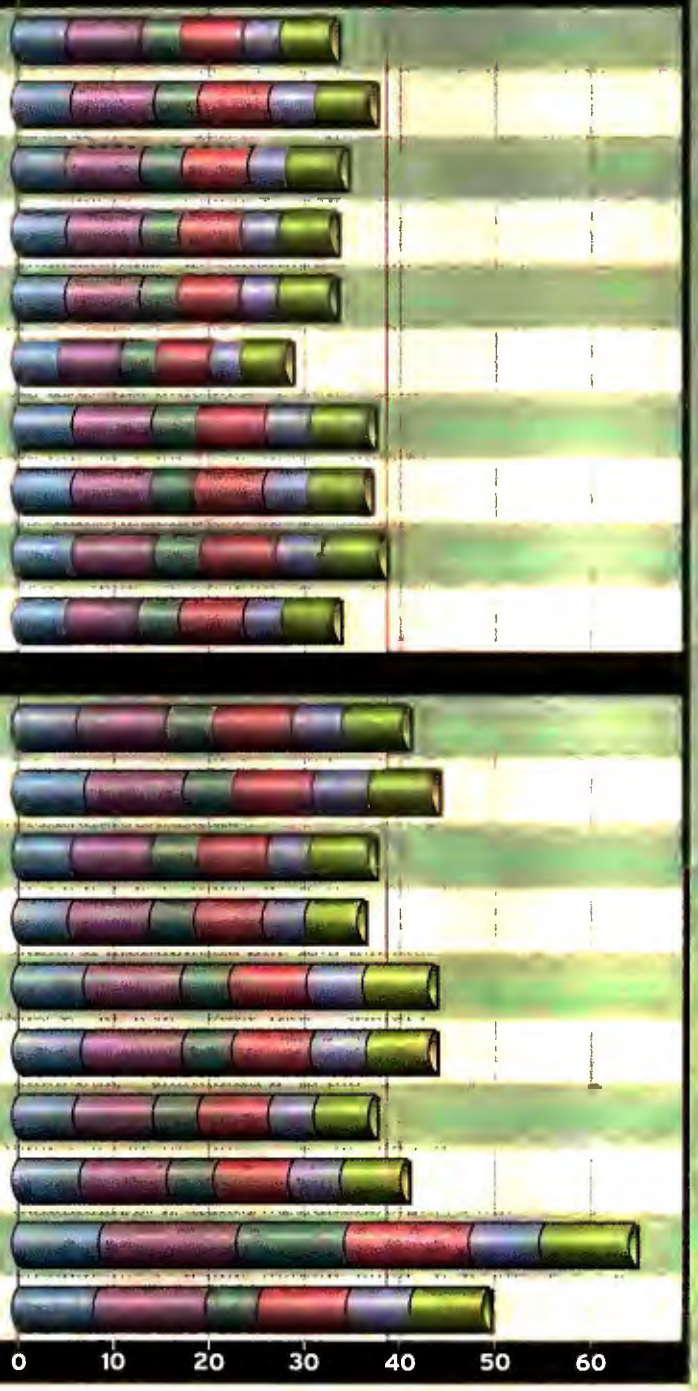
Gateway 2000 Solo 2200

The Solo 2200 ran for 3.75 hours in our battery tests, about 30 minutes longer than the 2100. But the 2200 also costs about $500 more than the 2100. And though Gateway's reliability rating is up in our reader fax-back surveys, the quality of service is still poor. ▶

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM P133ST*	Pentium-133	24	256	186
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	WinBook LM	Pentium-133	16	256	182
4	Micron TransPort MRX	Pentium-133	32	256	187
5	WinBook FX	Pentium-133	32	256	188
6	Gateway 2000 Solo 2200	Pentium MMX-166	40	256	218
7	AcerNote Nuovo	Pentium-133	16	256	166
8	HP OmniBook 800CT	Pentium-133	16	256	168
9	HP OmniBook 5500CT	Pentium-133	16	256	162
10	Sceptre Soundx Series 4000	Pentium-150	16	256	185
	BUDGET NOTEBOOKS				
1	HP OmniBook 5500CS*	Pentium-100	16	256	152
2	Compaq Armada 1130T*	Pentium-120	16	–	140
3	CTX EzBook 720CS	Pentium-120	16	256	167
4	Gateway 2000 Solo 2100 S5-120	Pentium-120	16	256	171
5	AcerNote Light Multimedia 373	Pentium-133	16	–	142
6	Toshiba Satellite Pro 420CDS	Pentium-100	16	–	142
7	Mega Image MegaBook 911	Pentium-133	16	256	165
8	Samsung Sens Pro 500	Pentium-120	16	256	152
9	Toshiba Satellite 110CT	Pentium-100	8	–	98
10	Broadax BSI NP8320T	Pentium-100	16	–	126

*Best Buy



Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows

Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

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 (http://www.pcworld.com/testing).

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BUDGET NOTEBOOKS

This Month's Best Buys

1 HP OMNIBOOK 5500CS

PRO: High-speed infrared port, good docs

CON: Dual-scan screen somewhat washed out

Continuing price drops have pushed HP's OmniBook 5500CS up the ranks. After a cut of $750 this month—to $1710—this OmniBook has now become number one.

A PC WorldBench score of 152 makes the OmniBook 5500CS the fastest Pentium-100 notebook we've tested. This system is also long-winded, lasting for about 4 hours in our battery-life tests.

HP OmniBook 5500CS

The OmniBook has a high-speed 4MB-per-second infrared port and a NTSC/PAL video port but doesn't include a CD-ROM drive or a modem. The display quality wasn't as good as we would have liked, either: We had a tough time finding the cursor on the washed-out dual-scan screen.

HP's support policy is decent but not outstanding. While it offers a three-year parts and labor warranty and unlimited toll-free support, the support lines are not open on weekends. From our limited fax-back data, HP's reliability rating was average, but its service quality was tops.

2 COMPAQ ARMADA 1130T

PRO: Sturdy, crisp display, good performance

CON: No multimedia features or modem

If you want a rugged system with a nice screen and good performance, the Armada 1130T should fit the bill. With a $300 price drop, this Armada holds its second-place Best Buy rank for the second month in a row.

The $1999 price on the 1130T buys respectable performance: This notebook cranked out a PC WorldBench score of 140—very good for a Pentium-120 with 16MB of RAM. The color active-matrix screen is vivid and bright. The keys have a crisp and lively action, and they're comfortably sized and nicely spaced. Unlike most new notebooks, the Armada features a trackball input device rather than a touchpad. Overall, this is a no-frills system—there's no CD-ROM drive, microphone, speakers, sound board, modem, or infrared port.

With a 7.5-pound traveling weight, the Armada 1130T is light and quite small. If you need to compute on the go, it has a decent battery life of nearly 4 hours. The Pentium-100 Armada 1120, which costs $700 less, is also a good buy.

Compaq Armada 1130T

New This Month

The following PCs 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 (http://www.pcworld.com/t20pcs).

3 CTX EZBOOK 720CS

PRO: Fast, good keyboard

CON: Poor screen quality

Packaged with a game pad and and a set of headphones, the $1699 CTX EzBook 720CS is designed for business travelers who also like to play. And the EzBook is fast. Of all the Pentium-120 notebooks we've tested, it ranks third with a PC WorldBench score of 167.

CTX EzBook 720CS

The dual-scan screen on the EzBook is substandard, though. The display has visible striation lines, and changing the brightness and contrast doesn't help much; you can upgrade to an active-matrix screen for an additional $500. Another strike against this notebook is its heft: At 9.8 pounds, the EzBook is heavy. However, the system has a substantial 4.5-hour battery life. The speakers have clear sound, and the keyboard is just right. The EzBook also comes with a sizable (for a budget system) 1GB hard drive.

The topper is still the price. The cheapest notebook on our charts, this CTX is a good alternative for the road warrior and closet gamer who's on a tight budget.

10 BROADAX BSI NP8320T

PRO: Good speed, great price

CON: Small keyboard, poor battery life and power management, weak system manual

The $1945 Broadax BSI NP8320T cuts a trim figure at a bargain price, and its PC WorldBench score of 126 is reasonable for a Pentium-100 notebook.

Broadax BSI NP8320T

The sub-2-hour battery life and 9.2-pound carrying weight aren't impressive, but if your only criterion is the bottom line, the NP8320T might be the notebook for you.

The 10.4-inch screen is sharp and the 1GB hard drive is large for a budget notebook. We liked the keyboard's snappy action, but it was a little too small for comfort. The system price includes a 6X CD-ROM drive and an infrared port.

There are some compromises, though. Power management is confusing: The suspend button is so small that you need a paper clip to depress it, and to get things going again, you have to press the power button rather than the suspend button—a step never outlined in the manual. The documentation is weak in other respects too, and doesn't even identify the computer by name. Support policies also fall short: Broadax offers only a one-year parts and labor warranty and no weekend tech support hours. ■

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 (http://www.pcworld.com/t20pcsnaps).

- AMS Travel Pro 1950T
- AMS Travel Pro 2000
- Broadax BSI NP6200T
- Broadax BSI NP8320T
- Fujitsu 530T LifeBook
- Kiwi OpenNote
- Samsung Sens Pro 500 P-133
- Trademark M-133NB
- Transmonde Vigor 120D
- Twinhead Slimnote 712TV
- Twinhead Slimnote 9133TZ

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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 5-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by May 31.
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.
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ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
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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	○ Digital (DEC)	○ IBM	○ Packard Bell	○ Tangent
○ Acma	○ DTK	○ Insight	○ Panasonic	○ Texas Instruments
○ ALR	○ EPS	○ Intelesys	○ PerComp	○ Toshiba
○ Apple	○ Epson	○ Leading Edge	○ Pionex	○ Twinhead
○ AST	○ Everex	○ Micro Express	○ Polywell	○ Unisys
○ Austin (IPC)	○ Fujitsu	○ Micron	○ Premio	○ USA Flex
○ Compaq	○ Future Tech	○ Midwest Micro	○ Quantex	○ Vektron
○ Compudyne	○ Gateway 2000	○ MIS	○ Robotech	○ WinBook
○ Comtrade	○ Hewlett-Packard	○ Nat'l Micro	○ Samsung	○ Xi
○ CTX	○ HiO	○ NCR	○ Sharp	○ Zenith (ZDS)
○ Dell	○ Hitachi	○ NEC	○ Sony	○ Zenon
○ Diamond	○ Hyundai	○ Netis	○ Swan	○ 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	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 92	○ 94	○ 96
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 93	○ 95	○ 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	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 92	○ 94	○ 96
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 93	○ 95	○ 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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- 16-Bit Built-in Sound with Speakers
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- Two Type II / One Type III PCMCIA Slot
- Lithium Battery / AC Adapter
- 33.6 PCMCIA Fax Modem
- Mobile Car Adapter
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- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
- Two Type II / One Type III PCMCIA Slot
- Lithium Battery / AC Adapter
- 33.6 PCMCIA Fax Modem
- Mobile Car Adapter
- Microsoft Windows95
- Quicken Deluxe
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- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
- Two Type II / One Type III PCMCIA Slot
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- Microsoft Windows95
- Quicken Deluxe
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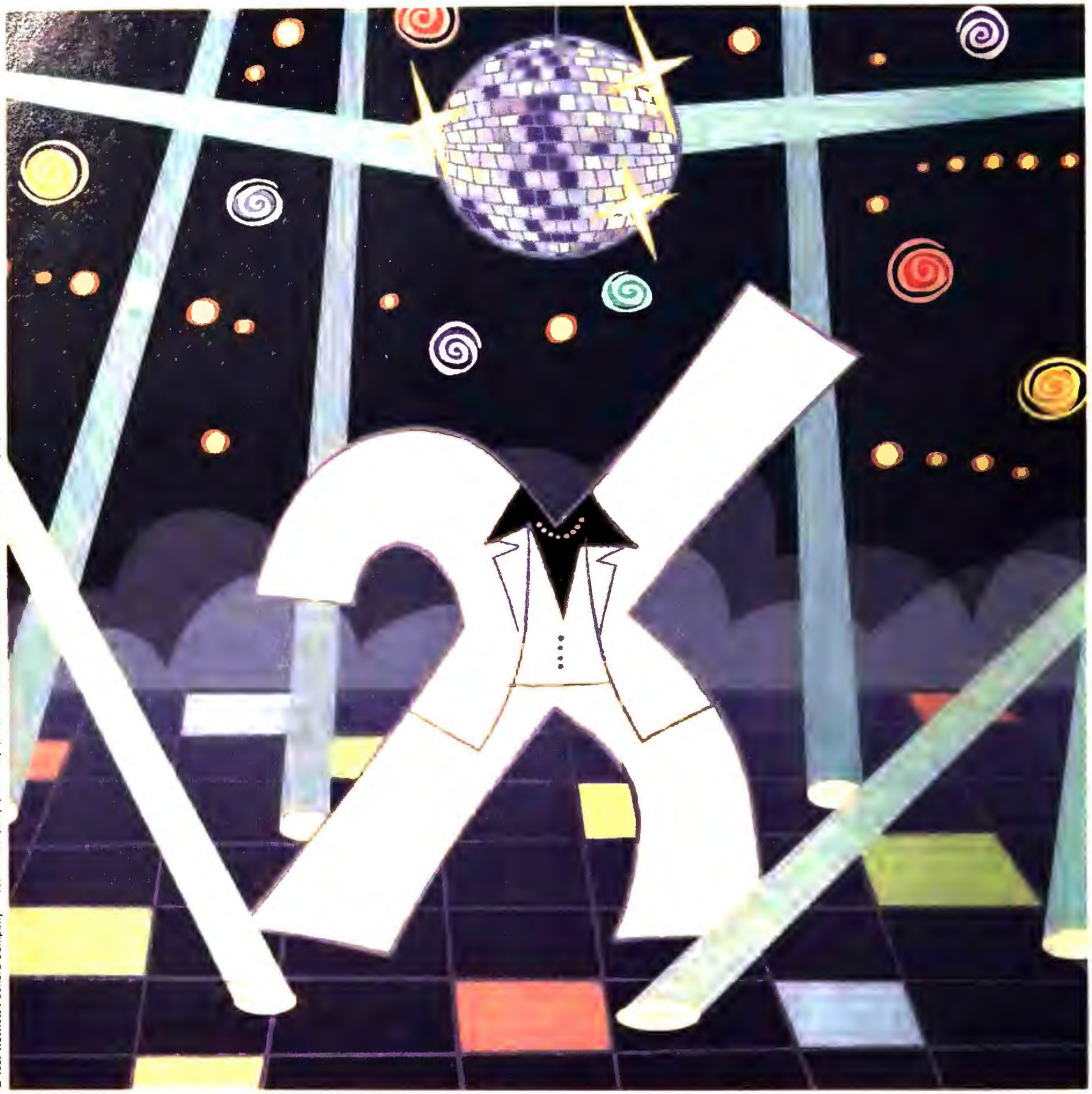

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TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTERS	Month tested	Street price (1/30/97)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	IBM Network Printer 12 800/358-6661 http://www.printers.ibm.com	Mar 97	$1250	92	8.9	2.4	**FEATURES:** 12-ppm laser. Standard 4MB of RAM; 600-by-600 dpi resolution; 250 sheets input, 270 output. **PRO/CON:** Fastest full-page graphics speed on the chart, very good print quality, control panel is easy to use; support policies include 24-hour, 7-day technical help. Manuals are numerous and can be confusing.	–
2	Lexmark Optra Lx+ 800/891-0331 http://www.lexmark.com	July 96	$1950	89	10.7	1.4	**FEATURES:** 16-ppm laser. Standard 4MB of RAM; 600-by-600 dpi resolution (true 1200 dpi with at least 8MB of RAM); 500 sheets input and output. **PRO/CON:** Excellent print quality, easy-to-read LCD labels on control panel. Somewhat slow, especially printing full-page graphics; IBM laser is faster on graphics.	690
3	Lexmark Optra R+ 800/891-0331 http://www.lexmark.com	Nov 96	$1199	88	10.8	1.2	**FEATURES:** 16-ppm laser. Standard 4MB of RAM; 600-by-600 dpi resolution (true 1200 dpi with at least 8MB of RAM); 200 sheets input, 250 output. **PRO/CON:** Lowest-priced monochrome laser on the chart. Print quality, speed, and design resemble the Optra Lx+'s, but paper capacity is lower.	691
4	HP LaserJet 5M 800/752-0900 http://www.hp.com	July 96	$1799	87	9.5	1.1	**FEATURES:** 12-ppm laser. Standard 6MB of RAM; 600-by-600-dpi resolution; 250 sheets input and output. **PRO/CON:** Very good print quality, easy-to-use control panel; comes with ethernet standard, unusual for a workgroup printer. Full-page graphics speed is the slowest on the chart.	692
5	Okidata OL1200/PS 800/654-3282 http://www.okidata.com	July 96	$1399	87	8.9	2.3	**FEATURES:** 12-ppm LED. Standard 6MB of RAM; 600-by-600-dpi resolution; 500 sheets input, 250 output. **PRO/CON:** Inexpensive; good print quality and performance, on-site service free for first year. Control panel not as intuitive as those of other printers on the chart.	693
	COLOR WORKGROUP PRINTERS							
1	HP DeskJet 1600CM 800/752-0900 http://www.hp.com	July 96	$1999	89	4.4	0.5	**FEATURES:** 8-ppm monochrome/2-ppm color ink jet with 6MB of RAM; 600-by-600 dpi monochrome, 300-by-300-dpi color. **PRO/CON:** Inexpensive, with good print quality and adequate speed; PostScript and ethernet are included. Ink jet pages, unlike a laser's, are sensitive to moisture and light.	694
2	Tektronix Phaser 350 800/835-6100 http://www.tek.com	Jan 97	$3420	87	3.4	0.9	**FEATURES:** 6-ppm solid ink printer. Standard 8MB of RAM; 300-by-300 dpi monochrome and color resolutions. **PRO/CON:** Stellar color quality, fast graphics speed; solid ink blocks are easy to load; black ink is free for as long as you own printer. Text speed is slow, however, and it takes only letter-size paper.	695
3	Xerox XPrint 4920 Plus 800/349-3769 http://www.xerox.com	Sept 96	$6500	86	5.5	0.3	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 16MB of RAM; 600-by-600-dpi monochrome and color resolutions. **PRO/CON:** Superb print quality; optional $1341 feeder gives it the highest maximum paper capacity (1750) of any color laser on the chart. Slow at printing full-page graphics.	696
4	HP Color LaserJet 5M 800/752-0900 http://www.hp.com	July 96	$7395	85	6.9	0.9	**FEATURES:** 10-ppm monochrome/3-ppm color laser. Standard 24MB of RAM; 300-by-300-dpi monochrome and color resolutions. **PRO/CON:** Fastest color laser we've tested; ethernet standard. Print quality is good for text and simple graphics, but not for continuous-tone images like photographs.	697
5	Tektronix Phaser 550 800/835-6100 http://www.tek.com	July 96	$6532	84	5.6	0.5	**FEATURES:** 14-ppm monochrome/5-ppm color laser with 8MB of RAM; 600-by-600-dpi monochrome and color resolutions, true 1200-dpi with 24MB of RAM. **PRO/CON:** It's the only color laser on the chart that accommodates labels and manual double-sided printing. Proprietary RAM is expensive.	698

Best Buy For expanded reviews, visit http://www.pcworld.com/t10printers. Windows 95 Plug and Play All products: 906

HOW WE TEST The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and cost of consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

FUJITSU BRANCHES OUT and Kyocera breaks with tradition in this month's Top 10 Printers review. Fujitsu is a large company that already sells computers, storage devices, scanners, and more. Now it's entering the workgroup printer market with its own brand of lasers—the first being the low-price $1100 PrintPartner 14AV. The new Kyocera FS-1700's laser engine completely replaces the LED engine of its predecessor, the ▶

FS-1600+, which we reviewed last July. Although the Fujitsu is pretty fast and the Kyocera offers lots of paper handling options, neither printer made the chart.

FUJITSU'S DEBUT PRINTER

THE PRINTPARTNER 14AV is what we'd call a promising first effort. It delivers impressive speed at an economical price. It prints as fast as the Lexmark Optras, and its graphics speed is close to that of our Best Buy, the IBM Network Printer 12. The Fujitsu's street price of $1100 is significantly lower than the monochrome chart's average of about $1500.

Design and print quality need some work, though. The PrintPartner 14AV's complicated innards make it awkward to clear a jam: You have to open the back of the printer, maneuver a flat plastic tab to release the paper path guide, and then pull out the guide. Fujitsu also skimped on the quality of the multipurpose input tray and face-up output tray at the back of the machine. Both trays hold paper using chintzy wire loops instead of sturdier full-size plastic or metal units.

But graphics print quality is the PrintPartner 14AV's blackest mark—literally. The gray-scale images that we printed looked so dark we barely recognized them, and they showed banding to boot. To lighten the images, we had to open the printer and adjust the toner-density knob inside. Those users brave enough to do so will find that at the knob's lowest setting, the grays lighten just slightly—and the banding appears worse. The PrintPartner 14AV might be a good buy for offices looking for a fast text printer; it's a poor choice for graphics, though.

KYOCERA GOES LASER

THE KYOCERA FS-1700 replaces the old FS-1600+'s LED engine with a laser one, but in many ways it's still the same printer. While it's good for offices that print in high volume, it's not designed very well. It claims a cost per page of less than a penny with its long-life imaging drum. The optional duplexers, collators, mail boxes, and paper feeders let a busy office do more kinds of print jobs in-house, bypassing the service bureau.

The FS-1700 comes with the same amount of RAM (2MB) as the FS-1600+ did. Though our test unit didn't perform quite as fast as its predecessor, its speeds were still a respectable 9.9 ppm for text and 1.5 ppm for full-page graphics. Its print quality is a little better, too. Gray-scale images look overly dark, but unlike the Fujitsu, toner density is easy to adjust.

But otherwise, the FS-1700 is very difficult to use. The control panel is frustratingly mazelike; a map in the paper-based setup guide doesn't help. To make matters worse, the main user manual comes on a CD-ROM. Reading its formatted pages on screen is tiring—and awkward if the printer isn't next to your computer. Finding a topic is also tough, because each chapter is a separate file and you can search only one at a time.

SPEED AND PRICE are the Fujitsu PrintPartner 14AV's strong points; unfortunately, its print quality and design need some work.

The FS-1700's design was also beset with problems. Its flip-out multipurpose input tray resisted opening so fiercely that we feared breaking it; we had a very hard time getting paper to feed from it, too. An overenthusiastic spring-loaded cap pushed the toner collection bottle out of position, creating a mess inside. Finally, the FS-1700's paper tray and other user-accessible parts felt very flimsy.

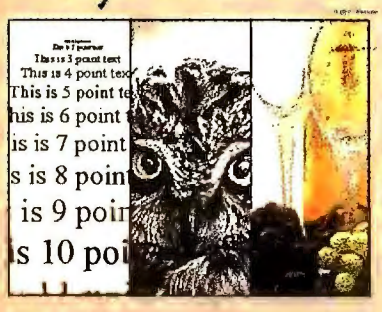
RETESTS: A SECOND CHANCE

WE RETESTED several printers because the vendors released updated drivers, but none showed significant changes. The Okidata OL1200/PS's print quality improved slightly, but not enough to raise its fifth-place ranking. Lexmark's Optra C and IBM's Network Color Printer, both color lasers, printed a little faster—but not enough to make our chart.

On the color chart, the overall ratings of the Tektronix Phaser 350 and Phaser 550 each dropped a point after we reevaluated their street prices. Tektronix, which does not release such prices to the press, allowed us to take a 15 percent discount off the list prices instead. When we checked with Dallas-based research company ARS, however, their data indicated that a smaller discount of about 10 percent was more realistic. As a result, the Phaser 550 falls to number five. —*Dan Littman* ■

PRINT QUALITY SAMPLES

Kyocera Achieves a Lighter Shade of Gray



HP DESKJET 1600CM

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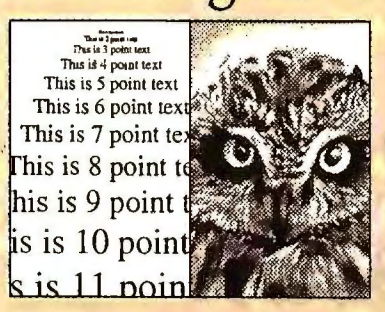
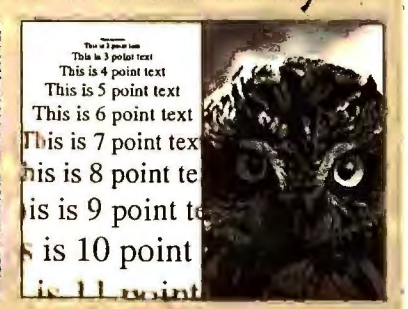


IBM NETWORK PRINTER 12

IBM's inexpensive monochrome laser—and our Best Buy—prints very good text and gray-scale images. Its graphics speed is the fastest on the chart, too.



KYOCERA FS-1700

The new Kyocera prints good text and line art. Gray-scale images look dark but can be adjusted somewhat. The software interface makes this very easy to do.

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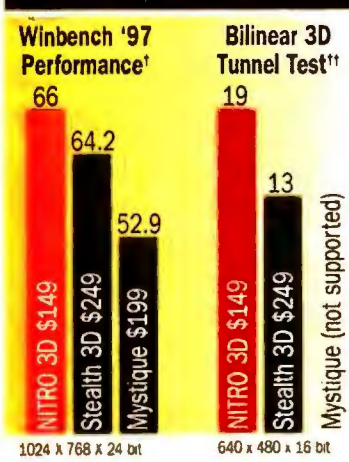

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TOP 10 MONITORS

	20- AND 21-INCH MONITORS	Month tested	Street price (3/3/97)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	**Mitsubishi Diamond Pro 91TXM** 800/843-2515 http://www.mitsubishi-display.com	NEW	$1550	84	very good/ very good	**FEATURES:** 21-inch Diamondtron tube (19.7-inch viewable screen), .28mm stripe pitch, 88-Hz refresh rate [1], Level 2b Plug and Play ready [2], three-year parts and labor warranty, 8.5-hour weekday toll-free support. **PRO/CON:** Superb text and graphics, easy to adjust, TCO-92 compliant; two very faint lines across screen.	719
2	**ViewSonic G810** 800/888-8583 http://www.viewsonic.com	NEW	$1495	80	very good/ very good	**FEATURES:** 21-inch tube (19.7-inch viewable screen), .25mm dot pitch, 83-Hz refresh rate [1], Level 2b PnP ready [2], three-year parts and labor warranty, 11-hour weekday toll-free support. **PRO/CON:** Very crisp text and graphics detail, ample on-screen menus; fussy controls make menu navigation awkward.	720
3	**Samsung SyncMaster 20GLsi** 800/933-4110 http://www.sosimple.com	Nov 96	$1349	80	good/ very good	**FEATURES:** 20-inch tube (18.4-inch viewable screen), .28mm dot pitch, 77-Hz refresh rate [1], Level 2b PnP ready [2], color and screen adjustment software, three-year parts and labor warranty, 24-hour daily toll-free support. **PRO/CON:** Very sharp graphics, ample on-screen menus; $64 price hike, small viewable screen.	721
4	**Compaq QVision 210** 800/345-1518 http://www.compaq.com	Nov 96	$1825	79	very good/ very good	**FEATURES:** 21-inch tube (19.5-inch viewable screen), .26mm dot pitch, 85-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty on parts, one year on labor, 24-hour daily toll-free support. **PRO/CON:** Very sharp text, realistic color graphics quality, uniform brightness; much button pushing needed to adjust screen.	722
5	**Cornerstone Imaging Color 21/81 fp** 800/562-2552 http://www.corimage.com	NEW	$1682	78	very good/ good	**FEATURES:** 21-inch tube (19.8-inch viewable screen), .27mm dot pitch, 94-Hz refresh rate [1], Level 2b PnP ready [2], full three-year warranty, 10.5-hour weekday toll-free support. **PRO/CON:** Very sharp text, big viewable screen, comprehensive screen controls easily accessible from a row of buttons, no need to hunt through menus.	723
6	**Hitachi SuperScan Elite 802** 800/441-4832 http://www.nsa-hitachi.com	NEW	$1799	78	very good/ good	**FEATURES:** 21-inch tube (19.8-inch viewable screen), .27mm dot pitch, 94-Hz refresh rate [1], Level 2b PnP ready [2], full three-year warranty, 8-hour weekday toll-free support. **PRO/CON:** Razor-sharp text, big viewable screen, same intuitive controls as the Cornerstone; poor documentation.	724
7	**Iiyama Vision Master Pro 21** 800/394-4335 http://www.iiyama.com	NEW	$1620	78	very good/ good	**FEATURES:** 21-inch Diamondtron tube (19.5-inch viewable screen), .30mm stripe pitch, 87-Hz refresh rate [1], Level 2ab PnP ready [2], three-year parts and labor warranty, 12-hour weekday toll-free support. **PRO/CON:** Razor-sharp text, easy-to-adjust on-screen menus; two very faint lines visible across screen.	725
8	**ArtMedia TN2185T** 800/278-6334 http://www.artmedia.com	Nov 96	$1638	78	very good/ good	**FEATURES:** 20-inch Trinitron tube (18.7-inch viewable screen), .30mm stripe pitch, 75-Hz refresh rate [1], Level 2ab PnP ready [2], three-year warranty on parts, one year on labor. **PRO/CON:** Very sharp text, complies with strict TCO-92 low-emissions standard, easy-to-adjust on-screen menu; name implies a bigger model.	726
9	**Cornerstone Imaging Color 50/115** 800/562-2552 http://www.corimage.com	NEW	$1827	77	very good/ good	**FEATURES:** 21-inch tube (19.8-inch viewable screen), .27mm dot pitch, 107-Hz refresh rate [1], Level 2b PnP ready [2], full three-year warranty, 10.5-hour weekday toll-free support. **PRO/CON:** Very crisp text, big viewable screen, row of buttons allows rapid access to a full suite of on-screen gauge controls; high price.	727
10	**Panasonic PanaSync S21** 800/742-8086 http://www.panasonic.com	NEW	$1599	77	good/ good	**FEATURES:** 21-inch Diamondtron tube (19.6-inch viewable screen), .25mm stripe pitch, 88-Hz refresh rate [1], Level 2b PnP ready [2], full three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Bright text and graphics; on-screen menus controlled awkwardly with buttons, two faint lines visible across screen.	728

Best Buy online http://www.pcworld.com/t10monitors All products: 910

[1] Highest refresh rate at 1280 by 1024 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 text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

NOT LONG AGO, a high-end 20- or 21-inch monitor was anything but affordable. Times change. Seven massive new screens land on our chart this month, offering extensive features, sharper screen quality, and in most cases, relatively low prices. To see how far big-screen monitor technology has come since our ranking last November, check out our two new Best Buys.

Number one this month is the new $1550 Mitsubishi ▶

Diamond Pro 91TXM. This replacement for the Diamond Pro 21TX (which formerly ranked ninth) costs $349 less and offers a sharper picture. Some big screens have a tough time displaying icons and fonts crisply in the far upper left corner, where people most often interact with their applications. Not so the 91TXM. In our tests, small type and every Windows screen element were crystal-clear across the entire display. Same for graphics: When the 91TXM showed our test image of Olympic runners, it was easy to pick out subtle details in the fabric of the lead runner's uniform, realistically rendered skin tones, and accurate colors in bright and dark areas of the image.

How does the 91TXM do it? It uses Mitsubishi's newest generation of Diamondtron tube, which has added two key enhancements: a higher-tension aperture grille and an improved high-contrast screen coating. That means text and graphics are noticeably crisper and have greater contrast not only in the center of the screen but in the far corners as well. The high-tension grille also helps the tube *degauss* (demagnetize) more efficiently and withstand shock from butterfingered shipping personnel. When we put it side by side with other big screens, flaws in the other models were readily apparent.

On our other new Best Buy—the $1495 ViewSonic G810—text and graphics are almost as remarkably sharp as on the Mitsubishi. And the ViewSonic costs $55 less. Its .25mm dot-pitch tube renders text and graphics with surprising detail. Nonetheless, Mitsubishi's screen remains a bit sharper in the far corners. ViewSonic's controls are extensive but could be improved—hunting through the on-screen menus with the control buttons is a chore. The Mitsubishi ends up on top thanks to more features overall, including color calibration software, TCO low-emissions compliance, and higher refresh rates. But both these displays are fine for general business or high-end imaging tasks.

BEST BIG PICTURE: An improved 21-inch Diamondtron tube gives Mitsubishi's $1550 Diamond Pro 91TXM sharper focus and greater durability. It's a terrific value.

THE BEST OF THE REST

DEBUTING IN FIFTH and sixth places are the $1682 Cornerstone Imaging Color 21/81 fp and $1799 Hitachi SuperScan Elite 802. These identical monitors are designed for text-intensive uses such as studying scanned text documents or massive spreadsheets. The new Cornerstone replaces its 21/75 fp predecessor that was on our chart last November. Both monitors use Hitachi's .27mm dot-pitch tube, and can refresh a 1280 by 1024 screen at a rock-steady 94 Hz. In our tests, tiny type serifs were rendered with remarkable precision across the entire screen. Graphics look good but not quite as brilliant as on our Best Buys. We give the 21/81fp and Elite 802 high marks for intuitive controls. Simply push one of the 12 buttons on the screen bezel, and the appropriate gauge appears on screen, showing the exact level of adjustment. There's no need to hunt through confusing on-screen menus.

Iiyama's $1620 Vision Master Pro 21 missed our roundup last November, but superb text quality and ample screen controls land it in seventh place this month. Although Iiyama targets this Diamondtron monitor at graphics professionals, our judges gave it higher marks for text-based tasks such as page layouts and spreadsheets than for graphics rendering. Images were bright, but shadow areas in our test picture of a park scene revealed a tad less detail than on our two Best Buy monitors. One touch we liked: The comprehensive suite of on-screen menus is easily activated by a trio of buttons.

The last two units on the chart are also new this month. The ninth-ranked Cornerstone Imaging Color 50/115 ($1827)

A GREAT VIEW: Our second-place Best Buy, the ViewSonic G810, is a high-end bargain at $1495. Text and scanned images are very crisp on its .25mm dot pitch tube.

offers even higher refresh rates than its fifth-ranked $1682 21/81fp sibling, but we saw little difference in display quality. Only if you need a very high refresh rate—for applications like computer-aided design or mapping—will the 50/115 model be worth the extra bucks.

The $1599 Panasonic PanaSync S21 in tenth place is targeted at business users who want a large screen at a fair price. Graphics are bright, and text is reasonably sharp, but awkward control buttons make using the on-screen menus a bit of a hassle. On the other hand, Panasonic's warranty covers the monitor for three years, and toll-free technical support is nonstop.

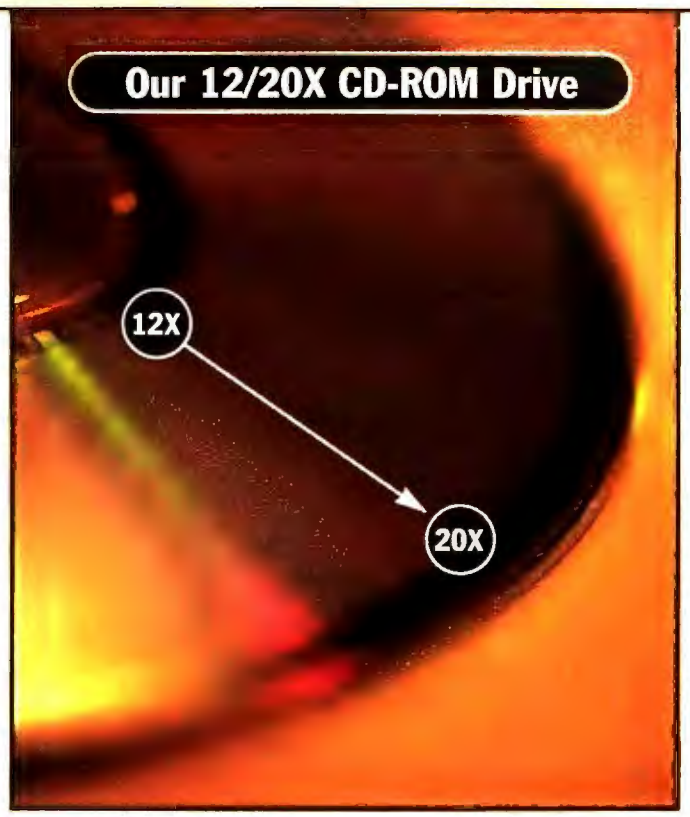
CLOSE BUT NO CIGAR

TWO OTHER MONITORS we tested this month landed just shy of the chart: an updated version of IBM's P200 and Dell's new UltraScan 20HS. Both models sport a row of ten buttons on the bezel. The buttons are clearly labeled and offer quick access to adjustment gauges. Text and graphics looked pretty good on these Trinitron-based units, but IBM's ranking was pulled down by its steep $1915 price, while Dell's brief one-year warranty is rare today (most monitors come with three-year warranties). We also wanted to test the new Wyse Technology WY-896D and the MAG DJ920, but both big screens were damaged in shipping. We'll test these the next time we review 20- and 21-inch monitors, in November.

—John Goddard ■

Why Our "X" Ratings Are Not Absolutely Obscene.

Their 16X CAV Drives *starts reading at 8X, and only reads at 16X at the end of the disc, a drive rating of 11.5X**



Our 12/20PleX CAV Drive *starts reading at 12X, and reads at 20X at the end of the disc, a drive rating of 16.5X**

Introducing The 12/20PleX CAV CD-ROM Drive

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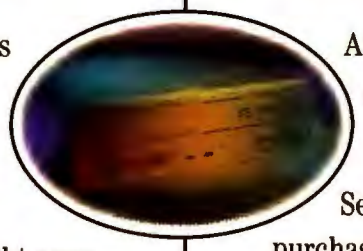
True fact, the new Plextor 12/20PleX CD Drive does exactly what its name implies – reads at 12X on the inside of the disc and maxes at 20X on the outside. And does it with the same professional reliability you expect from Plextor. Nothing obscene there.

The other guy's so-called 16X CD Drive actually performs at 8/16X – reading 8X at the beginning of the disc and 16X only at the outside of the disc. For them to tell you otherwise is absolutely obscene. The critics at PC Magazine, Computer Shopper, NetGuide, PC Graphics & Video and PC World saw through it right away.



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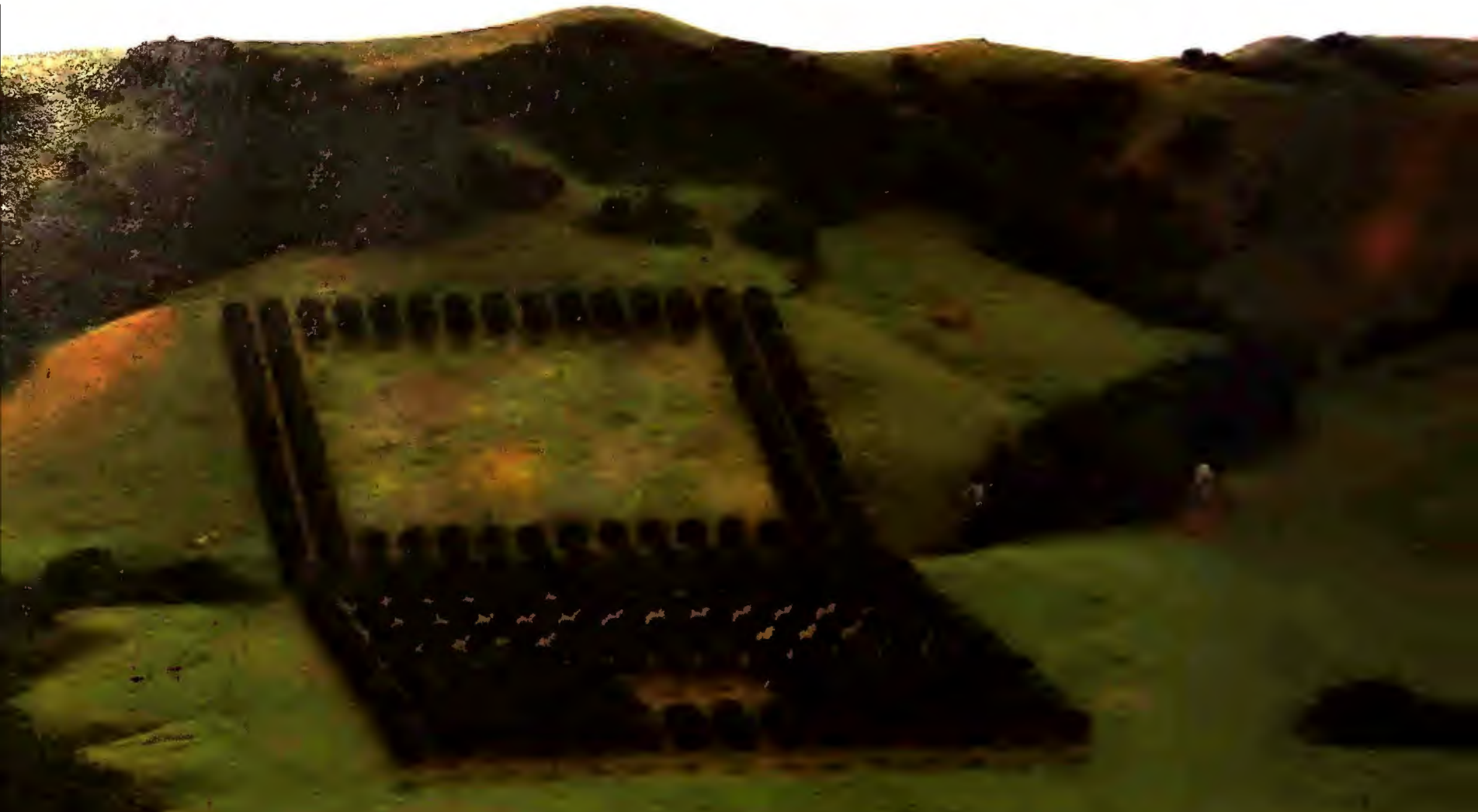

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Circle 162 on reader service card

PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (2/13/97)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	STB Velocity 3D 888/234-8750 http://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 interpolation, Mediamatics MPEG software, bundled games, S3 Virge/VX chip. **PRO/CON:** Good for graphically intense programs, memory upgradable, lifetime warranty; AVI and MPEG video playback are mediocre.	673
2	Matrox Mystique 800/361-1408 http://www.matrox.com/mga	NEW	$189	100	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:** Extra RAM improves what's the best 3-D here, good AVI and MPEG video playback, 2MB version also good; refresh rates hard to set.	674
3	Diamond Stealth 3D 3000XL 800/468-5846 http://www.diamondmm.com	Mar 97	$239	100	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:** Good for graphical apps, great software utilities, excellent video playback; still expensive despite small price drop.	675
4	Hercules Terminator 3D 800/532-0600 http://www.hercules.com	Dec 96	$119	99	184 very good	**FEATURES:** 2MB of EDO DRAM, 90-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG card, Xing MPEG software, S3 Virge chip. **PRO/CON:** Inexpensive, handles basic 3-D graphics well, excellent AVI and MPEG video playback, easy installation, toll-free support; poor documentation.	676
5	ATI 3D Xpression+ PC2TV 905/882-2600 http://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:** More colors at high resolutions, connects to a TV, excellent AVI and MPEG video; 3-D quality is merely okay.	677
6	VideoLogic GrafixStar 600 800/578-5644 http://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:** Good price, very fast, excellent software utilities; no 3-D acceleration, AVI and MPEG performance are not great.	678
7	STB Lightspeed 128 888/234-8750 http://www.stb.com	Aug 96	$139	98	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:** Nice value, performs well with business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	679
8	ATI 3D Pro Turbo PC2TV 905/882-2600 http://www.atitech.ca	NEW	$275	98	186 very good	**FEATURES:** 4MB of SGRAM, 150-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, ATI MPEG software, bundled 3-D graphics programs, ATI Rage II chip. **PRO/CON:** Good for graphics professionals, connects to a TV, excellent AVI and MPEG video playback; expensive.	680
9	Diamond Stealth 3D 2000XL 800/468-5846 http://www.diamondmm.com	Feb 97	$149	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:** $30 price drop, 4MB of RAM displays more colors and helps with 3-D effects; mediocre AVI video playback, poor MPEG playback.	681
10	Matrox Millennium 800/361-1408 http://www.matrox.com/mga	Apr 97	$269	97	187 very good	**FEATURES:** 4MB of WRAM, 120-Hz refresh rate at 1024 by 768, some 3-D acceleration, Compcore MPEG software, bundled game and 3-D graphics program, MGA-2064W chip. **PRO/CON:** Fast in business and graphics programs, superb AVI and MPEG video, great software utilities, upgradable memory; expensive.	682

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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 768 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.

3-D OR NO 3-D? Soon you won't have to decide, because almost all graphics cards will be able to handle at least basic 3-D images. On our chart, the best card for 3-D is the 4MB version of Matrox's Mystique. It's a little faster than the 2MB board and renders 3-D scenes more realistically. ATI's new 3D Pro Turbo PC2TV, in eighth place, is pricey at $275, but it's a good performer and lets you use your TV for playing games or browsing the Web. ■

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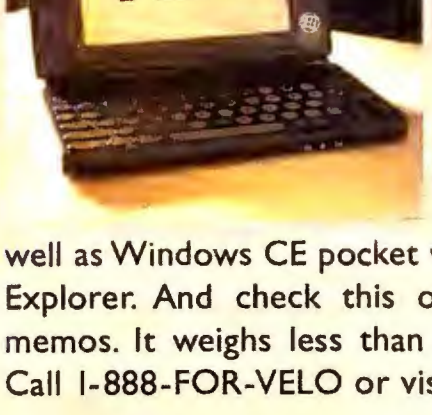

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PC MAGAZINE EDITORS' CHOICE

BYTE BEST OF COMDEX FALL '96

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PC WORLD

TOP 10 MODEMS

	EXTERNAL MODEMS	Month tested	Street price (2/15/97)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	Practical Peripherals PC288LCD V.34 770/840-9966 http://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:** Best performer on the chart, LCD English-language status display, loaded with features like manual volume control; very expensive.	699
2	U.S. Robotics Courier V.Everything V.34 800/877-2677 http://www.usr.com	Jan 97	$275	82	2:42	**FEATURES:** 33.6-kbps, FlashROM, distinctive ring, QuickLink II fax/data software, password protection, callback security. **PRO/CON:** Above-average performer, loaded with features, manual volume control, great documentation; expensive, takes up a lot of room on your desk.	700
3	Zoom V.34X Plus 800/631-3116 http://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, 14.5 hours of tech support each weekday; below-average performance, no security features.	701
4	Motorola ISG Premier 33.6 800/566-3266 http://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:** Ties with first-place Practical Peripherals unit for best performance on the chart, toll-free tech support; documentation is not for novices.	702
5	Diamond Multimedia Supra Fax Modem 336e 800/727-8772 http://www.diamondmm.com	NEW	$209	80	2:55	**FEATURES:** 33.6-kbps, MNP-10 error control, FlashROM, distinctive ring, Caller ID and callback security, Faxtalk and COMit fax/data software. **PRO/CON:** LED and LCD status displays, serial cable, great documentation, reasonably priced; slowest performer on the external chart.	703
	PC CARD MODEMS						
1	Motorola Montana 33.6 800/427-2624 http://www.mot.com/modems	Mar 97	$240	90	2:36	**FEATURES:** 33.6-kbps, FlashROM, 230.4-kbps modem-to-PC speed, digital line voltage protection with alert, QuickLink Mobile fax/data software. **PRO/CON:** Top performer on PC Card chart, did especially well under noisy line conditions, making it good for cellular use; installation required call to tech support.	704
2	Megahertz XJ4336 800/527-8677 http://www.usr.com/mobileusr	Mar 97	$269	87	2:38	**FEATURES:** 33.6-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, painless installation; despite $20 price drop, still the priciest modem on the PC Card chart.	705
3	Practical Peripherals ProClass 288 V.34 Data/Fax Modem With EZ-Port 770/840-9966 http://www.practinet.com	Jan 97	$159	87	2:42	**FEATURES:** 33.6-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, $40 off since last review (now cheapest PC Card on chart); installation not as easy as we'd like.	706
4	TDK CyberExpress 3000 800/999-4835 http://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, $20 price drop since last review; slowest modem on PC Card chart.	707
5	Zoom PCMCIA V.34C Plus Model 2870 800/631-3116 http://www.zoomtel.com	Jan 97	$199	84	2:47	**FEATURES:** 33.6-kbps, MNP-10EC error control, FlashROM, distinctive ring, stores multiple profiles, DOS/WinFax Lite fax/data software. **PRO/CON:** Attractively priced, digital line voltage protection, seven-year warranty; no security features, middling performer, installation not easy for novices.	708

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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.

PRACTICAL PERIPHERALS and Motorola are both Best Buys again this month, with few changes in rank overall. There were many price cuts—Practical Peripherals' ProClass 288 With EZ-Port, a PC card, dropped $40 since the last time we saw it. Diamond Multimedia's external Supra Fax Modem 336e, at number five, is the only new modem. It's the slowest on the chart, but is reasonably priced and easy to upgrade with FlashROM. ■

RUFF, WOOF, WOOF, ERRRRRRR, WOOF...
RUFF, WOOF, ERRRR, WOOF, WOOF...

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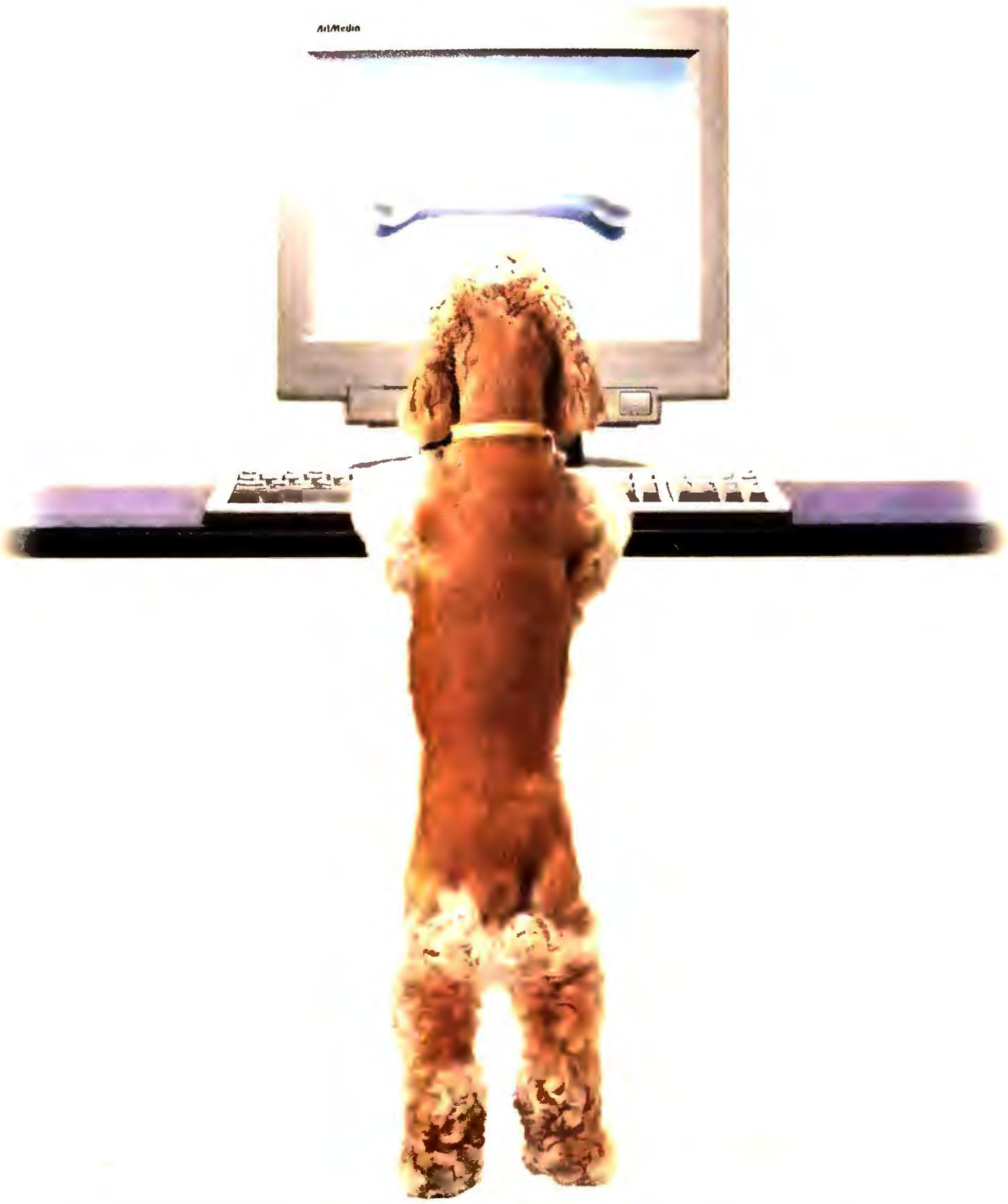

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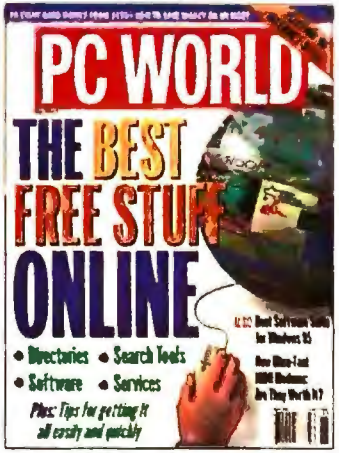

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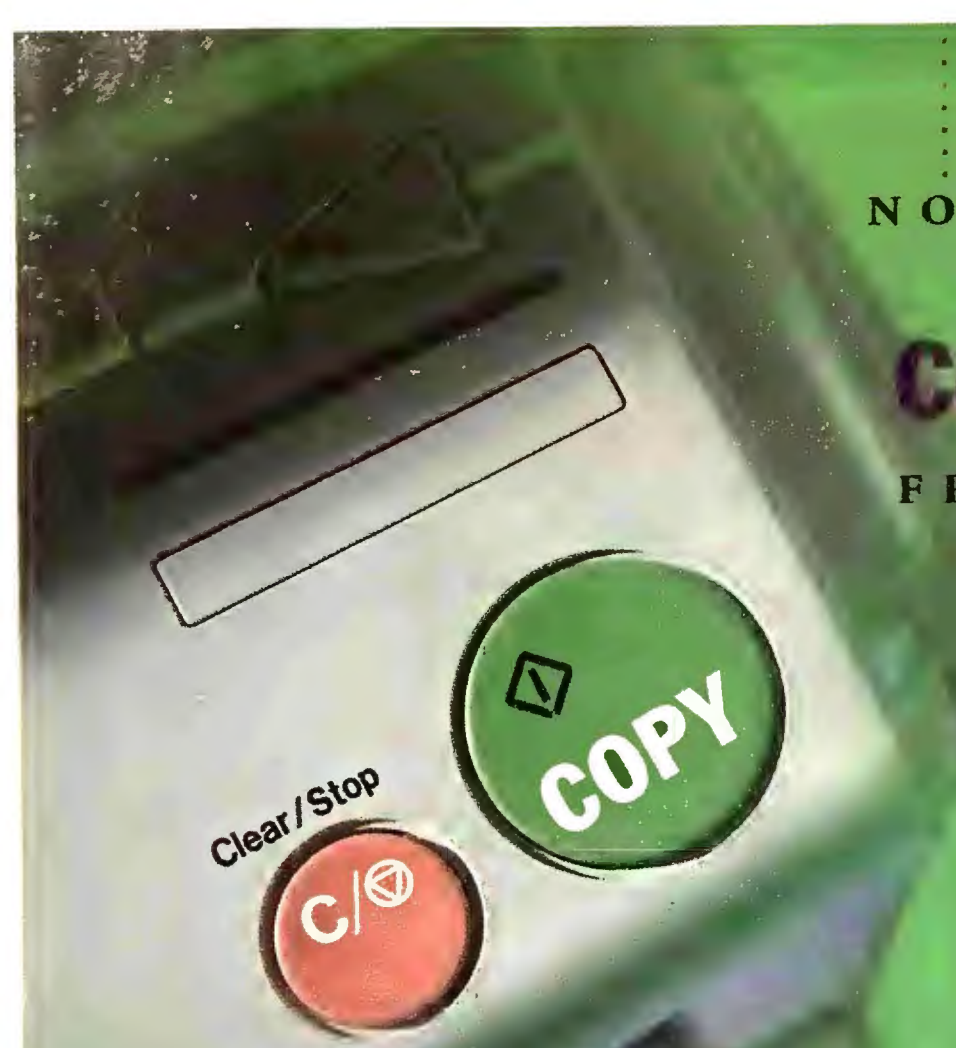

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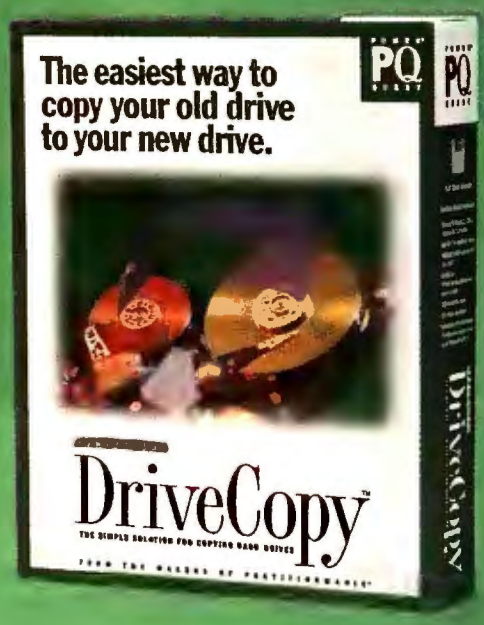

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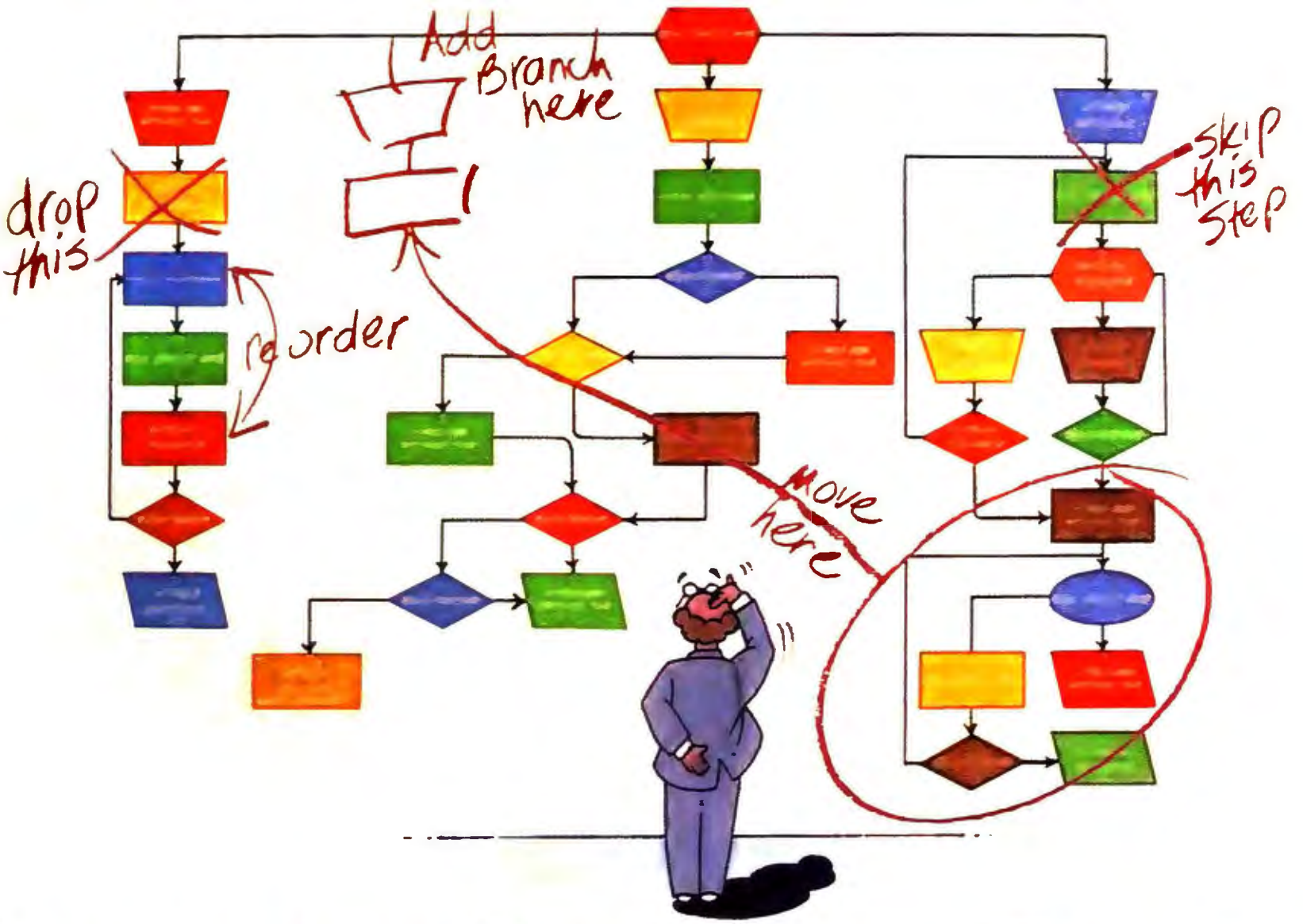

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THE ÜBER ENCYCLOPEDIA

MULTIMEDIA ENCYCLOPEDIAS make research playful; **Britannica CD 97** makes it fast. The new CD-ROM version of this legendary resource (32,000 pages in print) is still a poor sibling to Encarta and IBM's World Book in terms of multimedia bells and whistles. But it takes a back seat to no one when it comes to information. It's more expensive than Encarta, but it'll save you a bundle over the print Britannica. Another $50 a year buys you easy access to the Internet, with 5000 links to Web sites. It's less of an amusement park than a library, but it's still a fun place to ask, "What were John Coltrane's 'sheets of sound'?" or "How did the Buddha get enlightened?" In less than 15 seconds, you get articles explaining the jazz saxophonist's "cascade of notes during his powerful solos" or Gautama's experience under the bodhi tree. *—Derk Richardson*

WHEN IT COMES TO DIGITAL INFORMATION, Britannica CD 97 puts Encarta and World Book to shame.

Britannica CD 97

GRADE: **A**; PRICE: $299 list; Encyclopedia Britannica, Inc.; 800/747-8503; http://www/eb.com

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HOUSEHOLD ORGANIZER

IS THE FRONT of your fridge a jumbled array of bills, reminders, and IOUs? **Day-Timer HomeLife,** a personal information manager designed for the home PC, can help organize that mess. Each member of your household can choose an environment—from country home to action hero—and use it to keep track of daily schedules, to-do lists, address books, bank accounts, medical records, and more. You can even send electronic notes to each other's environments. HomeLife—depending on how diligently your family uses it—could soon have your household running like a finely tuned operation. *—Aoife McEvoy*

Day-Timer HomeLife

GRADE: **A**; PRICE: $50 street; Day-Timer Technologies; 800/225-5005; http://www.daytimer.com

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SUPER-COOL 3-D

3-D BOARDS HAVE been hyped as the coolest thing in PC gaming since Myst, but all have fallen short. VideoLogic's **Apocalypse 3D** is the one board that's ready for prime time, cranking out the best special effects around. It is bundled with two games written to take advantage of its 3-D capabilities—Mech Warrior 2 and Ultimate Race—and both look phenomenal when played with this board. The effects of fog and changing daylight in Ultimate Race are incredibly realistic. The Apocalypse 3D installs easily in a PCI slot and works with your current graphics board. Considering its power, $199 is a small price to pay. *—Brad Grimes*

Apocalypse 3D

GRADE: **A+**; price: $199 street; VideoLogic; 800/578-5644; http://www.videologic.com

READER SERVICE NO. 685

Picture This

I KNOW DIGITAL CAMERAS, photo CDs, and scanned photos are the wave of the future, but I like snapshots. I can carry them in my wallet or put them in an album, and they never look like printouts. The Panasonic TruPhoto Printer gives me the best of both worlds by producing glossy 3.5-by-5-inch printouts. The TruPhoto is more like a film developer than a printer: It develops your snapshots onto thermal paper. Other photo printers use dye sublimation and cost more. My photos printed a few shades darker than they looked on screen, but it's easy to tweak brightness and contrast with the bundled image editing program. The TruPhoto is a snap to set up and use, and print quality is surprisingly good. But to fork over $380 (plus $15 for 20 sheets of paper), you have to be dedicated to your photo collection. –Angela Freeman

Panasonic TruPhoto Printer

GRADE: **B**; PRICE: $380 street; Panasonic Interactive Media; 888/726-2746; http://www.truphoto.com

READER SERVICE NO. 686

THE TRUPHOTO PRINTER delivers glossy snapshots that are almost like the real thing.

EDITED BY

Christina Wood

PHOTOGRAPH: ROBERT CARDIN

SKIP THE SINUTAB

FEEL A COLD coming on? Take a hot eucalyptus bath, sip some herbal tea, and call me in the morning. I'm no doctor, but after browsing **A Guide to Alternative Medicine,** I've got a few ideas on how to handle some old problems. This interactive disc covers a lot of ground: yoga, meditation, herbs, acupuncture, and everyone's favorite, craniosacral therapy. Its attractive graphics and interface make it fun to explore. The text of a mammoth National Institutes of Health report on alternative medicine is included and goes well beyond the usual superficial content most CD-ROMs offer. Still, the videos are largely of the talking-head variety, and the glossary is basic and not linked to the articles.

—*James A. Martin*

A Guide to Alternative Medicine

Grade: **B-**; PRICE: $29.95 list; Isis Interactive; 800/417-4747; http://www.isismedia.com

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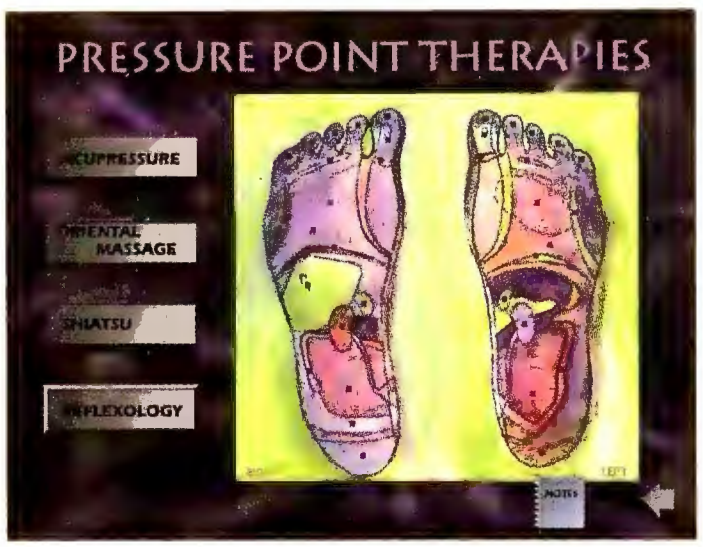

HEAL THYSELF with pressure points, one of many methods outlined in A Guide to Alternative Medicine.

REBOOT THE WORLD

IT'S 2066 A.D. Environmental scientists Lilah and Max have built a race of nanites (microscopic robots) to repair the earth's ravaged atmosphere. But the nanites have ideas of their own, namely, to rid the planet of humans. So they create Obsidian, a black monolith filled with dream realms and puzzles. In an obvious plot twist, Max gets sucked inside, and you must rescue him. **Obsidian** seamlessly combines video with surreal 3-D landscapes and spectacular animation; when you reach the mechanical fire-breathing spider, you start to wonder what the game's designers were smoking. Obsidian steals shamelessly from the film *Brazil* and other sources, and it's a tad impressed with its own cleverness. But any title where a character cries "You can't just reboot the world!"—like he really means it—is worth the bucks.

—*Daniel Tynan*

Obsidian

GRADE: **A**; PRICE: $59.99 list; Segasoft; 888/734-2763; http://www.segasoft.com

READER SERVICE NO. 688

SOMEONE'S IN THE KITCHEN

YOU WANT TO redesign your kitchen. But when you describe your ideas, your spouse looks at you like you've been possessed by Martha Stewart's evil twin and asks, "How much is that going to cost?" If you had Autodesk's **Picture This Home! Kitchen,** you could show your reluctant partner what your ideas will look like when realized. Once you've created the basic plan, choose the exact appliances and paint or wallpaper from a database of actual brands and models. Creating your design is somewhat difficult, despite the excellent video tutorial, but at least the program won't let you put cupboards on top of each other or install anything backwards. If your tastes run to the upscale or obscure, you won't find the products here, though Autodesk promises to have additional manufacturers and products on its Web site by next fall.

—*Christina Wood*

Picture This Home! Kitchen

GRADE: **B-**; PRICE: $49.99 list; Autodesk; 415/507-5000; http://www.picturethishome.com

READER SERVICE NO. 689 ■

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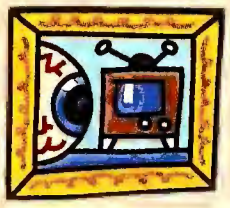

EXPOSING the blue side of American life, a recent report found that 50 percent of U.S. household members already watch TV alone. So presumably they'll embrace the idea of using their TV set to surf the Net—alone.

SOURCE: SRI CONSULTING

KEEPING UP

Check Your Credit

I KNOW I SHOULD order a copy of my credit report so I'm not unpleasantly surprised when I try to finance my dream home. But I never get around to it. The CreditCheck Monitoring Service, at the Consumer Info Web site (http:// www.consumerinfo.com), handles the whole nasty business. Place a request, and it sends you an encrypted credit report via e-mail within 2 hours, or two to three days by snail mail. The e-mail service was not ready at press time but should be running by the time you read this. CreditCheck also has information on understanding credit reports and handling discrepancies. A $49.95 yearly membership buys quarterly notification of any change to your credit report, but the three-month trial is free.

College Assistance

FINDING THE RIGHT college and the money to pay for it is more than academic: It's frighteningly expensive, and there's a ton of information to locate and sift through. ***U.S. News and World Report***'s new Web site, called edu (http://www.usnews.com), offers parents and students some help. It ranks colleges for all kinds of criteria, including overall value, then helps you prepare for tests and find financial aid. The personal organizer is really cool: Type in the details of your particular situation, and it lists links to the best places on the Net for you.

Call on the Prophets

SHOULD YOU BUY that house you just saw? Would that temp you've been chatting up in engineering have dinner with you? Well, if you have a little cybercash, you can take the guesswork out of life by asking the I Ching (http://www.iching.com). Ask your question, use your mouse to shake the dice six times (Shockwave required), pay your 50 cents, and get a cryptic but instructive reading. In answer to my question about a house, the Wise One told me that mutual attraction—if handled wisely—could be the basis of a long and prosperous relationship. —Christina Wood

ILLUSTRATION: LEFT, TIM CARROLL; RIGHT, GREG CLARKE

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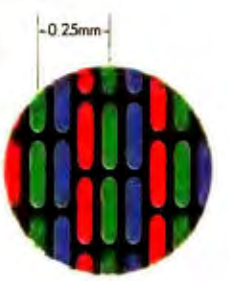

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PC WORLD

TOP 5 HOME PCs

	SYSTEMS	Street price (1/25/97)	Overall rating	PC WorldBench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	**Dell Dimension P200v** 800/388-8542 http://www.dell.com	$2499	88	213 very good	best/ best	fair	**FEATURES:** P-200, 32MB of SDRAM, 2.1GB hard drive, 8X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** Barebones power machine gives competitive performance at a very reasonable price. Price here includes MS Office Pro but no other software; mail order only. Good foundation for home office.	601
2	Hewlett-Packard Pavilion 7370V 800/724-6631 http://www.hp.com/info/pchome1	$3148	84	222 outstanding	best/ good	outstanding	**FEATURES:** P-200 MMX, 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 EDO DRAM. **PRO/CON:** Super muscle machine is great for gaming; expensive. Family software includes MechWarrior 2, Whiplash, SimCity 2000, MS Works, and Great Math Adventure.	602
3	Hewlett-Packard Pavilion 7350P 800/724-6631 http://www.hp.com/info/pchome1	$3048	83	200 good	best/ good	outstanding	**FEATURES:** P-166 MMX, 32MB of RAM, 2.5GB hard drive, 16X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor, built-in color scanner, Adobe Photo Deluxe, and Kai's Power Goo. **PRO/CON:** Great system if you like to work with art, photos, and video; expensive if you don't need the image editing software.	603
4	Micron Home MPC 800/634-8799 http://www.micronpc.com	$2699	82	215 good	good/ good	good	**FEATURES:** P-200, 32MB of RAM, 1.2GB hard drive, 12X CD-ROM drive, 33.6-kbps fax-modem, 17-inch monitor. **PRO/CON:** Very fast for a standard Pentium; software package includes Microsoft Office Pro, Quicken, Encarta, and MechWarrior 2. A little expensive; small hard drive.	604
5	Sony PCV-70 800/476-6972 http://www.sony.com/pc	$2128	80	201 good	[1]	outstanding	**FEATURES:** P-166, 32MB of RAM, 2.1GB hard drive, 8X CD-ROM drive, 28.8-kbps modem, 15-inch monitor. **PRO/CON:** Good price, user interface great for novices. Family-oriented software package includes Quicken, Encarta 96, Family Doctor, Reader Rabbit 1, and MechWarrior 2. Second-slowest machine on the chart.	605

Best Buy — All products: 901

[1] Insufficient data.

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.

PENTIUM MMX PCs: They're hot, they're pricey, and they're taking our chart by storm—two new MMX machines from Hewlett-Packard, that is. Thanks to that MMX boost in performance, first-rate service and reliability, and a simplified setup, they pushed Gateway's Family PC right off the chart. Also new to the Top 5, but not an MMX-based system, is Sony's PCV-70.

If improving multimedia performance is a priority, MMX technology should deliver. MMX systems are designed to make video, fast-moving graphics, and sound as smooth and clean as possible. Most manufacturers are rolling out MMX models, which currently are a little more expensive than standard Pentiums. If you're more concerned about price than enhanced multimedia capabilities, a regular Pentium system—for Internet use, word processing, and other basic tasks—will serve you well. By the end of the year, though, they may be hard to find.

But even MMX technology couldn't give the HPs the kick they needed to catch Dell's lead. The Dimension P200v remains number one for the sixth month in a row. Settling for second place, instead, is HP's new Pavilion 7370V. With a P-200 MMX processor as well as the fastest PC WorldBench score among home PCs to date, it's ideal for the serious gamer.

The other new MMX system from HP, the Pavilion 7350P, came in third place. This P-166 MMX is for you if you like to edit photos, art, or video on the PC. Check our Top 20 Power Desktops this month for a more detailed look at these systems.

HP's new machines pushed Micron's Home MPC to fourth place. This system held the record for fastest PC WorldBench score—until the Pavilion 7370V arrived.

New at number five, the Sony PCV-70 offers a P-166 processor, a simple user interface, and a family-oriented software bundle. But note that the PCV-70 will be discontinued and is being replaced by Sony's PCV-100 and PCV-120, both offering MMX processors.

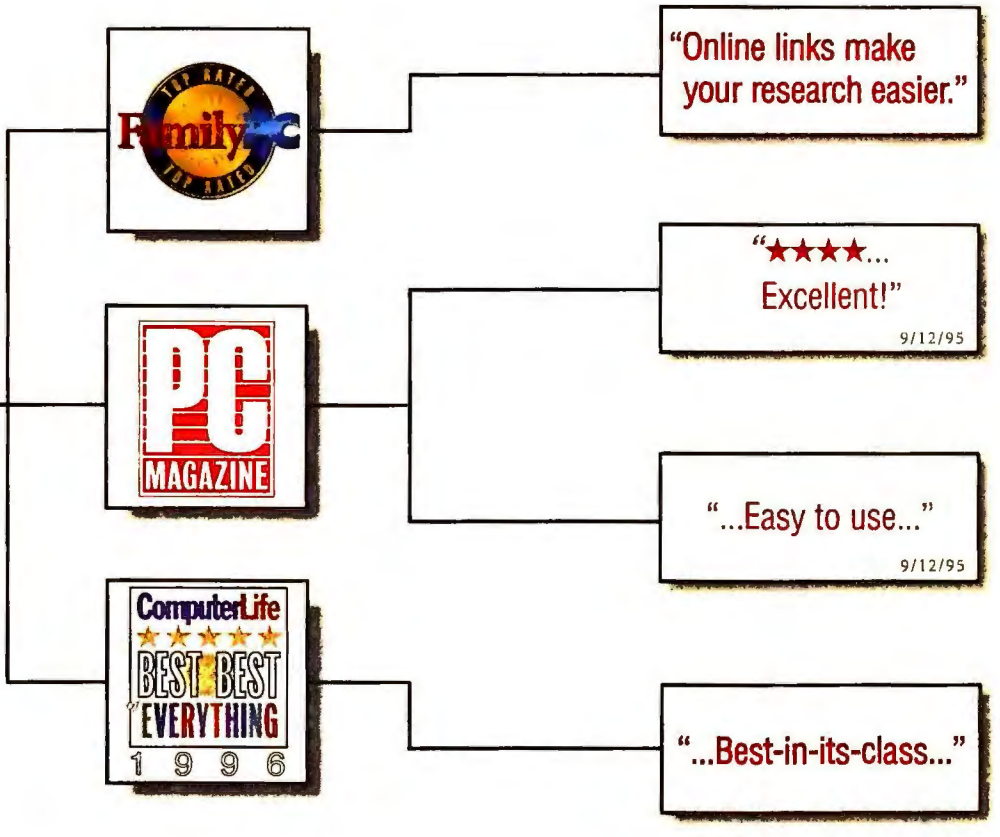
—Kirk Steers

SONY'S PCV-120, with a P-200 MMX processor, will replace the PCV-70.

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

ILLUSTRATION: JEFFREY PELO

Why 7 out of 10 people choose Family Tree Maker*



#1 Selling and Best Value

Why should you choose the program 7 out of 10 family history enthusiasts choose? Quite simply, Family Tree Maker's huge community of users and vast database of genealogy records will help you find your ancestors. And this award-winning program gives you the best variety of beautiful printouts.

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Source Code 546

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SCSI: The Miracle Upgrade Device

I KNOW A technology that will boost your system's performance, speed up some peripherals by a factor of 6, and make your Plug and Play dreams come true. But the name may frighten you. It's SCSI. There, I've said it—you still okay?

Last month I upgraded my wife's computer, giving her a bigger hard drive. My first impulse was to stick with an IDE hard drive, mainly because it's cheap and her motherboard already had a built-in IDE controller. But I decided to get her a SCSI controller and hard drive instead. And hey, she was even able to keep the old drive, since IDE and SCSI can coexist just fine in the same machine.

SCSI—which, if you haven't heard, stands for Small Computer System Interface and is pronounced like you're describing someone who needs a shave—is one great way to hook up drives and other peripherals. The very first (and best) reason for upgrading to SCSI is that it's easy to add up to seven internal and/or external devices to one SCSI card. (By comparison, a standard IDE controller is limited to four devices, typically only CD-ROM and hard drives.) And get this: That card takes up only one system slot and one IRQ (interrupt request) number for all the devices you throw at it. If you want to add two or more peripherals—say, a tape drive *and* a scanner—you want SCSI.

Connecting a new SCSI device is just a matter of daisy-chaining it onto the last one. On my system, for instance, I have a CD-ROM drive, two hard drives, an external tape backup, and an external scanner all on one SCSI adapter. No muss, no fuss. And there's room for two other toys if I feel the need.

For the record, I recommend Adaptec's SCSI Ultra line of adapters. They have a very fast 20-megabyte-per-second transfer rate, are easy to find in stores, and are reasonably priced.

> The hard drive's so **fast**, I worry it'll **lift** my computer off the **desk.**

SPEED THRILLS

AND SCSI IS FAST. SCSI hard drives are generally better built than IDE drives, with spin rates of up to 7200 revolutions per minute. (For a real E-ticket ride, check out Seagate's Cheetah ST34501W, a 10,000-*rpm* SCSI drive—so fast that I worry it'll lift my computer off the desk.) When the PC World Test Center evaluated SCSI hard drives in May 1996 ("A Gigabyte Drive for $199"), it found only a modest performance difference between IDE and SCSI. But those tests ran only one application at a time. I multitask a lot, and for me the difference is substantial.

But where SCSI really pulls ahead is with external storage devices like Iomega Zip drives. If they're not SCSI, these devices generally connect through the parallel port, which was never intended for anything faster than a printer. In the not-too-distant future, many of these devices will use the Universal Serial Port; they will probably be faster than their parallel cousins but still won't keep up with SCSI.

And SCSI adapters have their own built-in processing skills. When you back up a SCSI hard drive to a SCSI tape drive, the adapter does the processing, leaving your CPU for more important tasks, like playing Monster Truck Madness. SCSI also handles multiple device requests simultaneously—as opposed to IDE, which processes only one command at a time.

SCSI'S BAD RAP

YOU'RE PROBABLY SCARED by SCSI's reputation for being complex. But listen, once you get past some incredibly stupid naming conventions (you don't really need to know about Fast, Wide, and Fast-Wide), it's no more difficult than IDE. And once you get the adapter working, adding actual devices is amazingly easy. Macintosh users have been using SCSI devices for years—how tough can it be?

To learn more about SCSI, check out Granite Digital's Web page (http://www.scsipro.com/granite/szmanl1.htm), or pick up a copy of Peter Ridge's exhaustive *Book of SCSI, A Guide for Adventurers* (No Starch Press, 1995, 800/420-7240).

Cheetah ST34501W

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PC World *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.* ■

ILLUSTRATION: GREG CLARKE

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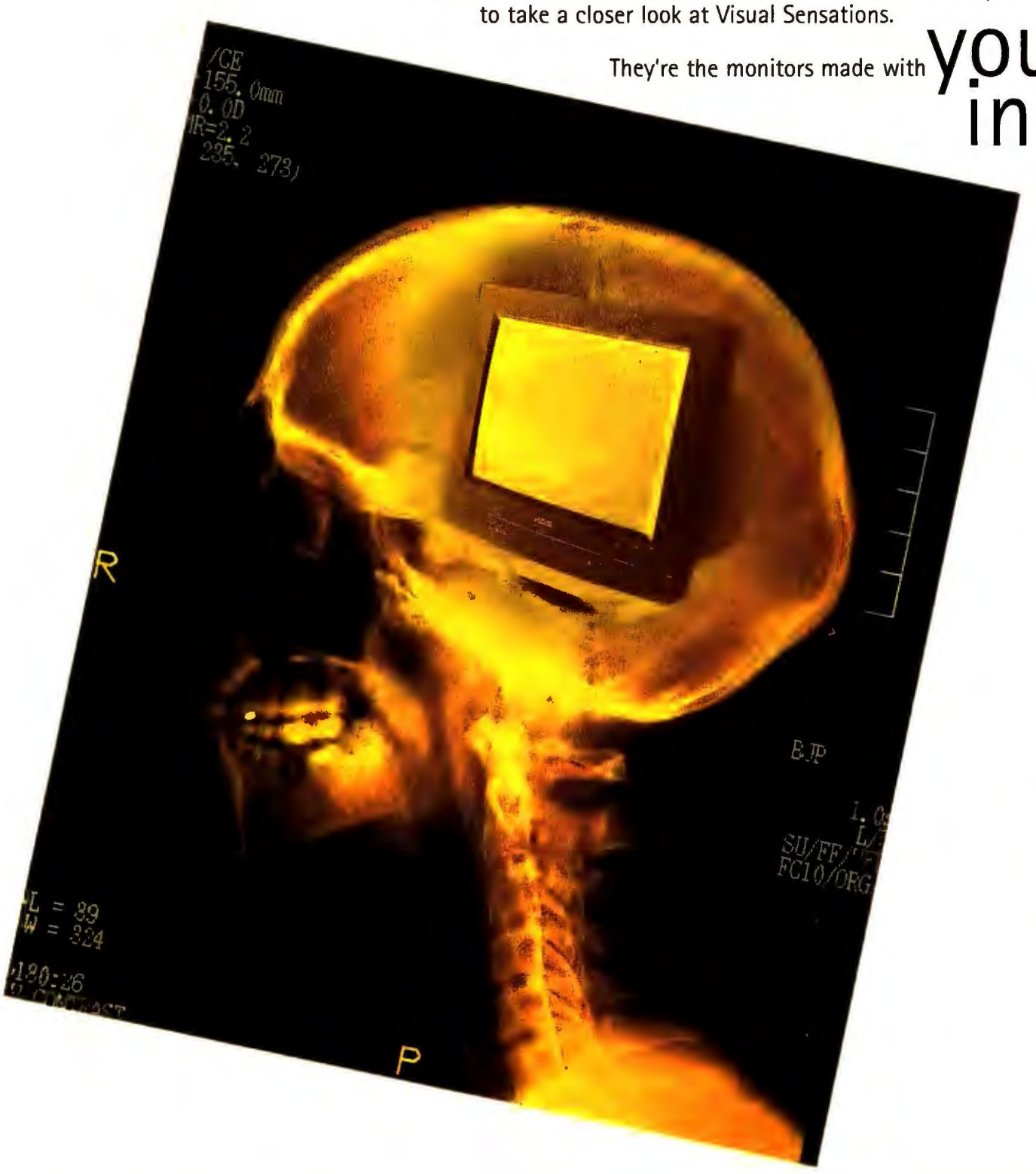

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HERE'S HOW

ANSWER LINE

The Best Way to Launch Any Executable File

I RECENTLY DOWNLOADED PKWare's PKZip utility. But after unzipping the program, I'm still not sure what I have to do to launch it. I tried to unzip a file at the DOS prompt, but it gave me the 'bad command or filename' message. A friend of mine told me that I needed to copy the program into my autoexec.bat file. I tried doing that, but the program still doesn't work.

Brandon DeSantiago, Internet

THERE ARE SEVERAL ways to run programs in Windows and DOS. You can type the command that launches the program at the DOS prompt (including Windows' MS-DOS prompt windows), or choose *File•Run* in Windows 3.1's Program Manager or Windows 95's Start menu, then type the command in the 'Command line' field and click *OK*. That doesn't mean the program will run, however. Whenever you try to run an executable file—Windows and character-mode (DOS) programs both—you have to tell DOS where the file is on your hard disk.

In the case of PKZip 2.04G (the latest version), the executable file is called pkzip.exe. Let's say you downloaded the program and installed it in a directory called \programs\pkzip on your C: drive. The surest way to run this program is to type the entire path at the DOS prompt: **c:\programs\pkzip\pkzip.exe**. That way, no matter what directory or drive DOS is currently logged to, PKZip will launch. That's a lot of typing for most of us, though.

Alternatively, you can change to the program's drive (**c:**) and directory (**cd\programs\pkzip**), if necessary, then launch the program by typing **pkzip.exe**. You can shorten that to **pkzip**, but watch out—if the directory contains a batch file that's named pkzip.bat, the pkzip command launches the batch file instead.

If you use a program only once in a blue moon, these two methods are probably fine. But if you use it daily, you'll want to avoid all that typing. One way is to add the program's directory to DOS's path variable in the autoexec.bat file; then when you launch a program without specifying the entire path to the executable file, DOS first searches the current directory and then looks in each directory listed in the path variable until it finds and runs the program. (If it doesn't find it, DOS displays the 'bad command or filename' error message.) Adding PKZip's directory to the path variable lets you launch it with the pkzip command, no matter which directory you're currently in—for Windows users, that's usually the directory in which Windows is installed.

To see what directories your current path variable contains, type **path** at the DOS prompt. To add to it, open your autoexec.bat file in DOS's text editor (**edit c:\autoexec.bat**) or any other text editor, find the line that starts with 'path=', type a semicolon at the end of the line, and then type the name of the drive and directory that you want DOS to search (each directory in the list is separated from the next by a semicolon). If you don't already have an autoexec.bat file, simply type **path=** in your text editor, followed by the directory you want to search. Save the file, exit the editor, and restart your computer.

The only drawback to the path variable is that it can't exceed 127 characters. Since many programs add their directories to the path during installation, you may run out of room. If that's the case, and you really do need all the directories listed in the path, you can solve the problem by creating a batch file that temporarily plugs your program's directory into the beginning of the path variable, launches the program, then restores the original path. See the batch file in **FIGURE 1** for an example of this approach.

Save your batch files with short, easy-to-remember names for fast access from the DOS prompt, or create Shortcuts or Program Manager icons for them under Windows. For a primer on creating batch files, see January's *Answer Line*.

By Scott Spanbauer

ILLUSTRATION: DOUG ROSS

CONTENTS

Avoid Typing Long Paths

```
@echo off
set origpath=%path%
set path=c:\programs\myprog;%path%
myprog.exe
set path=%origpath%
set origpath=
```

FIGURE 1: AUTOMATE PROGRAM LAUNCHING in DOS or Windows using a batch file. This file temporarily adds a program's directory to the path statement, launches the program, then resets the original path. For best results, save the batch file in a directory already listed in the path. To view the current path, type **path** at the DOS prompt.

WINDOWS 95 (IN)SECURITY

MY WIN 95 PC isn't connected to a network, but more than one person uses it. Each has a log-in account and password, but there's no real security. How do I protect my files, folders, and drives?

Carlson Ng, Toronto, Ontario

BECAUSE WINDOWS 95 confronts you with a log-in dialog box, you might think it can keep out those without an account and password. It can't.

Network access is about the only part of Windows 95's security that you *can* count on; if you don't share your drives and folders, other users on the network won't be able to access them. Of course, they can just walk over to your computer and view, delete, or run anything they want. Anybody who logs in can create a new user account and password—not that they even need to. Windows 95 user accounts identify you by name to other computers and track your desktop and Start menu settings, but they do not protect the contents of your hard disk. In any case, anybody can bypass the log-in screen by pressing <Esc> or booting in Safe mode.

The easiest way to keep all but the most dedicated snoops out of your computer is to use the BIOS password feature. To enable it, enter the computer's CMOS setup program; most systems display a message at start-up telling you which keys to press to get into the CMOS utility. If yours doesn't, read the manual or call the manufacturer. The manual should also tell you how to create a boot-up password. Once you've enabled one, the PC won't start up completely until you enter the password, so store it in a few safe places.

If you're afraid of losing the password, here's another option. Windows 95 comes with an accessory called the System Policy Editor, which lets you restrict what users (including those who log on by pressing <Esc>) can do. The System Policy Editor makes sense when you want to share your system with other users, keep them from running certain programs, and preserve your own desktop settings.

You'll find the System Policy Editor accessory in your Win 95 CD's \Admin\Apptools\Poledit directory. If you have the floppy disk version of Windows 95, you'll have to download the System Policy Editor from Microsoft's CD-ROM Extras Administration Tools Web page (http://www.microsoft.com/windows/software/admintools.htm).

To install the System Policy Editor, ▶

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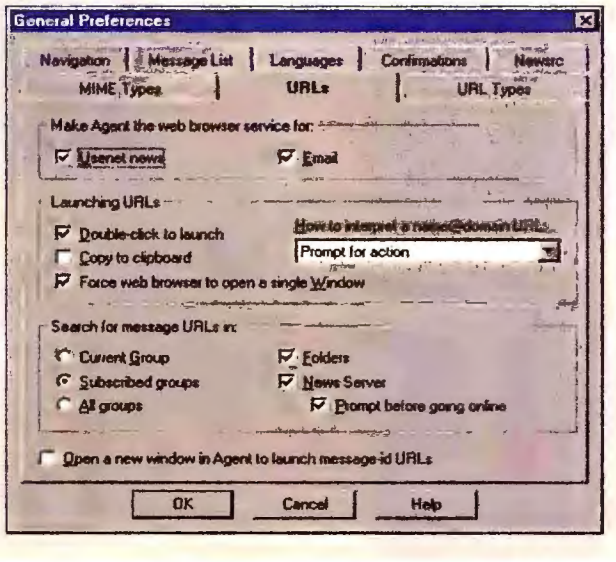

ANSWER LINE

252 Launch executable files
253 Windows 95 security, read e-mail and newsgroup discussions in your browser
255 Check cluster sizes in DriveSpace 3

WINDOWS TIPS

258 Change your PC's color scheme, replace Microsoft's logo on start-up
260 Enhance Explorer, tune up Windows 3.x
262 Rename Windows 95's long file names

SPREADSHEETS

266 Print two sheets on one page, goal-seek in Excel

WORD PROCESSING

268 Word 97's AutoShape tool, named styles
270 Little-known WordPerfect 7 buttons, access the Web from Word Pro 96

DATABASE TIPS

272 Publish Access 97 data on the Web

INTERNET TIPS

274 Access the Net from an old PC
276 Speed up AOL, get weather reports from the Web, uninstall Navigator, generate quick HTML documents, send animated greetings

HARDWARE TIPS

278 Survive a PC crash test

MULTIMEDIA TIPS

280 Control audio CDs, view QuickTime movies, find Enhanced CDs

UPGRADE GUIDE

282 Install Windows NT on a Win 95 machine

INTERNET

online

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choose *Settings•Control Panel* from the Start menu, double-click *Add/Remove Programs*, select *Windows Setup*, click *Have Disk*, type in the path to the installation files, and click *OK*.

Next, choose *Start•Programs•Accessories•System Tools•System Policy Editor*, select *File•Open Registry*, then select *Local User•Shell•Restrictions* and try different settings (**FIGURE 2**). You'll find more options under *Local User•System•Restrictions*.

However, experts can bypass even the most stringent System Policy Editor restrictions. To forestall that possibility, try one of two shareware security add-ons—Win-Secure-It 2.0 and StopLight 95 ELS.

Shetef Solutions' Win-Secure-It 2.0 is a $29 program that lets you hide and write-protect files and folders from some people, and make them available to others using an optional password. Win-Secure-It also keeps an activity log, so you can see who's been poking around in your absence. Download a fully functional copy from the company's Web site.

Safetynet's StopLight 95 ELS lets you set up access for files and folders and encrypt your entire hard disk. Download a demo version of the $50 program from the company's Web site.

• Win-Secure-It 2.0 $29; Shetef Solutions; 800/242-4775, 713/524-6394; http://www.shetef.com

READER SERVICE NO. 666

• StopLight 95 ELS $50; Safetynet, Inc.; 800/672-7233; http://www.safetynet.com

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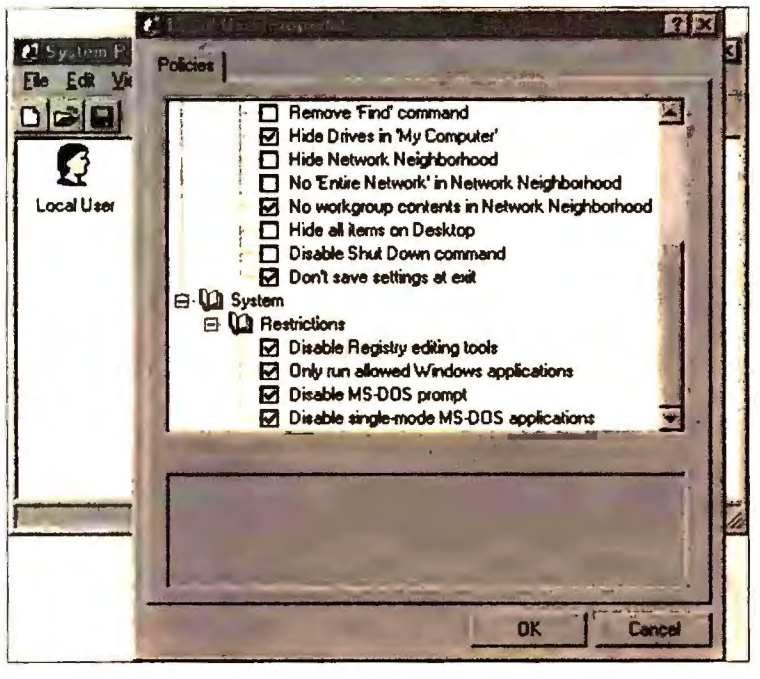

FIGURE 2: THE SYSTEM POLICY EDITOR can prevent most users from messing with your settings and files.

DOES DRIVESPACE 3 REALLY SAVE SPACE?

IN THE FEBRUARY *Answer Line*, you say that DriveSpace 3 beats cluster waste by using economical 512-byte clusters instead of the 32K clusters that a FAT partition between 1GB and 2GB would use ["Reduce Wasted Space on Your Hard Disk by Compressing With DriveSpace 3"].

I'm currently running DriveSpace 3, and I followed your step-by-step procedure. I would like to know how I can tell whether I'm using 512-byte clusters. When I type the command dir/v (the verbose directory listing) in a DOS box to display both the file size and the amount of disk space that's allocated for each file, the report says that the smallest files are still using 32,768 bytes.

Joel J. Tleon, Buffalo, New York

IF YOUR HARD DRIVE is larger than 256MB and had a fair amount of free space before you installed DriveSpace 3 (which is included with the Microsoft Plus pack or Windows 95 OEM Service Release 2), you should have ended up with noticeably more free space after creating the compressed volume file. If you weren't paying attention to your free space before and after, you may have to trust Microsoft on this one.

The dir command doesn't know about DriveSpace 3 and its internal workings—it just reports the size of allocation units (clusters) based on the partition size, which probably remained the same. Microsoft explains all of this in the drvspace.txt file in your \program files\plus! directory (see the answers to the first two questions in the Frequently Asked Questions section of drvspace.txt).

Answer Line *welcomes your questions and tips 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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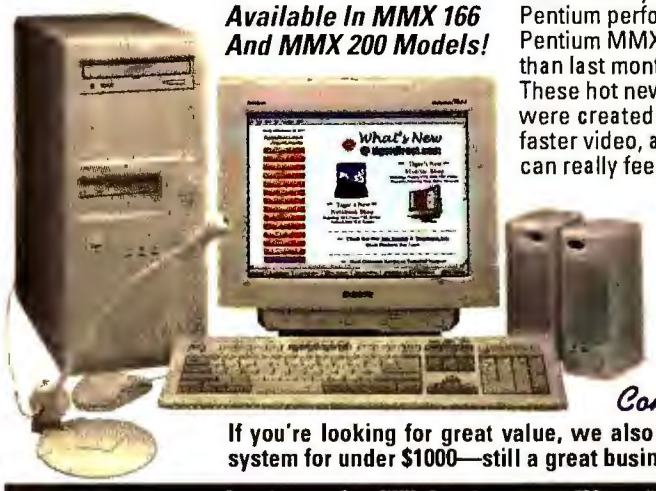

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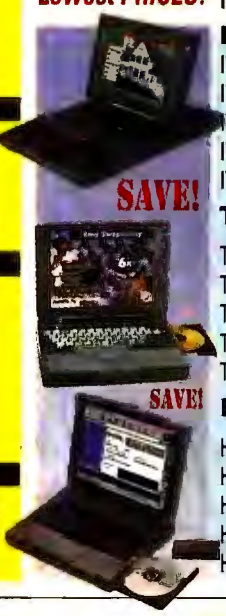

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[1] 33-bit equivalent with the analog gamma correction. [2] Estimated street price as of March 1, 1997. S-12 prices vary from $499-$649 based on software bundles. [3] Average street price from sampled advertisements in Computer Shopper February, 1997.

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Ditch Microsoft's logo ◆ Tune up Windows 3.*x* ◆ Long file names and DOS

Color Your World—And Other People's, Too

WINDOWS LETS YOU customize the color of almost every item on screen—from buttons to title bars. Just open the Control Panel, double-click *Color* (Windows 3.*x*) or *Display* (Windows 95), and click the *Appearance* tab. If your display supports thousands or millions of colors, you can use the color palette to create a seemingly infinite number of custom shades for use in your color schemes. In Windows 3.*x*, just click *Color Palette* to expand the dialog box. In Windows 95, click the item's drop-down list to select it, click the *Appearance* tab, click the *Color* drop-down list, then click *Other*.

After you've created your custom color scheme, click *Save Scheme* in Windows 3.*x*. In Windows 95, click *Save As*.

But what if you want to be able to share your creative flair with others or transfer the color schemes you use at home to your office? No problem.

In Windows 3.*x*, first make a backup of the control.ini files in your Windows directory. In Program Manager or File Manager, choose *File•Run*, type **control.ini**, and press **<Enter>**. When control.ini opens in a text editor, scroll down to the [color schemes] section (see **FIGURE 1**) and select the lines that start with the names of the color schemes you want to export. Copy and paste these lines into a new text file, then save the file to a floppy disk and transfer it to the destination computer. From that machine, open the file in a text editor and copy its contents, then open the control.ini file and paste the copied lines under the [color schemes] heading. Save the file. The next time you open the Control Panel, you can choose one of your transferred color schemes.

FIGURE 1: EXPORT COLORS IN WINDOWS 3.*x* by copying the appropriate lines from one system's control.ini file to another's. When you open the Control Panel that contains the copied colors, choose from the schemes you transferred.

In Windows 95, by far the simplest approach is to transfer your complete collection of color schemes from the Registry. But as a precaution, first make backups of the user.dat, user.dao, system.dat, and system.dao files in your Windows folder.

Choose *Start•Run*, type **regedit**, and press **<Enter>**. Navigate down the tree in the left pane until you come to the folder HKEY_CURRENT_USER/Control Panel/Appearance/Schemes. With the *Schemes* folder selected, choose *Registry•Export Registry File*. In the resulting dialog box, make sure the *Selected branch* option is selected. Name the export file and save it in a convenient location. Then copy the exported Registry file to a floppy disk and transfer it to the destination computer. On that machine, open the Registry Editor as explained above and choose *Registry•Import Registry file*. Locate and select the Registry file you made, click *Open*, and then click *OK* to acknowledge the message that the file was imported.

Now when you open the Display Properties sheet in the Control Panel, you'll see all the color schemes from the originating computer. One warning: Importing color schemes this way will overwrite any existing color schemes of the same name on the destination computer.

CUSTOM START-UP SCREENS IN WINDOWS 95

TIRED OF MICROSOFT shoving its Windows 95 logo in your face every time you start your computer? Not to worry. You can use your own logo (or pretty much any graphic) in place of Microsoft's image. For starters, you'll need a bit-map file, which you can get by scanning a photo, downloading an image from an online service, or creating your own picture in Microsoft Paint or another image editing application.

FIGURE 2: SQUEEZE A 256-COLOR BIT MAP into 320 by 400 pixels and use it to replace the Windows 95 start-up logo.

Not just any picture will do. It must be an 8-bit color image, which means it can have no more than 256 colors. One way to tell is to open an image in Microsoft Paint and choose *File•Save As*. If the 'Save as type' option says '256 Color Bitmap', you've hit pay dirt. If it says '24-bit Bitmap', you need to convert the graphic to 256 colors—something Paint can't do without making a blotchy mess of most images. To reduce the number of colors gracefully, you'll need an image editing program that can *dither*—that is, mix colored speckles to simulate a greater number of colors. A picture composed of less than 256 colors, such as a 16-color bit map, poses no problem as long as you save it as an 8-bit (256-color) image.

Image size is also an issue. Win- ▶

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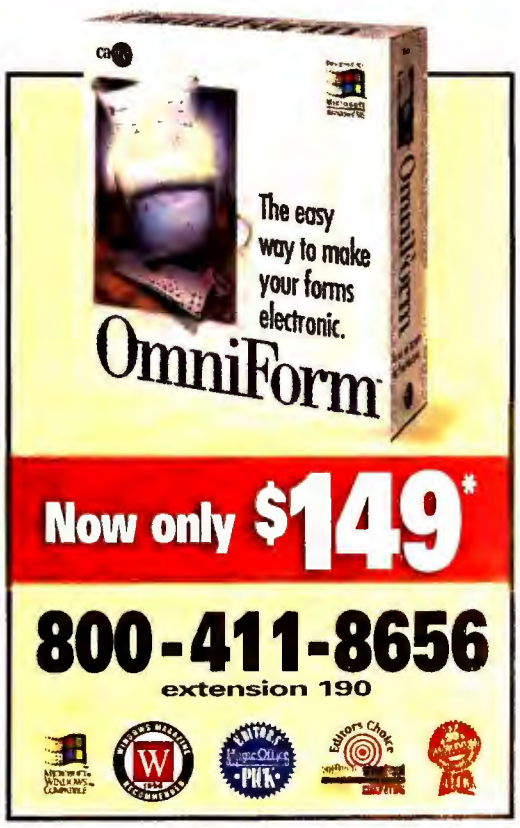

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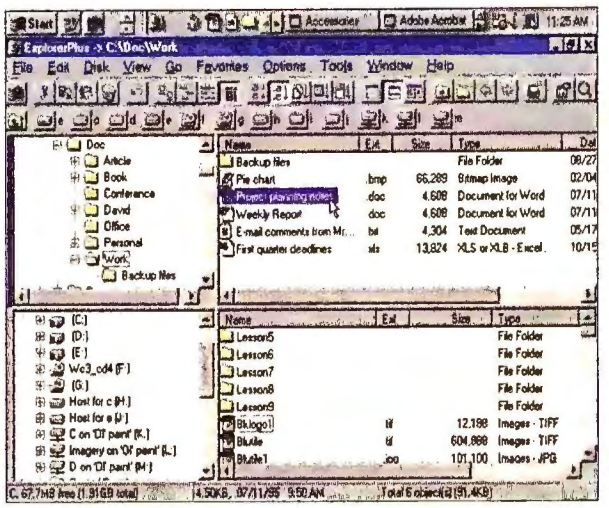
WINDOWS TOOLBOX

Windows Explorer on Steroids

POWERDESK UTILITIES for Windows 95 greatly enhance Windows Explorer's performance and rev up Explorer's toolbar with some extra functions. PowerDesk File Finder (a search utility) and PowerDesk Size Manager (a disk management utility) round out the packages. The $35 PowerDesk Utilities is available from Mijenix (800/645-3649, 608/277-1981). You can also download PowerDesk Utilities from PC World Online at http://www.pcworld.com/software_lib/.



dows 95 needs a picture of 320 by 400 pixels for its start-up screen, even though it stretches the image to 640 by 480 pixels. Consequently, you're better off working with the latter size if you plan to make any changes to the image. In that case, use an image editor (almost any will do) to reduce the picture to 320 by 400 pixels.

If your application doesn't have the reduction capability, try this work-around in Paint: Open the graphic file and choose *Image•Stretch/Skew*. Select *Horizontal*, type **50**, and click *OK*. Choose *Image•Stretch/Skew* again, select *Vertical*, type **104**, and click *OK*. Finally, choose *Image•Stretch/Skew* one more time (see **FIGURE 2**), select *Vertical*, type **80**, and click *OK*. (This three-step shuffle to specify the vertical dimension is necessary because Paint requires you to use whole-number percentages when you resize images.) The picture will look funny and squished, but that's what Windows wants. Go figure.

Once your image has the right color level and dimensions, save it in the Windows .bmp format. To do this in Paint, choose *File•Save As*, select *256 Color Bitmap* under 'Save as type', enter a name, and click *Save*. Next, find the logo.sys file—the current logo image—in the root directory of your start-up disk. Either move logo.sys to another location, or rename it something like **logosys.old** in case you want it back later. Finally, locate your new bit map, rename it **logo.sys**, and move it to the root directory in place of the old logo.sys. The next time you start Win 95, your custom picture will appear in all its glory.

A final tip: To customize the two Windows 95 shutdown logos, find the logow.sys file ('Please wait while your computer shuts down') and the logos.sys file ('It's now safe to turn off your computer') in your Windows folder. Rename the files or move them. Then create two new bit maps as described above, rename them **logow.sys** and **logos.sys**, and put them in your Windows folder.

TEN TUNE-UP TIPS FOR WINDOWS 3.X

WINDOWS 3.1 AND 3.11 still get the job done for many of us. But when your Windows resources become intolerably low, the only sure way of recovering those resources is to exit Windows and restart. To keep your version of the operating system in top shape, make sure you're using these tried-and-true memory management techniques.

1. **Cache in.** Running Windows without a cache is like trying to run a race while holding your breath. A disk cache is an area of memory that stores recently used data from your hard disk, so your computer doesn't have to take the comparatively slow route of looking on the drive for everything it needs.

Fortunately, Windows 3.*x* installs and uses a cache of its own—SmartDrive. To make sure SmartDrive is in use, look for a line containing 'smartdrv.exe' in config.sys or autoexec.bat. (If you don't see it, ask the person who configured your computer whether a third-party cache program has been installed.) If you're using Windows for Workgroups 3.11, open the Control Panel, double-click the *386 Enhanced* icon, click *Virtual Memory*, click *Change*, and make sure *Use 32-Bit Disk Access* is checked. The cache size (both in this Control Panel dialog box and in your smartdrv command line) should be big enough to boost your speed but small enough to keep it from taking too much memory away from applications. If you don't have time to experiment with different cache sizes, just accept the default values.

2. **Buff it down.** DOS has a kind of built-in disk cache that you control with the 'buffers=' line in your config.sys file. But if you're using SmartDrive, a larger DOS buffer setting can actually hurt efficiency. Open config.sys (it's in the root of your start-up drive) using a text editor such as Notepad, and try a setting like **buffers=15**. If you're not using SmartDrive, use the setting **buffers=30**, or whatever your caching software recommends.

3. **Tune it up.** Run an optimizing utility once a week to defragment your hard disk. This procedure is especially important if you are using a temporary swap file (yech—see tip 4), but defragging also improves SmartDrive's performance. If you can't afford a third-party tool such as SpeedDisk—part of the venerable Norton Utilities—use the Scandisk and Defrag utilities that come with DOS 6 (you'll need to exit Windows to use these tools). If you're using disk compression other than DoubleSpace or DriveSpace, stick with the defragmenting utility that came with your compression software.

4. **Swap till you drop.** When you run out of memory, Windows uses free hard disk space, or *virtual memory*, as a temporary swap file. But you'll get much better performance if your computer uses a permanent swap file—a dedicated portion of your hard drive that Windows can use only for this purpose. Some applications, in fact, won't even start unless you have a permanent swap file.

To make sure you've got one, open up the Control Panel, double-click the *386 Enhanced* icon, and click *Virtual Memory*. The Swapfile Settings list at the top of the Virtual Memory dialog box (see **FIGURE 3**) tell the story: If you see 'Type: Permanent', you're in good shape. ▶

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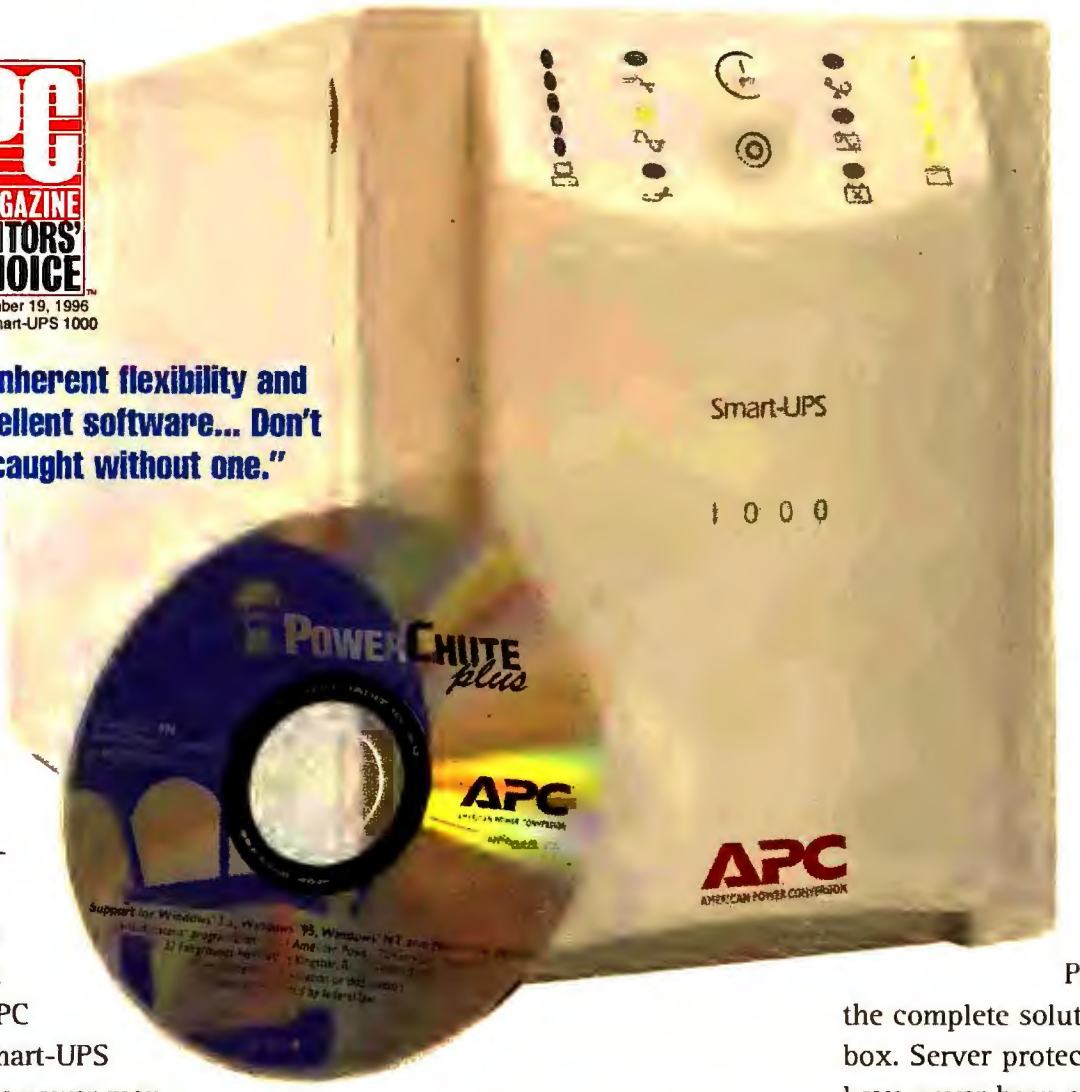

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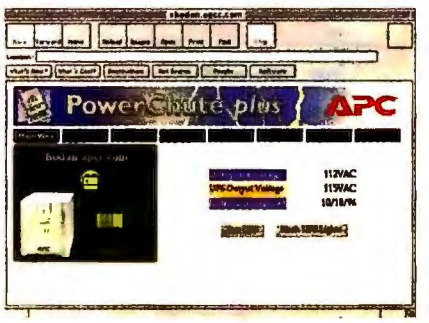

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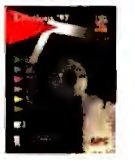

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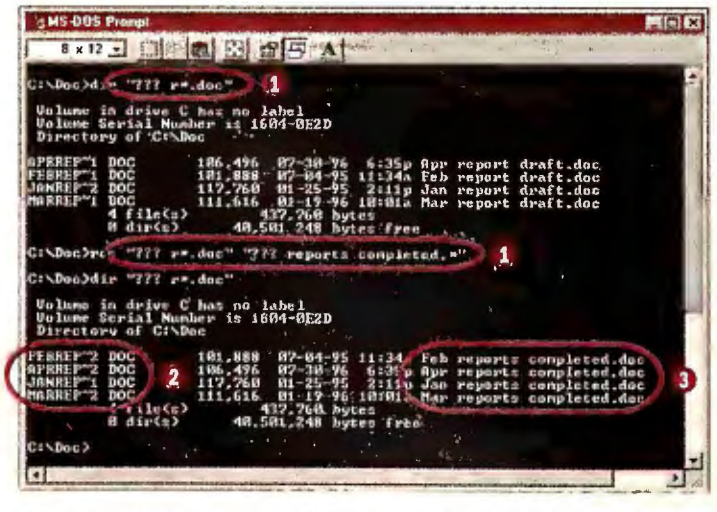
Rename Long File Names From the DOS Prompt

I AM USING Windows 95 and want to rename a group of files with similar names. The Windows 3.*x* File Manager would let me use wild cards to rename a group of files. I have not been able to find a similar method in Windows 95. I could do it from DOS, but the rename command won't support long file names. Any suggestions?

Jeff Stewart, Tullahoma, Tennessee

AU CONTRAIRE, Jeff. The DOS Rename command works fine for long file names. The trick: You must put anything that represents a long file name in quotation marks. For example, the DOS prompt has no problem with a command like **ren "1996 reports*.doc" "1997 reports*.doc"**. Or if you have files whose names begin with three-letter abbreviations for months (such as Jan report draft.doc), you could rename them with a command like **ren "??? r*.doc" "??? reports completed.*"**. (The combination of wild cards and regular characters you use depends in part on which files you want to filter out.)

DOS's Rename command has the same limitations with long file names as it does with short ones: The changed portion cannot be longer than the old portion. Otherwise, the change will overwrite some or all of the characters represented by the wild card (unless the change comes at the end of the name, as in the last example above). To see the results of your changes, use the dir command, put long file names in quotation marks, and include any wild cards you want. You'll see the long file names in the right column of the directory listing.



DOS AND LONG FILE NAMES go hand in hand in Windows 95. (1) To rename files, use quotation marks in DOS commands; (2) check out the eight-character DOS name on the left side of file listings; and (3) look to the right side for the long Windows file name.

If that isn't what you see, exit Windows and defragment your hard disk(s) as described in tip 3. Then return to the Virtual Memory dialog box and click *Change* to get to a dialog box with a New Swapfile Settings section. Select a fast hard disk with lots of free space (but *don't* choose a compressed drive, a network drive, or a RAM drive), and enter a virtual memory size in the New Size box. If you have oodles of hard disk space, you needn't use the entire amount that Windows recommends for virtual memory. As a rule of thumb, set a swap-file size that is double the amount of your total RAM (or a little less if you have 16MB or more). Depending on the apps you use and your disk space requirements, you can come back and change this size later. Click *OK* and follow the prompts to restart Windows.

5. **Access with 32 bits.** While you're in the Virtual Memory dialog box (see tip 4), notice whether the 'Use 32-Bit Disk Access' box in the bottom left of the dialog box is checked. (If you don't see the check box, click *Change* to expand the dialog box.) Checking this box lets Windows use a special device driver for faster disk access. To take advantage of this feature, you must be using a Western Digital WD-1003 (or compatible) hard disk controller. How do you know what you've got? Make sure the box is checked, then click *OK* and follow the prompts to restart Windows. If Windows won't restart, you probably don't have a compatible system. In that case, type **win /d:f** at the DOS prompt to start Windows without this feature; then return to the Virtual Memory dialog box and uncheck the box.

6. **Deny DOS.** If you never use DOS applications, eke out a bit more memory by removing from your config.sys file the line that loads emm386 .exe. Delete the line that begins with the command 'Device=c:\emm386.exe'.

7. **Try a paler shade of light.** A more austere display can also save memory. Lower the number of colors your monitor uses. Your video system

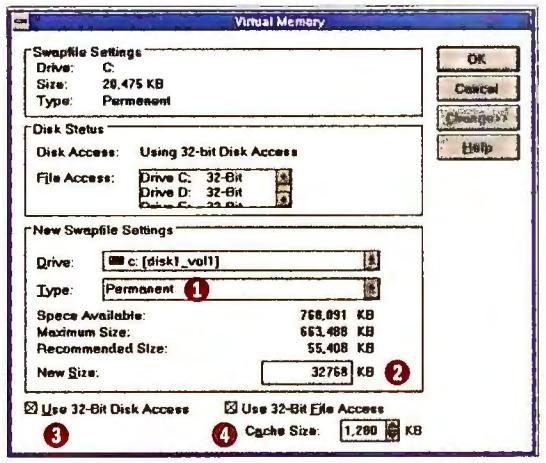


FIGURE 3: SPEED UP WINDOWS by (1) setting up a permanent swap file on the fastest drive you have, (2) making the swap file as big as possible, (3) checking Use 32-Bit Disk Access, and (4) checking Use 32-Bit File Access and setting a cache size that minimizes the need for disk access.

should have a Windows utility to do this.

8. **Pattern it.** Another way to conserve resources is to turn off Windows' wallpaper. Open the Control Panel, double-click the *Desktop* icon, and select *(None)* from the Wallpaper File drop-down list. If your desktop now seems too dull, choose a design from the Pattern drop-down list at the top of the Desktop dialog box—or click the *Edit Pattern* button to create your own. Click *OK* when you're finished.

9. **Tune out, turn off.** Fancy commercial screen savers slow things down and eat up system resources. To save resources , use Windows' built-in screen savers, which make fewer demands on the system. To remedy both problems, skip the screen saver altogether and just turn your monitor off when you're not using it.

10. **Simplify, simplify, simplify.** Each on-screen item creates a small drain on system resources. To maximize resources, reduce the number of icons and groups in Program Manager, and open only the windows, toolbars, menus, and icon displays you need for your applications.

Find files from this article at http://www.pcworld.com/software_lib/. Windows Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Dunn is a principal author of* The PC Bible, *second edition (Peachpit Press, 1995, 800/283-9444).* *See page 14 for contact information.* ■

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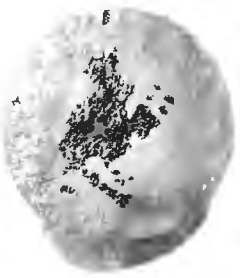

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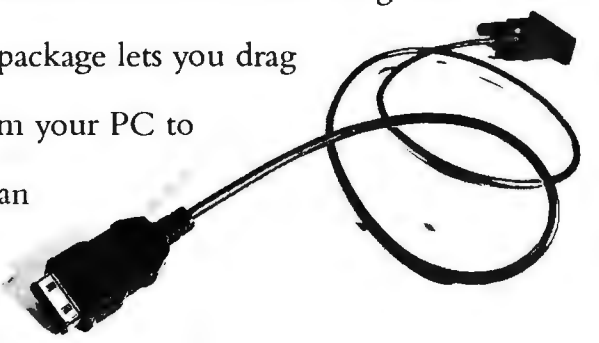

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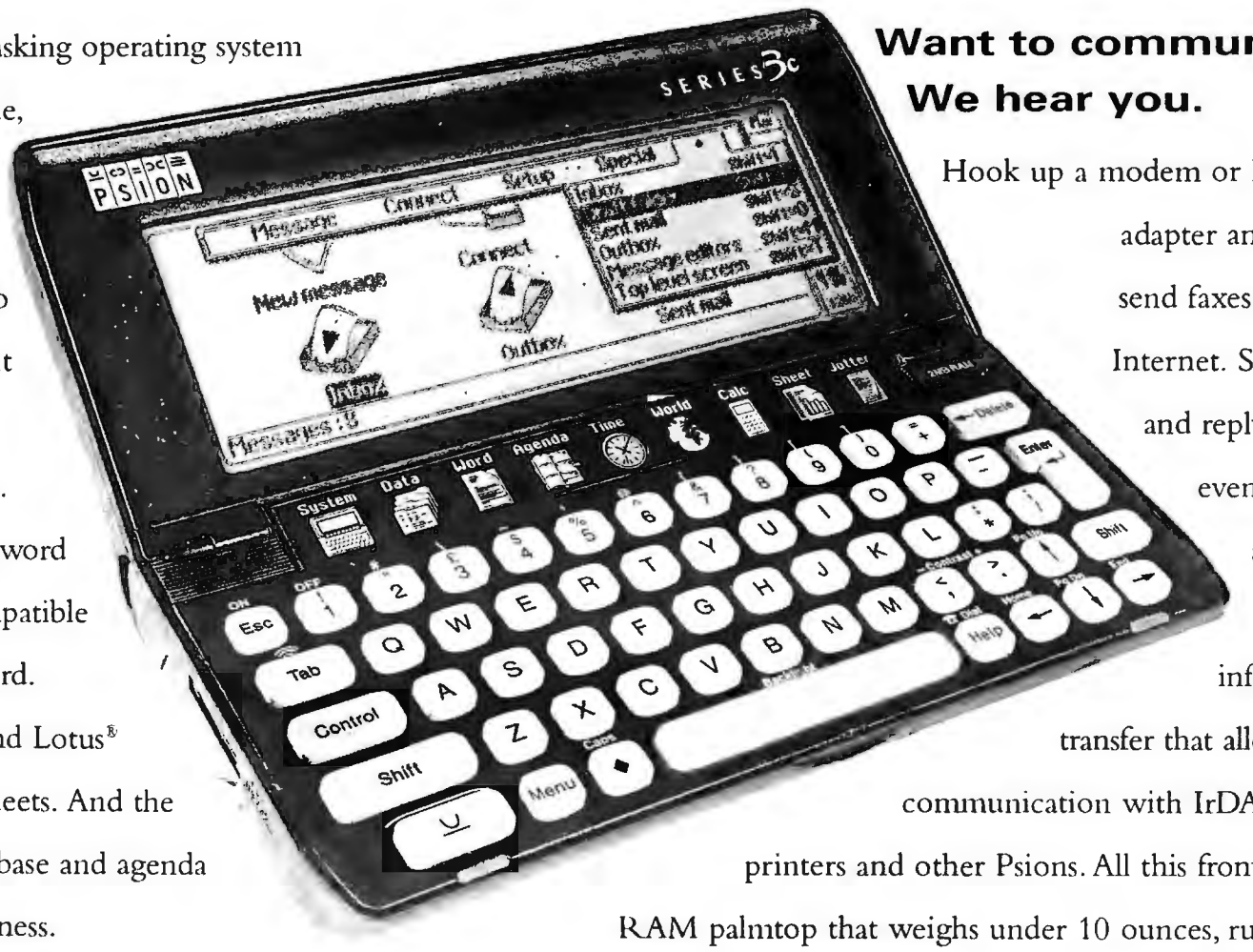

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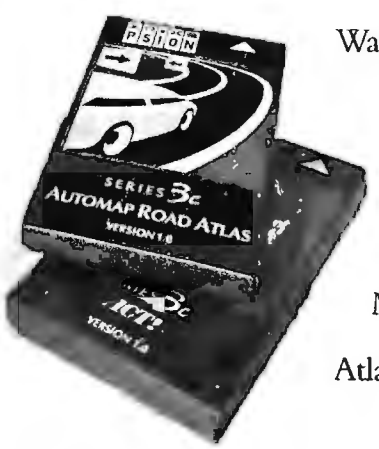

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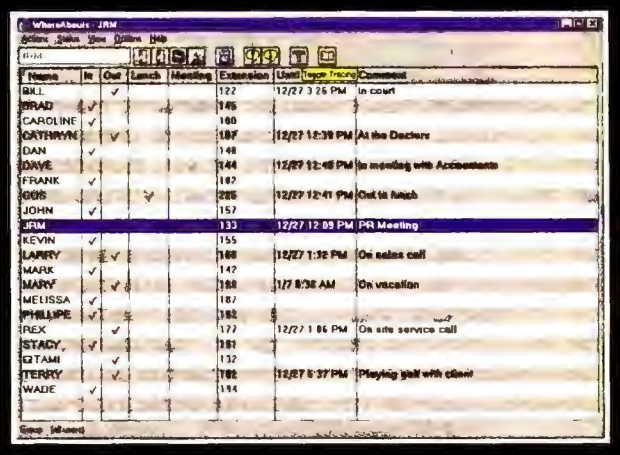

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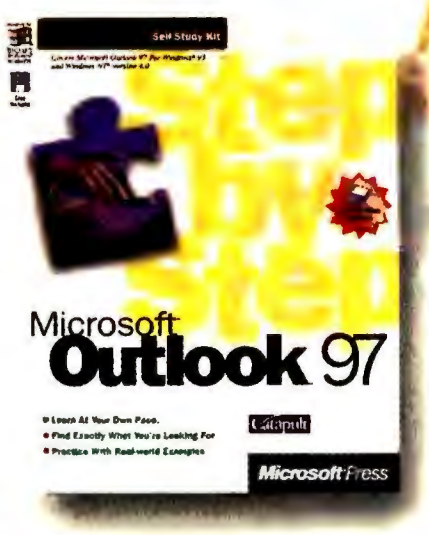

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Print Data From Two Sheets on One Page

I RECEIVED a message from a reader who switched from 1-2-3 to Excel and was wondering how to print data from two different sheets in a file onto one page of a report. Hang on a sec—I'll tell you how.

Suppose you have an Excel workbook where Sheet1 looks like the figure below.

	A	B	C	D
1	GROUP A			
2		Jan	Feb	Mar
3	Worst	102.88	124.28	135.51
4	Probable	188.00	152.33	161.18
5	Best	213.09	231.10	242.08
6	Average	167.99	169.24	179.59

Sheet2 looks identical, except the data is for Group B. You want to print the Group B stuff just beneath Group A, on a single sheet. Go to Sheet2. Select *View•Toolbars* and click *Customize*. In the Categories list, click *Utility*. Drag the camera tool from the 'Buttons' section of the Customize dialog box onto the worksheet, then close the dialog box. On Sheet2, select A1:D6 and click the camera tool. Return to Sheet1 and click cell A7. You'll get an image of the Group B data just below Group A. Press and hold down **<Alt>** as you drag the picture into position. (The <Alt> key causes objects to snap to the worksheet grid.) If there's a border around the image, select it and choose *Format•Object*. Click the *Patterns* tab, and in the Border area select *None* and click *OK*. See **FIGURE 1** for the result.

In 1-2-3, just select *File•Print*, click *All worksheets*, and then click *OK*. To print only from selected sheets, choose *Selected Range* in the Print dialog box and enter a print range that looks like A:A1..A:D6, B:A1..B:D6. In Quattro Pro, select *File•Print* and choose *Notebook* or specify multiple blocks under Block Selection.

	A	B	C	D	E
1	GROUP A				
2		Jan	Feb	Mar	
3	Worst	102.88	124.28	135.51	
4	Probable	188.00	152.33	161.18	
5	Best	213.09	231.10	242.08	
6	Average	167.99	169.24	179.59	
7	GROUP B				
8		Jan	Feb	Mar	
9	Worst	144.40	104.23	105.29	
10	Probable	187.37	151.39	171.57	
11	Best	241.97	233.44	230.96	
12	Average	191.25	163.02	169.27	
13					

FIGURE 1: EXCEL'S CAMERA TOOL lets you copy data from one sheet to another.

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OUR SMALL BUSINESS (we sell flowers and gifts) is growing each month. We'd like to get to the point of making $5000 per month and want to find out what our monthly sales must be to get this kind of income. Can you suggest how to calculate this in Excel 97?

Rosh Whitfield
Myrtle Beach, South Carolina

BASED ON THE rather complicated file you sent, I've constructed the drastically simplified model shown in **FIGURE 2**.

You say that you generally mark up your inventory by 75 percent, and that your fixed costs—rent, utilities, wages, and so forth—are about $20,000 per month. The formulas in Figure 2 calculate the inventory cost as a function of sales (a number that's easy to estimate) and then derive the profit based on the level of sales.

Enter the data and formulas shown in Figure 2. Select *Tools•Goal Seek*. Specify B6 as the Set cell; enter **5000** as the To value; and specify B2 as the By Changing cell. Click *OK*, and Excel calculates a value for sales that produces the desired profit.

In 1-2-3 the command is *Range•Analyze•Backsolver*. In Quattro Pro, it's *Tools•Numeric Tools•Solve For* (B6 is called the Formula Cell, and B2 the Variable Cell).

Find additional tips at http://www.pcworld.com/hereshow. Spreadsheets *welcomes your questions and tips and pays $50 for published items. Contributing Editor Richard Scoville is a software training consultant based in Chapel Hill, North Carolina. See page 14 for contact information.* ■

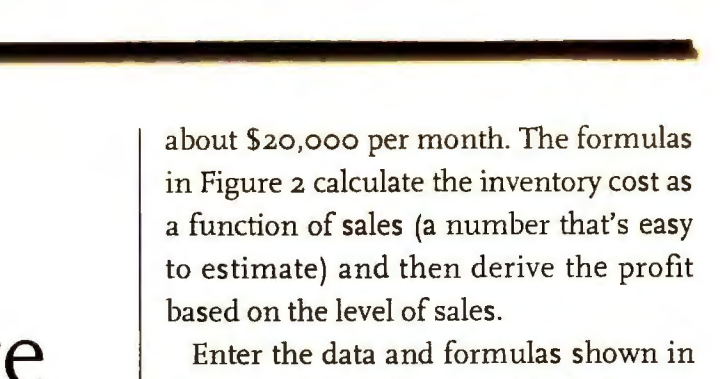


FIGURE 2: THIS EXCEL MODEL calculates what your monthly sales must be to reach a specified goal.

SPREADSHEETS TOOLBOX

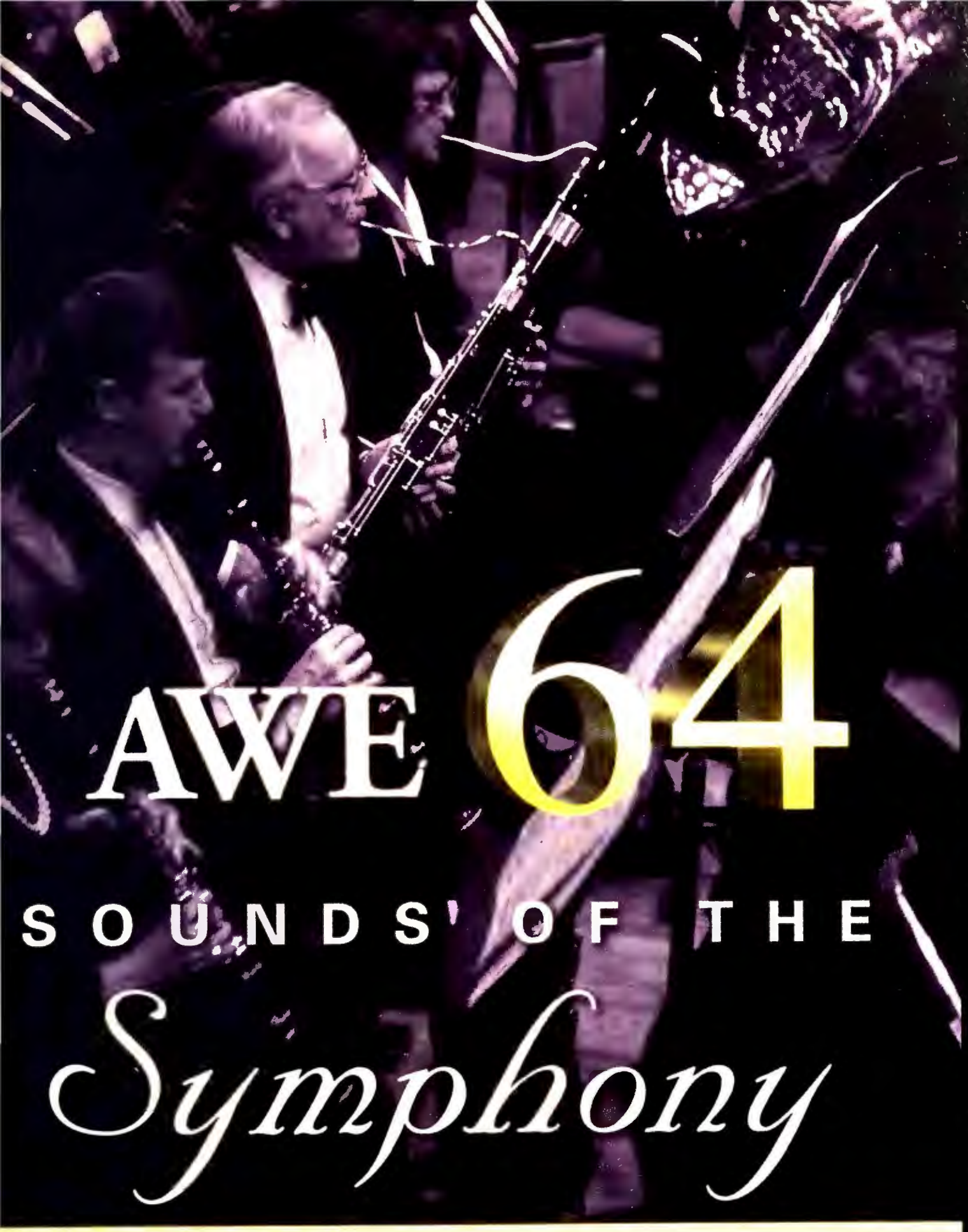
Add Business Sense to Your Spreadsheet Skills

IF YOU'RE LIKE ME, you'd much rather sit around and play with your spreadsheet than do anything resembling real work. The trouble is, if you're an experienced spreadsheet user, your colleagues keep asking you to solve real problems. And they expect that because you're a whiz at Excel, you just naturally know how to figure the value of an inventory using LIFO versus FIFO.

Like me, you probably say brightly, "No problem" and then, under your breath, "Omigod, what's a FIFO?"

There's good news: I've found the perfect spreadsheet book for people like us. It's called *Business Analysis With Excel* by Conrad Carlberg (Que Corporation, 1995, 215/567-1821). Carlberg has an incredibly broad reach, and he explains things very clearly.

His book covers the essential financial, accounting, and statistical concepts found in most MBA curricula—for example, exponential smoothing and contribution costing. Carlberg develops each concept within the context of a realistic business case, using Excel spreadsheets as examples. You get plenty of cool spreadsheet tips combined with concise explanations of very useful analytical concepts and methods. It's a combination that will make you look almost as smart as Carlberg. Well, maybe.



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.

Experience an evening at the symphony with the new Sound Blaster® AWE64 Gold™ and hear every crisp sound with perfect audio fidelity. The Sound Blaster AWE64 Gold is simply the best sounding Sound Blaster ever. And it's designed specifically to upgrade your PC's multimedia audio system. Play back up to 64 simultaneous voices, producing a richer, fuller sound than previously thought possible. With 20-bit digital output, audio quality is uncompromised. And of course, compatibility is assured because it's a genuine Sound Blaster. To listen to and learn more about the Sound Blaster AWE64 Gold contact us at:

www.SoundBlaster.com/sound/AWE64Gold.

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Circle 54 on reader service card

Use named styles ◆ Click WordPerfect toolbar buttons ◆ Get a Web page in Word Pro

Jazz Up Documents With Transparent Shapes

MICROSOFT WORD 97's new AutoShape tools are a great way to enhance your documents. For example, they let you surround text with a border in almost any shape. But these shapes aren't designed by default to be transparent, and making them transparent takes a little trickery. Here's how to draw a filled shape around existing text, then let that text show through (also see **STEP BY STEP**):

1. Set up your document with the text you want to highlight in its final location.
2. If the Drawing toolbar isn't visible, select *View•Toolbars•Drawing* to display it.
3. Click the *AutoShapes* button on the toolbar, pick one of the basic shape types from the menu, and click the shape you want in the resulting box.
4. Back in the document, click and drag to draw and position the shape over the text you want to emphasize. Your text will be covered by the shape and won't be visible.
5. Select the shape (you'll see selection handles around it) and then right-click it. Select *Format AutoShape* from the pop-up menu. Click the *Colors and Lines* tab in the Format AutoShape dialog box, then go to the drop-down Color list in the Fill section and select *No Fill*. You can also set the color and thickness of the lines.
6. To force the shape to move with the underlying text if you make changes, click the *Position* tab and make sure *Move object with text* is selected. Click *OK* to close the dialog box, and the underlying text will be visible through the shape. Once the shape is transparent, it's a little harder to select it to change its size or other attributes. To select the shape, move the pointer over the shape until it changes to a four-way arrow and then click.

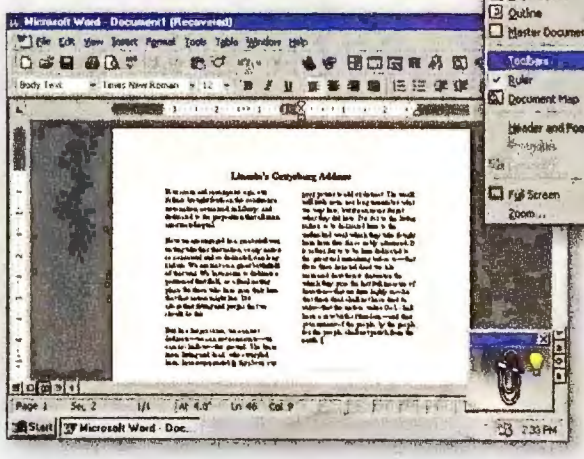
FORMAT YOUR DOCUMENTS WITH NAMED STYLES

WHICHEVER WORD PROCESSOR you use, formatting text using named paragraph styles is by far the fastest way to work. Each of the current word processors offers a default set of styles, but those prefab styles may not always suit your needs. While you can create new styles using ▶

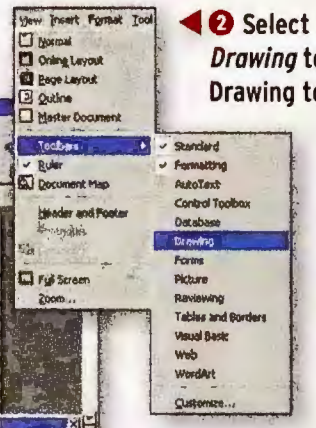
STEP BY STEP

Word 97's AutoShape Tool Lets You Dress Up Your Documents With Shapes and Borders

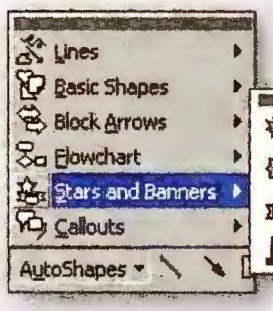
❶ Create your document and place the text in its final position on the page. ▼



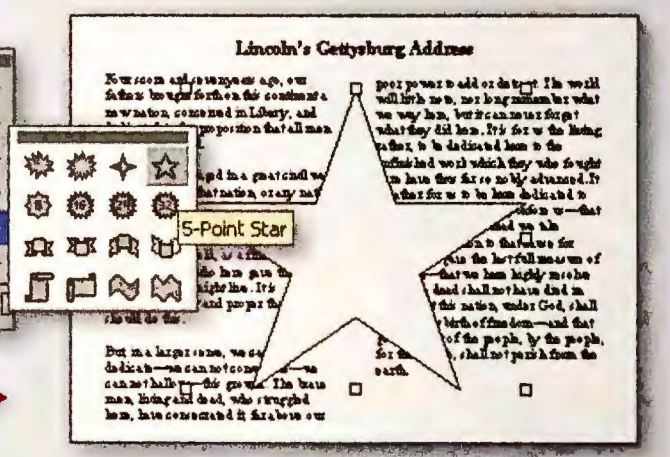
◀❷ Select *View•Toolbars•Drawing* to display the Drawing toolbar.

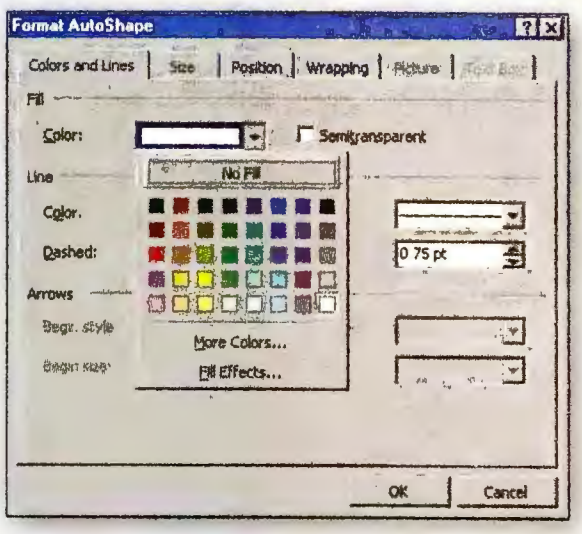


❸ Pick a shape from the AutoShapes pop-up menu. ▼

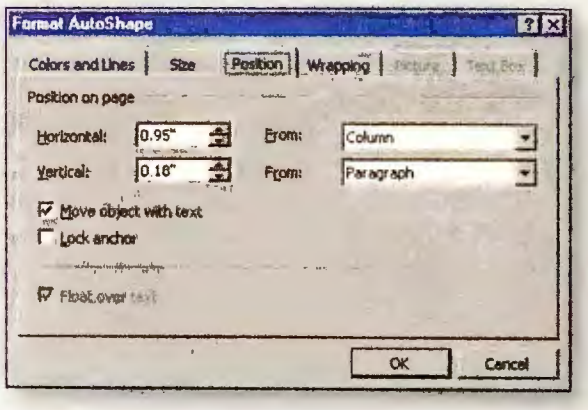


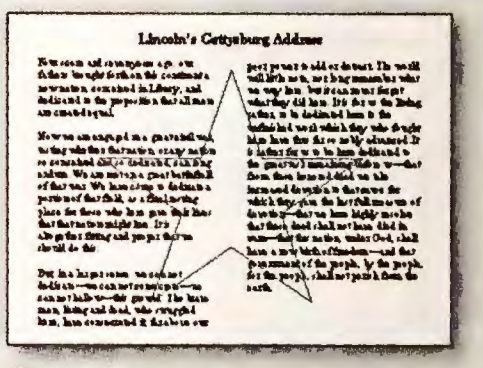
❹ Click and drag the shape over the ▶ document to place it.



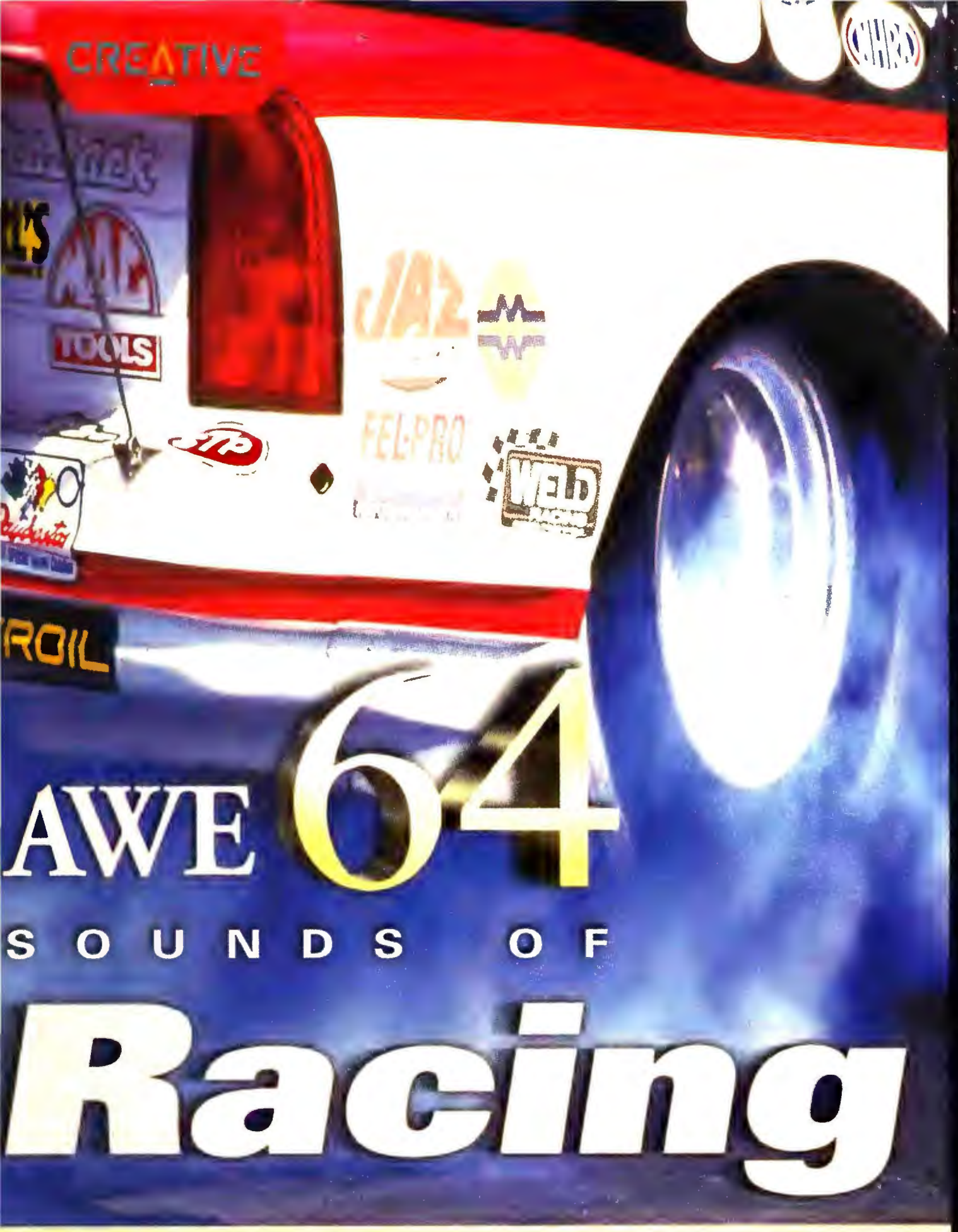


◀❺ Select *Format AutoShape*, then the *Colors and Lines* tab. Drop down the Fill section's Color menu and click *No Fill*. Set other line options as desired.





◀❻ Click the *Position* tab in the Format AutoShape dialog box, and make sure the *Move object with text* box is selected to anchor the shape to the underlying text.



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. Vrrrrrooooooom.
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.

Put the pedal to the metal with the new Sound Blaster® AWE64 Gold™, the only sound card created to upgrade your Pentium® PC's multimedia audio system. With 64 available voices playing simultaneously and the new WaveGuide technology, music playback will never be the same. And don't worry about compatibility issues, because it's a genuine Sound Blaster. Also, DirectSound™ and DirectSound3D™ hardware acceleration is included. For more details and a demonstration of the Sound Blaster AWE64 Gold contact us at:

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Circle 59 on reader service card

a dialog box, there is an easier way: Use text you've already formatted. Follow the steps below to create permanent styles you can use in all new documents.

In all the programs, start by formatting some text to look exactly the way you want. When you're finished, select the preformatted text and follow the steps below for your word processor.

Word 6, 7, and 97. Select *Format•Style*, and click *New* in the Style dialog box. In the New Style dialog box, type a name for your style in the Name field, select *Add to Template*, click *OK*, then click *Close* in the Style dialog box. Word will save the new style in the current template when you exit.

WordPerfect 6.1 and 7. Select *Format•Styles* and then click *QuickStyle* in the Style List dialog box. In the QuickStyle dialog box, type a name for your new style in the Style name field, then click *OK*. Back in the Style List dialog box, select *Options* and then select *Copy*. Select *Template* in the Styles Copy dialog box and click *OK* to store the style sheet in WordPerfect's default template. Finish up by clicking *Close* in the Style List dialog box. WordPerfect 6.1's style sheets cannot record color, so that attribute won't be included.

Word Pro 96 and 97. The process is more complicated in Word Pro, since you can't create a style in a document and store it in the current template. To create a new, permanent style, follow these steps:

1. Before modifying Word Pro's default template, select *File•Close* to close all open documents. Select *File•Open*. Select *Lotus Word Pro SmartMaster (*.MWP)* in the 'Files of type' list, then select *default.mwp* from the file list (look in the lotus\smasters\wordpro directory). Click *Open*. The default.mwp template is used to create plain blank documents; if you want your new style to appear in a different template, choose another one. To modify the default.mwp template, first select *File•Close* to close the blank document that loads when you start Word Pro. Otherwise, you won't be able to save changes.
2. Enter some text into the new document that appears after you've closed the blank document, select the text, and then format it the way you want the new style to look.
3. Select *Text•Named Styles•Create*. Type a name for your new global style in the 'Style name' field of the Create Style dialog box, and then click *OK*.
4. Delete the text you've formatted so it is not saved with the template.
5. After you've created the styles you need and have deleted all the text you entered, select *File•Save* to store the modified SmartMaster template.

POSITION TABLES IN WORD 97

WORD 97 OFFERS a new way to position tables horizontally or vertically in your document without having to surround the table with a frame, as you had to do in previous versions. To use this new feature, first select the entire table, either by selecting *Table•Select Table* or by pressing **<Alt>-<NumPad 5>**. Then click one of the alignment buttons on the Tables and Borders toolbar (**FIGURE 1**). This tip works both for tables created with the Table•Insert Table command or the new table drawing tool.

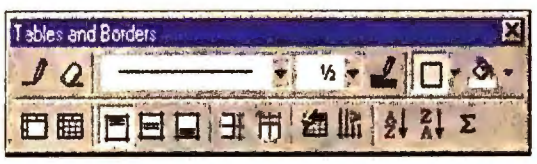


FIGURE 1: ALIGN WORD 97 TABLES using buttons on the Tables and Borders toolbar.

FIVE LITTLE-KNOWN WORDPERFECT 7 ICONS

MOST OF US USE very few of the buttons on WordPerfect 7's toolbar, probably because we're unfamiliar with many of their functions. Here are five buttons on the default WordPerfect 7 toolbar that you shouldn't miss.

This button toggles between the current editing view and a full-page view of your document. Use it to check formatting on the whole page—it's much faster than selecting from the menus.

This button calls up WordPerfect's Make It Fit dialog box, which lets you shrink a long document down to fit on a specified number of pages.

This button fires up your Web browser and takes you to Corel's home page. From there, you can access the World Wide Web.

Need some quick help? Click this button to open the Ask the Perfect Expert dialog box, and ask your question in plain English.

Click the Show Me button when you want WordPerfect to help you with the current task. You'll get a list of options such as accessing the help system and being coached through a process. It's a great learning tool. It can also perform complex tasks for you automatically.

ACCESS THE WEB FROM WITHIN WORD PRO 96

IF YOU HAVE Windows 95's Dial Up Networking installed, or if you have an Internet account, you can quickly access any page on the Web without leaving your Word Pro 96 document. Just dial in to your Internet account, then select *File•Internet•Open from Internet* in Word Pro. In the Open from Internet dialog box (shown in **FIGURE 2**), select the *WWW* radio button. In the 'File name' field, type the complete URL for the Web page you want to open and click *Open*.

Word Pro will connect to the Web, retrieve the page, and drop it into a new document. When the transfer is complete, you can open other pages on the Web by double-clicking the links. Naturally, you can download these pages and save them either as HTML documents or as Word Pro documents.

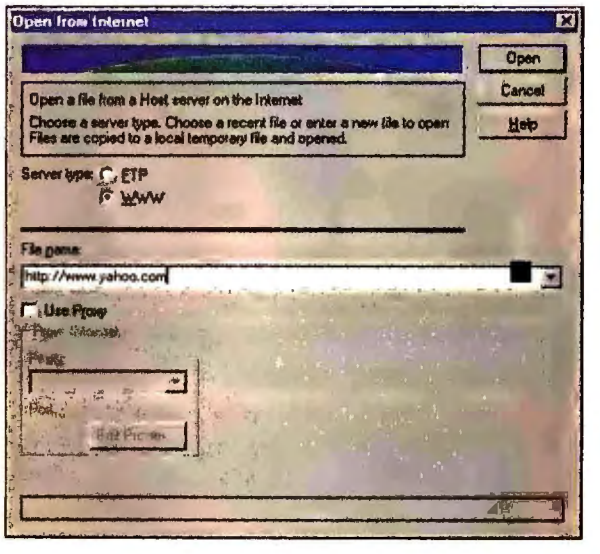
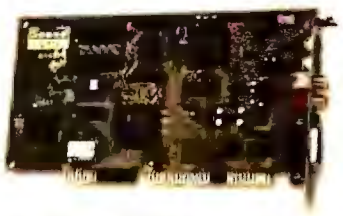


FIGURE 2: GET DATA FROM ANY WEB PAGE while you're in Word Pro 96.

Word Processing *welcomes your questions and pays $50 for published items. Contributing Editor George Campbell is a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

AWE 64

Reasons To Upgrade Your Multimedia PC



Introducing the new Sound Blaster® AWE64 Gold, the uncompromised pursuit of perfect fidelity.

- Incredibly smooth, expressive and realistic audio with 64 voices of advanced WavEffects™ and WaveGuide Synthesis.
- Professional sound editing and sequencing software included.
- 20-bit S/PDIF digital output.
- 120dB dynamic range.
- 4MB onboard RAM for high quality SoundFonts™ and 3D Positional Audio.
- Ultra high-performance, low-noise, CD-quality record and playback.
- Definitive upgrade for your PC's multimedia audio system.

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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).
10. Not your grandmother's sound card.
11. 120dB signal-noise ratio (digital).
12. SoundFont technology.
13. Yelling, shoving as over 30 million Sound Blaster users all upgrade at once.
14. E-mu® 3D Positional Audio.
15. 4MB of RAM, upgradable to 28MB.
16. Multipoint interpolation.
17. New WaveGuide Technology.
18. The best sounding Sound Blaster ever.
19. Creative WebPhone™ software.
20. Supported by 99% applications.
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22. CD-quality, 16-bit audio fidelity.
23. Genuine Sound Blaster.
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25. 8/16 bit stereo sampling from 5kHz to 44.1kHz.
26. MIDI cable.
27. Recording from microphone, CD or line-in.
28. Liquid, psychedelic guitar solos.
29. Advanced 16-bit real-time audio compression.
30. Crystal clear recordings.
31. Gold RCA connectors.
32. Completely user customizable.
33. Automatic dynamic filtering.
34. Instant bass, treble, master volume control.
35. 2, 3.5 and 4MB SoundFont banks.
36. Two CD audio-in connectors.
37. Awesome audio.
38. Powerful percussions.
39. Superior strings.
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42. Microsoft® NetMeeting software.
43. Rockin' guitar riffs.
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46. Screams from Eradicator™ software.
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49. Creative 3D Copter software.
50. Total harmonic distortion (0.01).
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52. Lilting Irish tenor.
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55. Creative WaveStudio® software.
56. Cool samples included.
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58. Direct sound hardware acceleration.
59. Vienna SoundFont Studio™ software.
60. Direct sound 3D hardware acceleration.
61. 32-level control for mixing recordings.
62. Talk over the Internet in real time.
63. 32-level control for mixing output.
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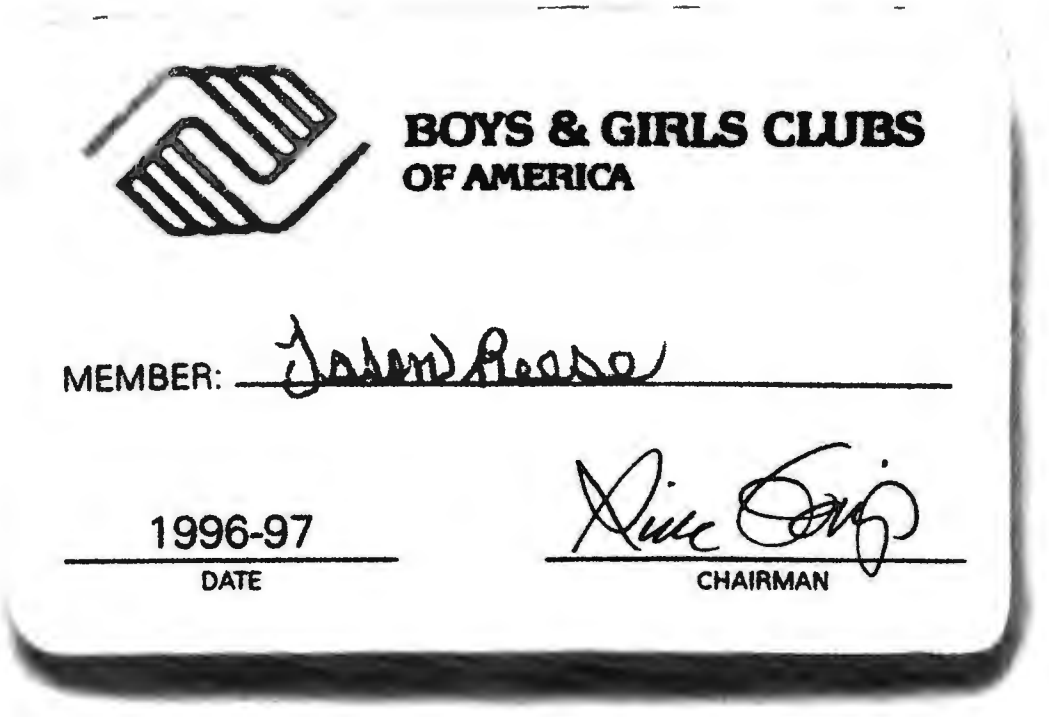

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DELL POWEREDGE 2100 SERVER

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- 256KB Integrated L2 Cache
- Integrated PCI Ultra-Wide SCSI-3 Controller
- *NEW* 9GB Ultra-Wide SCSI-3 Hard Drive [7200RPM, 8ms] (27GB Max.)
- 8X SCSI CD-ROM Drive
- 3Com 10/100 PCI Ethernet Adapter
- 3Com OfficeConnect Hub 8/TPC
- Microsoft Windows NT Server 4.0
- Intel LANDesk Server Manager v2.5x
- *NEW* Dell Server Assistant CD-ROM
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- Intel LANDesk Server Manager v2.5x
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Publish Access 97 Data to the Web

ACCESS 97 CONTAINS built-in HTML Templates and a Publish to the Web Wizard that help you publish a snapshot of your database on the Web. You can also set up a dynamic Web publication that shows the most current data. We don't have room to cover all that, so we'll stick to the fundamentals. You'll learn how to create a simple, static Web page; add graphics; and view the results.

Before we start, here are a few basics. The Publish to the Web Wizard creates Web pages with the .html file extension. It uses HTML templates, stored in .htm files, that determine which graphics are part of a Web page, whether the pages have numbers, and other options. Access 97 also includes several HTML templates with different background graphics.

To publish your database table directly to the Internet, you must do two things. First, install the Web Post Wizard, which you'll find in the Value Pack that comes with Office 97. Then install Microsoft Explorer (if it's not already installed) and fire it up. You can also use Netscape Navigator.

CREATE A NO-FRILLS WEB PAGE

1. SELECT *File•Save as HTML* from the Access menu to start the Publish to the Web Wizard. Click *Next* in the first step.
2. To select an object, click the check box that precedes its icon and name. Click *Next* to go to the next step. For this example, we chose a single table called Classes (shown in **FIGURE 1**), but you can select as many objects as you like. The wizard turns each database, form, or page of a report into a separate Web page.

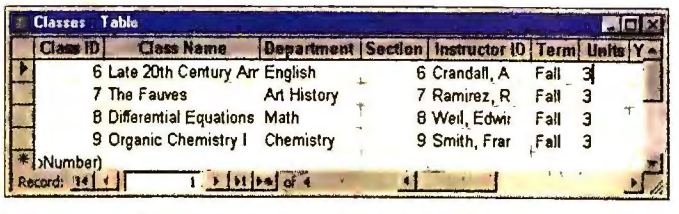

FIGURE 1: TURN THIS TABLE INTO A WEB PAGE with the Publish to the Web Wizard in Access 97.

3. Click *Next* in the next wizard step without entering the name of an HTML document as a template. This will give you a default page with a gray background.
4. Leave *Static HTML* selected and click the *Next* button.
5. Enter the name of the folder where you want to place the HTML file. If you want to create the publication on a local drive and copy it to a Web server later, choose a folder like C:\My Documents. To create a new folder on the fly, click *Browse*, then click *Create New Folder* in the 'Choose a directory' dialog box. After you specify a folder, click *Finish*. To publish to an Internet server, check one of the options for the Web Post Wizard before you click *Finish*. The Web Post Wizard copies all the files in the publication folder to an Internet server in case the pages reference graphics or other files, so use a folder reserved for the publication.

ADD A BACKGROUND TO YOUR PAGE

THE WEB PAGE C:\SkyClasses\Classes_1.html is shown in **FIGURE 2**. It was created by the Publish to the Web Wizard and has a blue sky background. To add a graphic to your page, follow these steps:

1. Create a new folder to hold your publication. In Figure 2, for example, we used the folder C:\SkyClasses.
2. Copy any graphics files you want to include in your publication to the folder you created in step 1. The Web page in Figure 2 includes a graphic called msaccess.jpg, copied from C:\Program Files\MS Office\Templates\Access to C:\SkyClasses.
3. Choose *File•Save as HTML* from the Access menus. Click *Next* in the first step of the Publish to the Web Wizard, then continue as in steps 2, 3, 4, and 5 in the previous section, with one exception. In step 3, you must enter the name of an HTML template: Click *Browse* and select *Sky.htm* (or whatever template you want to try). By default, Access looks in the directory C:\Program Files\MS Office\Templates\Access for HTML templates. You can create your own templates, but if you are a beginning Access user, you'll find the going easier if you modify one of the built-in templates instead.
4. When you're asked what folder to publish to, specify the folder you selected in step 1. Also, choose one of the Web Post options if you are publishing directly to a Web server. Then click *Finish*.

VIEW YOUR PAGE IN ACCESS

1. IF THE WEB TOOLBAR isn't already visible, right-click the background of any Access toolbar and select *Web*.
2. In the drop-down box on the right side of the Web toolbar, type the name of the Web page that you want to view and then press **<Enter>**. The page shown in Figure 2 is C:\SkyClasses\Classes_1.html. (If you viewed the page recently, you can select it by using the drop-down menu.) If you aren't sure what the page is called, click *Go* on the Web toolbar, choose *Open*, and click the *Browse* button in the Open Internet Address dialog box. Then you can use the Browse dialog box to locate the page that you want to view.

FIGURE 2: USE A BUILT-IN TEMPLATE like Sky.htm to give a Web page a custom background.

Database Tips *welcomes your questions and tips and pays $50 for published items.* PC World *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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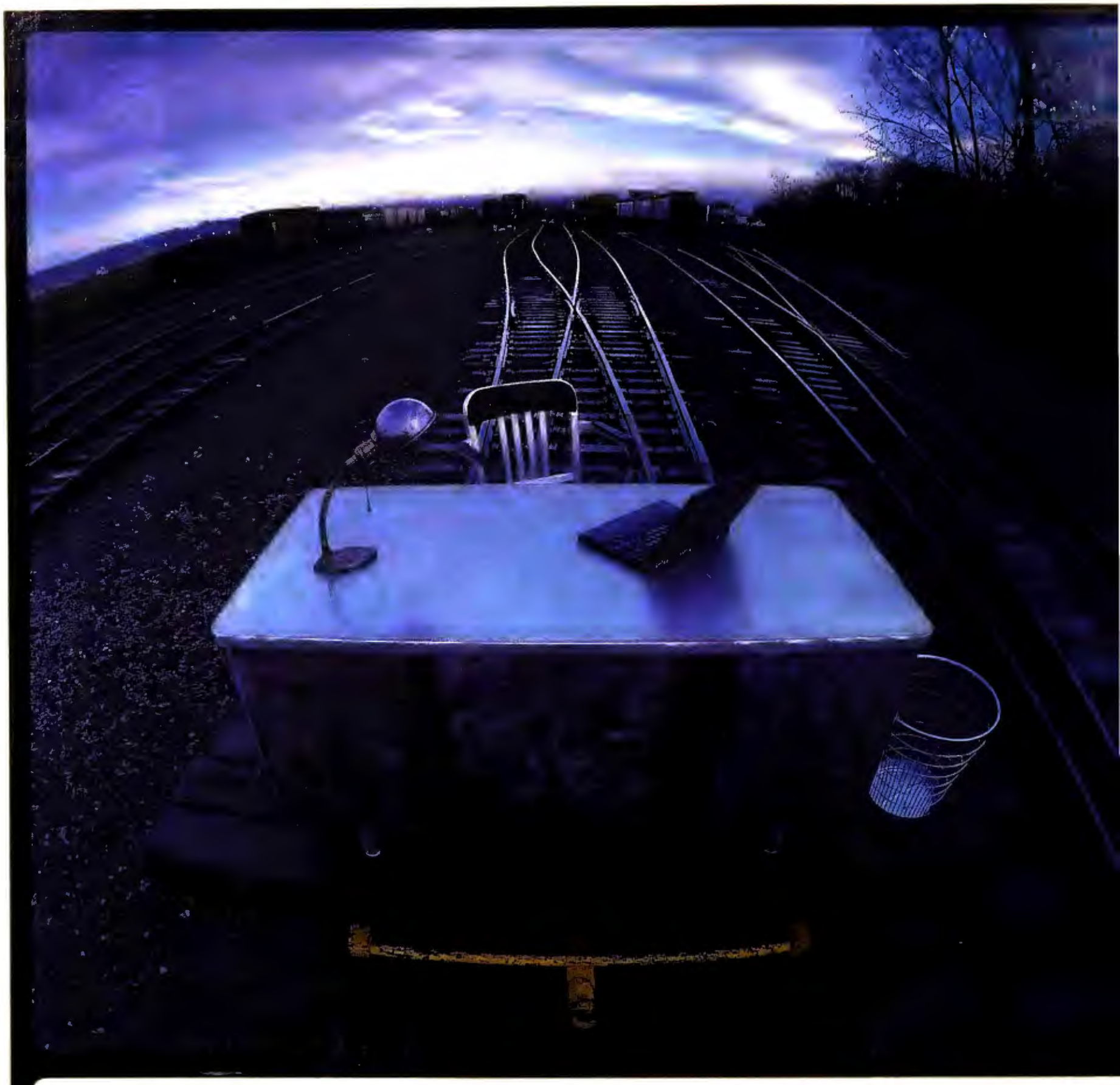

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Tap into AOL via an ISP ◆ Upgrade Netscape Navigator ◆ Retrieve Weather from the Net

Cruise the I-Way in Your Old Computer

CAN YOU ACCESS the Internet with the old PCjr or 286 DOS clunker in your basement? Yes, you can get onto the Internet with any computer that you can plug a modem into.

If you just want to send e-mail over the Internet (face it, that's all many people do), get yourself an old-fashioned communications program like Procomm Plus, plug a modem into the phone jack, and you can be tête-à-têteing with anyone on the Internet in minutes. Make the link by signing up with an Internet service provider or a commercial service like CompuServe that lets you dial in with a general communications program.

Whether you're able to connect to a service like America Online, which requires you to call in with fancy software, or access the splashy graphics of the World Wide Web depends on your computer's vintage—and how much fiddling you're willing to do. But even if your computer isn't new enough to give you Internet graphics and sound, you have many ways to search for information and retrieve it with that old PC. Here's what you can do with some venerable hardware and software.

386 with Windows. To view the Web in Technicolor, you need at least a 386 PC with 4MB of memory and a VGA monitor. It should be running Windows 3.1 in Enhanced mode. Ideally, you should have at least a 14.4-kbps modem—otherwise graphics downloads will creep. These are the minimum requirements for using a Web browser like Mosaic or Netscape, and for tapping into the Net through America Online, CompuServe, or Prodigy. (Tip: If you have a 386 or 286 PC, give it a 16550x UART chip if it doesn't have one already. Either buy the chip itself and slip it into the socket on the motherboard, or purchase a high-speed serial card such as the Hayes ESP. This will speed up your communications significantly.)

386 without Windows. Even without Windows, you can get Web graphics on your DOS 386 PC, but not as many as if you were running Windows, and they don't appear as rapidly. You need a DOS-based Web browser; several are available as shareware and freeware.

The popular $50 shareware browser Minuet from the University of Minnesota is an integrated Internet package for older computers (see **FIGURE 1**). It requires at least 512K of memory, DOS 2.1, and a hard disk. Its Web browser is text based but can display GIFs and JPEGs on a 386 PC with VGA or better graphics. You can't, however, click on the images and link to other pages. Minuet also offers e-mail, Gopher, telnet, FTP, and Usenet news. Its default is a SLIP connection; these days, most Internet services use PPP connections. You can configure Minuet to run on a PPP connection, but not without glitches. Check the following Minuet distribution sites (but note that not all of them work regularly): http://www.cesnet.cz/pub/gopher/minnesota/minuet/, or ftp://minuet.micro.umn.edu/pub/minuet/latest/minuarc.exe, or http://www.cren.net/.www/minuet/overview.html.

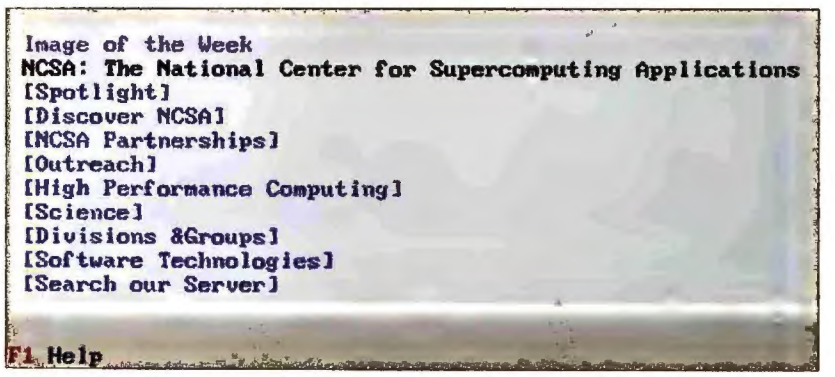

FIGURE 1: WITH THE MINUET SHAREWARE BROWSER, even an old 386 computer without Windows can get onto the Web.

286 or 8086. The text-based Web browser DOSLynx works on computers as old as 8086s with 512K of RAM, DOS 3.0 or later, and a monochrome monitor. (Sorry folks, it doesn't work on a PCjr.) You can download this freeware from http://lynx.browser.org/. It works with both SLIP and PPP connections, but you need to download the appropriate driver for the type of connection you have (ftp://ftp2.cc.ukans.edu/pub/WWW/DosLynx/support/). You also must download a dialer or use a terminal program to call your Internet service, and you have to learn the commands to get into SLIP or PPP mode. After that you exit the dialing program, load the SLIP or PPP driver, and fire up DOSLynx.

The $35 shareware program Net-Tamer (http://people.delphi.com/davidcolston/) automates access to the Web from PCs as old as a 286 XT with a Hercules graphics card. It offers e-mail, FTP, telnet, and a Web browser. Net-Tamer displays graphics only on a 386 machine or better, and it supports only PPP connections.

Other Internet utilities such as mail and FTP programs are available in DOS flavors for older PCs. To find them and to get more information about accessing the Net with a clunker, head to The DOS User's Guide to the Internet (http://www.palms.4kz.com.au/dos.html), run by Nigel Gorry in Queensland, Australia.

Finally, consider tapping into the Net via a UNIX shell account with an Internet service. Dial your Internet service with an old-fashioned communications program like Procomm Plus, and log in just as you would to a computer bulletin board. Once the connection is made, you type in Internet commands to download files from other computers via FTP, travel to other computers via telnet, and retrieve e-mail and read Usenet messages. This is the way computer users surfed the Net in the years before Web browsers. In fact, this is the way many Internet old-timers still cruise the Web, insisting that the ▶

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browser graphics are just eye candy and that these old-fashioned connections are much faster than working through the latest Web browsers anyhow.

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READER SERVICE NO. 606

SPEED UP AOL BY LOGGING IN THROUGH THE NET

ARE YOU FED UP with getting a busy signal whenever you call AOL in the evening? Or are you paying through the teeth to call AOL long-distance because the company doesn't have a local number in your community? If you have an account with another Internet service provider, try tapping into AOL through the Net instead. By making a Net connection, you can also get a faster connect speed to AOL than you can by dialing up AOL directly.

On the AOL Welcome screen, click the *Setup* button. In the dialog box, click the *Edit Location* box. In the Network edit boxes on either side of the next dialog box, enter **TCP/IP** and pick the highest possible modem speed—*57.6 kbps*. Click *Save*, then fire up your Internet dialer and log in to your Internet service. Once you're connected to the Net, load your AOL software. Type your password, click the *Sign On* button, and you're online.

WEATHER FORECASTS FROM THE NET

TIRED OF FLIPPING to the Weather Channel to snag the report for the city you're flying to? Get a copy of the $19.95 shareware program WinWeather from Insanely Great Software by downloading it from the company's Web site (http://www. igsnet.com/igs) or by calling 908/548-5107. Keep it loaded on Windows' desktop, and click its *Refresh* button whenever you want to check the weather outlook for a particular city.

WinWeather retrieves weather data, forecasts, and maps and displays them on your screen. It also dials the Net and downloads the current temperature, forecast, and even weather maps—both ground and satellite. Click the *Fct...* button next to each city for an extended forecast (see **FIGURE 2**).

WinWeather is available for Windows 95 and Windows 3.1 on PC World Online (http://www .pcworld.com/software_lib/).

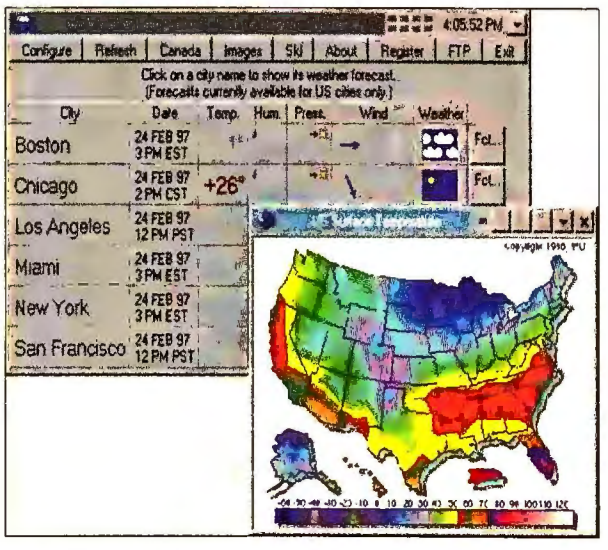


FIGURE 2: WINWEATHER lets you check forecasts, satellite pictures, and ski reports.

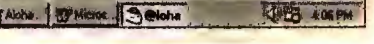
UNINSTALL NAVIGATOR IN WIN 95? YOU CAN'T

YOU DID EVERYTHING you were supposed to. You downloaded the latest version of Navigator from the Netscape Web site. You installed the program according to instructions. It worked fine. Then you uninstalled your old version of Navigator, and *everything* stopped working. Your new version of Navigator wouldn't work. If you had other browsers, none of those would work either.

Is there an easy way to straighten out the mess? Netscape's tech support says no. The only solution is to reinstall the new version of Navigator and anything else that's not working. The problem: Navigator uses files in Windows 95's Registry that other Internet browsers need. When you uninstall Netscape, it purges those files. Yes, that's a pretty crummy thing to do—Navigator not only disables its new version, it also destroys any other Web browsers you installed.

GENERATE QUICK WEB PAGES WITH AN HTML PRINTER DRIVER

TURN YOUR FAVORITE word processor into a quick-and-dirty HTML page generator with Microsoft's free HTML Printer Driver for Windows 95. HTML Printer Driver will take a document created in your word processor and save it to disk as an HTML file, complete with its original font size and all the formatting. You'll find the driver on PC World Online (http:// www.pcworld.com/software_lib/). The HTML Printer Driver works with the majority of text-based applications, although it does not work with drawing programs such as CorelDraw. It can even turn bit maps embedded in a document into JPEG files.



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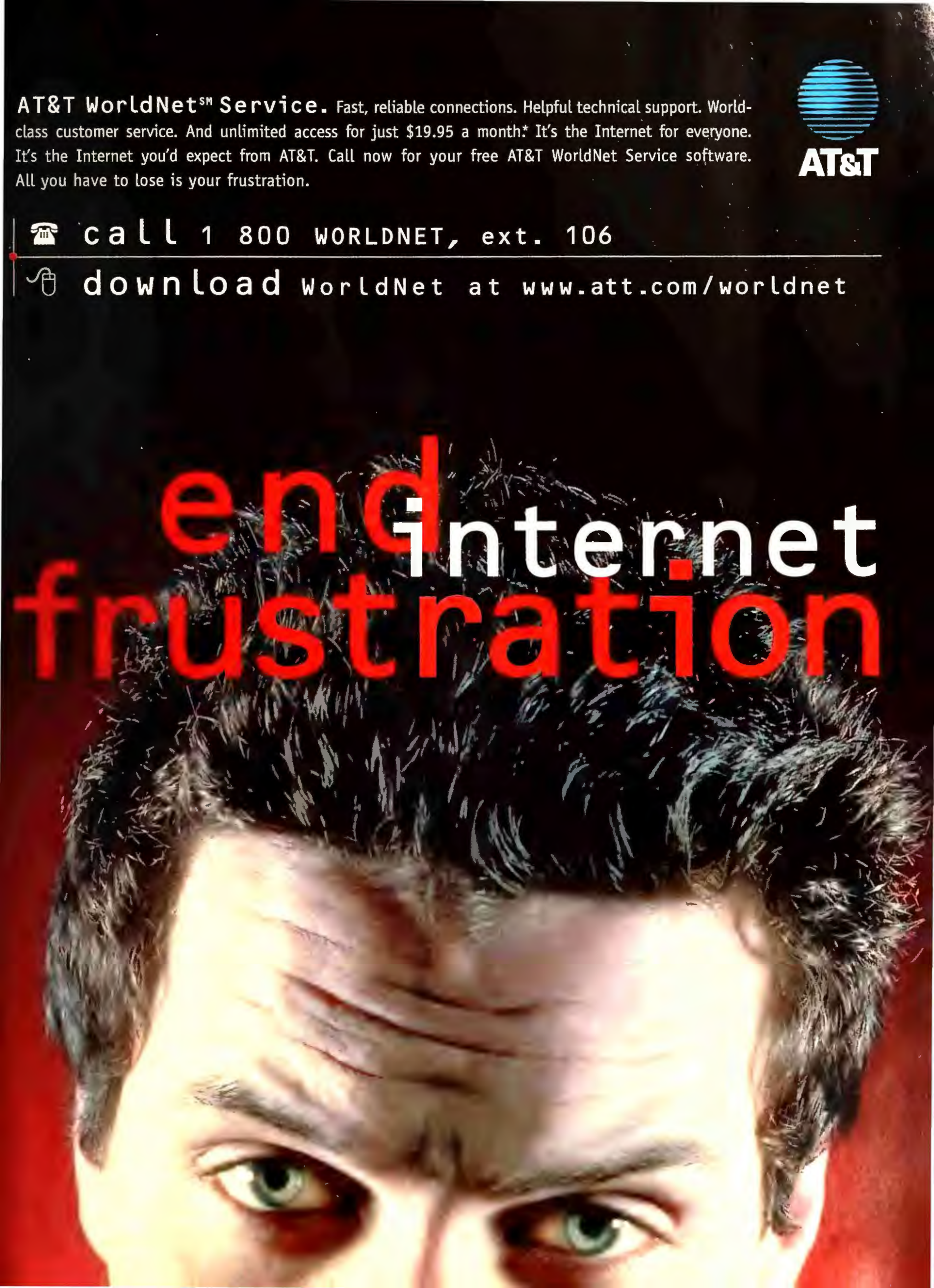

Surviving Your Crash Test

YOU TAKE THAT FIRST sip of coffee, turn your computer on, and...it freezes. Have you lost your hard disk, or is this just an easily remedied glitch? Here's what to do.

Don't panic. You may have lost your hard disk and everything on it, but you probably haven't. Western Digital claims that its current line of hard disks will run an average of 34 years. You can take that claim with a grain of salt, but take some reassurance from it, too, at least for now.

Turn your computer off. Wait 10 seconds, and then turn it back on. This gives the computer a chance to completely reset itself. If the problem recurs...

Check the obvious. Examine the cables, connectors, and power cords to make sure they're seated properly. Confirm that the monitor is on and that the contrast and brightness aren't turned down. Make sure your surge protector is on and hasn't blown a fuse. Loose connections inside the computer are another possible source of trouble, but before popping the cover...

Look for clues. As your computer starts up, it runs a Power-On Self Test (or POST) that checks many of its essential hardware elements to confirm their presence and functionality. The results are usually displayed on the monitor (if these move too quickly, press **<Pause>** to freeze the screen). A faulty memory chip, for example, generates a message like '201 Memory Error' and halts the start-up process.

Some BIOSes denote errors by a series of beeps; some give you a number. Ask your PC or BIOS vendor for an interpretation.

POST also confirms the presence of components like the hard disk, floppy drive, and CPU. If you get past POST without locking up, and you see the 'Starting Windows 95' message, your hard disk is at least partially working. If the system freezes while executing config.sys or autoexec.bat, you may have a hardware configuration problem. Look for error messages by pressing **<F8>** after you see 'Starting Windows 95', and then execute each command in these two files.

If instead of 'Starting Windows 95' you get a 'Boot disk failure' or 'Operating system not found' error, your PC can't load Win 95 from the hard disk. This may indicate a seriously damaged drive.

Boot from a floppy. This bypasses the hard disk and confirms your computer's basic operation. First, pull out the Windows 95 Startup Disk you made when you installed Windows 95. Or find a working Win 95 system, insert a blank floppy disk, click *Add/Remove Programs* in the Control Panel, click the *Startup Disk* tab, and click *Create Disk* to make a new one.

Insert the Startup Disk and restart your computer. If it successfully starts and displays an A:> prompt, your basic hardware is okay. Type **C:**, press **<Enter>**, and try to read the disk. If you get a C:> prompt, change directories and copy a file to the floppy. If you can, back up your files, then run a diagnostic program such as Norton Disk Doctor (part of Norton Utilities for Windows 95 from Symantec, $79).

If, on the other hand, you get an error like 'Drive C: not found', then...

Check your CMOS settings. Sometimes CMOS settings get lost (usually when the battery supporting CMOS memory fails), then the computer can't recognize the hard disk. To correct this, press **<Delete>** or **<F1>** while your PC is booting up to get into the CMOS setup program. If no disk is listed, that's your problem.

If you have a recent BIOS, it may offer a utility that detects and installs the proper settings for your hard disk. If not, you can enter them yourself, but it's tricky. Write down the correct settings; you may find some listed on a label on the hard disk. If the drive is larger than 528MB, you'll have to alter the parameters. Call the drive maker's tech support line for help.

Save your corrections and exit the setup program. The system should reboot and recognize the hard drive.

If your CMOS battery is dead, you may be able to get a replacement from your motherboard or system vendor. The batteries usually cost less than $60.

Find additional tips at http://www.pcworld.com/hereshow. Hardware Tips *welcomes your questions and tips and pays $50 for published items. Kirk Steers is a* PC World *contributing editor.* *See page 14 for contact information.* ■

Decoding Start-Up Errors

As your computer starts up, it self-tests much of the essential hardware to confirm its presence, and then posts results on screen. Here are some of the more dreaded messages that may appear.

When it says...	You've got trouble with your...
162, 173 CMOS Battery State Low CMOS Checksum Failure CMOS Display Type Mismatch CMOS Memory Size Mismatch CMOS Time and Date Not Set	CMOS setup
2*xx* Parity Error Refresh Failure Timer Not Operational	main memory
Error Gate A20 KB/Interface Error	keyboard
Diskette Boot Failure Invalid Boot Diskette	floppy disk
17*xx*, 104*xx* C: Drive Failure File Allocation Table Bad General Failure Reading Drive C: HDD Controller Failure Read/Write Error Reading Drive C:	hard drive
24*xx* Display Memory Read/Write Error	graphics card

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Control Music CDs With a Single Click

WHEN THE PHONE RINGS or someone enters your office, how many mouse clicks does it take you to pause a music CD in your CD-ROM drive? If it's more than one, you're not using FlexiCD, a handy Windows 95/NT program that's one of Microsoft's unsupported but free gotta-have PowerToys utilities.

FlexiCD adds a CD icon to the right end of the Windows 95 Taskbar. The icon serves as a shortcut for playing music CDs. Left-click the icon to play and pause a CD, or right-click it for a pop-up list of options including Next Track, Track List, and CD Properties (see **FIGURE 1**).

FlexiCD is available on PC World Online (http://www.pcworld.com/software_lib/). Create a folder called PowerToys on your Windows desktop and click the link on the Web page to download the file named flexi_cd.exe into it. Open the PowerToys folder on your desktop and double-click *flexi_cd.exe* to extract the other files. Then right-click *Flexicd.inf* and select *Install* from the pop-up menu.

You may see a crotchety error message that tells you to insert a FlexiCD disk. Click *OK* to clear the error box, click the *Browse* button in the Copying Files box, specify where the FlexiCD.exe file is, and click *OK* twice to finish the installation.

FlexiCD is added to your Windows Startup group. The next time you launch Windows, the FlexiCD icon should appear in the Taskbar. Now you can use FlexiCD to instantly pause that Blind Melon jam or Pavarotti aria just before the boss arrives.

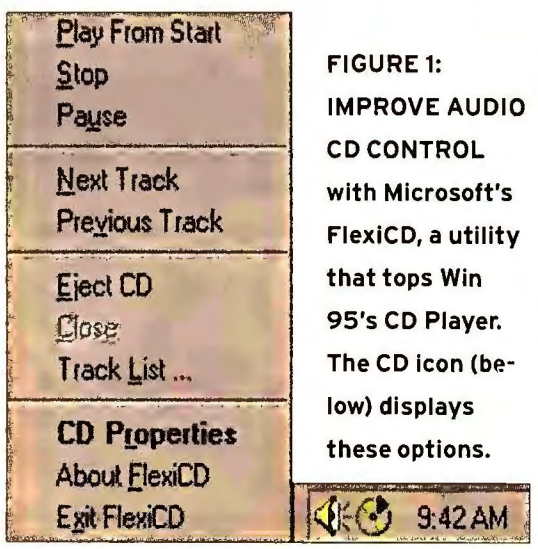

FIGURE 1: IMPROVE AUDIO CD CONTROL with Microsoft's FlexiCD, a utility that tops Win 95's CD Player. The CD icon (below) displays these options.

If you want all the PowerToys utilities—and why not?—download the file powertoy.exe when you visit *PC World*'s software page.

WATCH GOOD-TIME MOVIES IN QUICKTIME

SOME 20,000 WEB SITES now offer QuickTime content, including video, audio, 3-D animation, and virtual reality. If you haven't visited any of the hottest QuickTime sites, you're missing out on some cool multimedia action.

Depending on the Web browser and plug-ins you use, you may already be able to enjoy the benefits of streaming video, audio, and animation provided by the latest QuickTime for Windows software. The Windows 95 versions of Netscape Communicator 1.0, Netscape Navigator 3.*x*, and Internet Explorer 3.*x* all come bundled with plug-ins that support QuickTime content. Check Apple's QuickTime Web site (http://quicktime.apple.com) to make sure you have the latest of these plug-ins.

For example, the new QuickTime VR (Virtual Reality) for Windows software lets you view and navigate in 3-D and photorealistic environments on the Internet. Another application is QuickTime Movie Player, which is helpful if you prefer downloading and saving QuickTime movies (.mov files) for viewing offline.

To find some of the best QuickTime sites, you need look no further than the Apple QuickTime Samples page (http://quicktime.apple.com/sam/). There you'll find links to a constellation of QuickTime movie clips, music, and animation from major studios including Disney, Paramount Pictures, Sony Pictures Entertainment, Twentieth Century Fox, and Warner Brothers.

One of the most interesting places for finding unique QuickTime movies is CNN Interactive's Video Vault (http://www.cnn.com/video_vault/index.htm), a collection of video clips ranging from the nutty to the newsworthy, covering everything from politics, sports, and entertainment to "implosions, explosions, and crashes"—the kind of scenes you wish you had videotaped when you first saw them on television. Now, instead of cursing yourself for not having a blank videotape handy, you can go on the Internet and download many of those news clips as QuickTime movies (see **FIGURE 2**).

FIGURE 2: DOWNLOAD QUICKTIME MOVIE CLIPS (shown here as separate clips in QuickTime Movie Player) at CNN Interactive's VideoVault Web site.

TRACK DOWN ENHANCED CDS

SEVERAL MAJOR MUSIC outlets, including Tower Records, carry Enhanced CDs—audio CDs with bonus multimedia tracks. If you can't find these discs in a local music store, go shopping on the Internet. Check out the Enhanced CD Database (http://www.musicfan.com/ecd/index.html) for a comprehensive list of ECD music categories.

Find files from this article at http://www.pcworld.com/software_lib/. 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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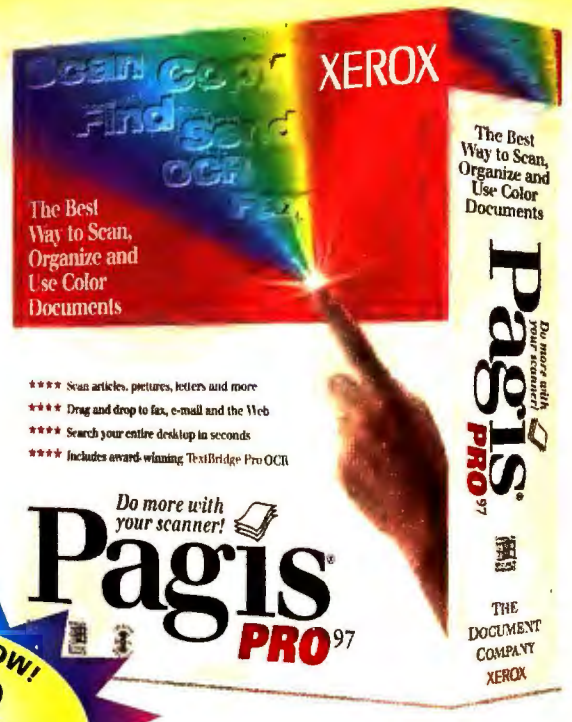

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Add Windows NT to a Windows 95 PC

ONE DAY YOU'LL PROBABLY run Windows NT. After all, NT is far more crash-proof than Windows 95, it's better designed for the latest processors, and it offers the same user interface. NT's hardware requirements are not much greater than Windows 95's and should be met by any business PC you buy today, except that you'll want a minimum of 32MB of memory. (For more pros and cons, see "War of the Windows: NT 4.0 vs. 95," January.)

Be warned, though, that while you can install NT 4.0 on your Windows 95 PC and set up a dual-boot configuration, NT won't pick up any settings or applications from your existing Windows 95 installation—you'll have to reinstall every program you want to run under NT—and it doesn't support Plug and Play hardware.

Here's an overview of setting up a dual-boot 95/NT system. Another caveat: Read each screen closely. If you're not careful, you could wipe out your 95 installation. For more information, check PC World Online (http://www.pcworld.com/hereshow).

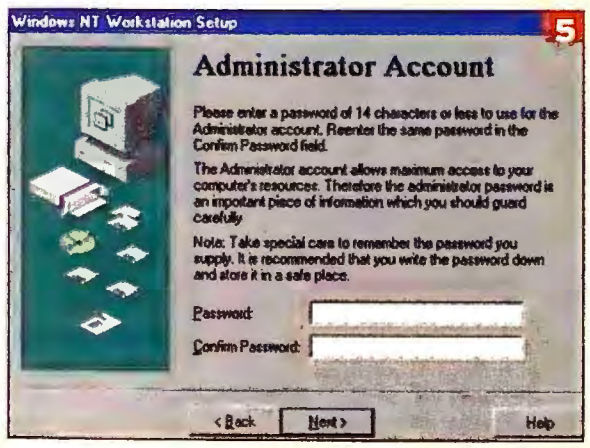
Stan Miastkowski is a PC World *contributing editor.*

Gather the drivers. Make sure NT 4.0 drivers are available for your hardware. The Hardware Compatibility List book that comes with NT tells you whether you need to get a driver from the maker or from Microsoft (http://www.microsoft.com/ntwkssupport/default-sl.htm). Do a full backup before you start, and be sure you have at least 150MB of free disk space.

Start the installation. Insert the NT CD-ROM and boot your PC from the Setup Disk 1 floppy. You may be asked to insert other installation floppies. Eventually, you'll see the Welcome screen. (Note the R option, which lets you start over if things go wrong and you need to try again from scratch.) Press <Enter> to continue.

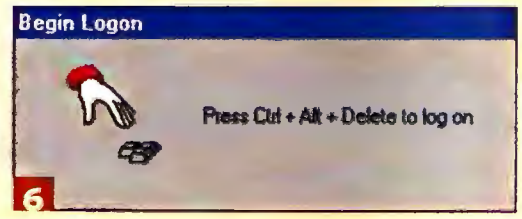
Watch the partitions. Read more screens. Let NT detect your hard disks, and confirm the obligatory license screen. Confirm the screen of system components that NT found. Read the partition screen carefully. To set up dual boot, press <Enter>. Warning: If you press <D> you'll wipe out your hard disk.

Choose your directory. When you see the File System screen, press <Enter> to leave the partition as is. (Changing it will wipe out your Windows 95 installation.) When NT asks you to select the directory to install in, choose the default \WINNT. (Don't change it to \WINDOWS!) Let NT do an exhaustive hard disk analysis. After the initial files are copied, remove the floppy disk and CD-ROM, and press <Enter> to restart.



Observe NT conventions. At this point, the Windows NT installation will look a lot like its Windows 95 counterpart, with a few crucial differences. Carefully read each screen that appears. Make sure you create an Emergency Disk. Take special note of the Administrator Account screen shown here. Don't forget your password! Windows NT isn't a Plug and Play operating system, so it probably won't recognize your graphics card or install the drivers. (For more on this, see step 6.) Eventually, you'll be instructed to restart your computer.

Add the missing drivers. Press <Ctrl>-<Alt>-<Delete> (this is how you log in to Windows NT). Enter your password when the prompt appears, and NT should start up. If everything appears to be working correctly, install the correct drivers for your video card, sound card, and other peripherals. Windows NT's driver installation procedures are similar but not identical to Windows 95's. Refer to NT's extensive integrated on-screen help for guidance on the installation of each driver.



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800CS, P100, 16MB, 810MB, 10" DS. $2399
800CT, P133, 16MB, 1.35GB, 10.4" Act. $3349

IBM ThinkPad
365XD, P100, 10.4" DS, 810MB, 4XCD $1999
365X, P133, 11.3" Act., 1.0GB $1899
365X, P120, 10.4"Act., 810MB $1799
760EL, P133, 12.1" Act., 2.18GB $4759
760E, P150, 12.1" Act., 1.26GB $5429
760ED, P133, 12.1" Act., 2.1GB, 6XCD $5699

AST Acentia Series
J30, P100, 10.4" DS, 800MB, 14.4 ..... $1705
J30, P100, 10.4" Act., 810MB $1722
J50, P133, 10.4" Act., 810MB $2118
P30, P100, 11.3" DS, 810MB, 4X CD $1989
P30, P100, 11.3" DS, 1.2GB, 4X CD $2226
P50, P133, 11.3" Act., 800MB, 4X CD $3221
P50, P133, 11.3" Act., 1.2GB, 4X CD $3458
P50, P133, 12.1" Act., 1.0GB, 6X CD $3694
P50, P133, 12.1" Act., 2.1GB, 6X CD $4074
A41, P120, 11.3" DS, 1.08GB, 6X CD $2149
A41, P120, 12.1" Act, 1.08GB, 6X CD $2704

HITACHI M & E Series
M 120T, P120, 11.8" Act., 1GB, 4X CD $2999
E 133T, P133, 11.3"Act., 1GB. $1999

TEXAS INSTRUMENTS
Extensa 600 P120, 12.1" DS, 810MB, 6X CD $1799
Extensa 650CDT P133, 11.3" Act, 2.1GB, 10X CD $2899
Extensa 650CD P133, 12.1" DS, 1.44GB, 10X CD $2399
TM 6020, P120, 11.3" Act., 1.08GB $2689

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TM 6050, P150, 12.1" Act., 1.35GB $3649
TM 6160, P166 w/MMX, 12.1" Act., 2.1GB. $4465

COMPAQ Armada & LTE Series
Armada 1120, P100, 10.4"DS, 810MB $1299
Armada 1120T, P100, 10.4"Act, 810MB $1765
Armada 4110, P100, 11.3"DS, 810MB $1599
Armada 4110D, P100, 11.3"DS, 810MB, CD $1899
Armada 4120, P120, 11.3"DS, 1.08GB $1999
Armada 4120T, P120, 11.8"Act, 1.08GB $2799
Armada 4130T, P100, 11.8"Act, 1.08GB $2999
LTE 5250, P120, 10.4"Act, 810MB $3129
LTE 5280, P120, 11.3"Act, 1.3GB $3829
LTE 5300, P133, 12.1"Act, 1.3GB $4279
LTE 5380, P133, 12.1"Act, 2.16GB $4999

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- 11.3" and 12.1" Super VGA displays

PC MAGAZINE EDITORS' CHOICE

Model	CPU	Screen	RAM/HD	CD	Price
760EL	133MHz	12.1" Active	16MB/2.1GB	Opt.	$4999
760ED	133MHz	12.1" Active	16MB/1.2GB	4X	5399
760E	150MHz	12.1" Active	16MB/2.1GB	Opt.	4999
760ED	133MHz	12.1" Active	16MB/2.1GB	6X	5399

ThinkPad® 365XD

ThinkPad® 365X as low as $1899
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5-Year TAP Warranty... $299.97

ThinkPad® 365X & XD

- Up to Pentium 133MHz processors
- Up to 6X CD-ROM drive on 365XD
- 10.4" & 11.3" SVGA displays
- 16-bit sound, speakers and microphone
- Infrared port for wireless communications
- External floppy drive on 365XD

Call about 4.1 lb ThinkPad 560 models

Model	CPU	Screen	RAM/HD	CD	Price
365X	133MHz	11.3" Dual Scan	8MB/1.1GB	Opt.	$1899
365XD	120MHz	10.4" Active	8MB/1.1GB	6X	2099
365XD	133MHz	11.3" Active	8MB/1.4GB	6X	2699

Additional models available. Call for details

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Model	CPU	Screen	RAM/HD	CD	Price
420CDS	100MHz	11.3" Dual Scan	8/772MB	6X	$1679
430CDS	120MHz	11.3" Dual Scan	16MB/1.2GB	10X	1969
420CDT	100MHz	11.3" Active	8MB/1.2GB	6X	2449
430CDT	120MHz	11.3" Active	16MB/1.2GB	10X	2699

MMX Models Available

Tecra 510

Call about 200, 660, 730 & 740 models

Tecra 500 & 510

- 120 & 133MHz processors
- Up to 10X CD-ROM drives on selected models
- 16MB EDO RAM memory
- 12.1" Super VGA displays

Tecra 500CS as low as $1799
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5-Year TAP Warranty... $299.97

Model	CPU	Screen	RAM/HD	CD	Price
500CS	120MHz	12.1" Dual Scan	16MB/1.3GB	Opt.	$1799
500CDT	120MHz	12.1" Active	16MB/1.3GB	6X	3449
510CDT	133MHz	12.1" Active	16MB/2.1GB	10X	4279

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Model	CPU	Screen	RAM/HD	CD	Price
420D	120MHz	11.3" Dual Scan	8/1.0GB	10X	$1799
520T	120MHz	11.3" Active	8/B10MB	6X	2499
530T	133MHz	11.3" Active	16MB/1.3GB	6X	2999 *
555Tx	150MHz MMX	12.1" Active	16MB/2.0GB	10X	3999 †

* Includes built-in 2B.B fax/modem † Includes 33.6 fax/madem

LifeBook™ 400 Notebook

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- Up to 33.6 fax modems

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5-Year TAP Warranty... $499.97

Model	CPU	Screen	RAM/HD	CD	Price
635T	133MHz	12.1" Active	16MB/1.3GB	Opt.	$3999
655Tx	150MHz MMX	12.1" Active	16MB/1.3GB	Opt.	4299

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5-Year TAP Warranty... $349.97

Model	CPU	Screen	RAM/HD	CD	Price
VP 560	133MHz	12.1" Dual Scan	16MB/1.4GB	12X	$2449
VP 565	133MHz	12.1" Active	16MB/1.4GB	12X	3299
VP 575	166MHz MMX	12.1" Active	16MB/2.1GB	12X	4399

HiNote VP 500

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Model	CPU	Screen	RAM/HD	CD	Price
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	$4499
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799*
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	4699**
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799

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Model	CPU	Screen	RAM/HD	CD	Price
1070	133MHz	12.1" Dual Scan	16MB/1.1GB	10X	$2899
10B0	166MHz MMX	12.1" Active	16MB/1.44GB	10X	4299

LTE 5000

Model	CPU	Screen	RAM/HD	CD	Price
5250	120MHz	10.4" Active	16/B10MB	Opt.	$2729
52B0	120MHz	11.3" Active	16MB/1.35GB	Opt.	3439
5300	133MHz	12.1" Active	16MB/1.35GB	Opt.	3859
53B0	133MHz	12.1" Active	16MB/2.2GB	Opt.	4159
5400	150MHz	12.1" Active	32MB/2.2GB	Opt.	4349

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Model	CPU	Screen	RAM/HD	CD	Price
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Model	CPU	Screen	RAM/HD	CD	Price
M120D	120MHz	11.3" Dual Scan	16MB/1.0GB	6X	$1999
MX133T	133MHz	12.1" Active	16MB/1.35GB	BX	3999
MMX166T	166 MHz MMX	12.1" Active	16MB/2.1GB	BX	5199

M120D as low as $1999
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Mx™ Series Notebook

NEC

6200MX

Model	CPU	Screen	RAM/HD	CD	Price
6200MX	166MHz MMX	13.3" Active	32MB/2.1GB	10X	$6399

6050

Model	CPU	Screen	RAM/HD	CD	Price
6050H	150MHz MMX	12.1" Active	16MB/1.4GB	10X	$4699
6050MX	150MHz MMX	12.1" Active	16MB/2.1GB	10X	5199

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5-Year TAP Warranty... $799.97

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Ascentia A

Model	CPU	Screen	RAM/HD	CD	Price
A41	120MHz	11.3" Dual Scan	16MB/1.0GB	6X	$1999
A42	120MHz	12.1" Active	16MB/1.0GB	6X	2499

Ascentia J

Model	CPU	Screen	RAM/HD	CD	Price
J55	133MHz	11.3" Active	16MB/1.0GB	Opt.	$2249

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Ascentia A

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WideNote

Model	CPU	Screen	RAM/HD	CD	Price
W100D	133MHz	11.2" Wide Dual Scan	16MB/1.1GB	Opt.	$2799
W100T	133MHz	11.2" SHA Wide Active	16MB/1.1GB	Opt.	3299

9300

Model	CPU	Screen	RAM/HD	CD	Price
9300D	150MHz	12.1" Dual Scan	16MB/1.4GB	10X	$2699
9300T	150MHz	11.3" Active "SHA"	16MB/1.4GB	10X	3199

9300D Only $2699
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Echos

Model	CPU	Screen	RAM/HD	CD	Price
Echos	100MHz	11.3" Dual Scan	8MB/1.3GB	6X	$1799
Echos	100MHz	10.4" Active	8MB/1.3GB	6X	2099
Pro	133MHz	12.1" Dual Scan	16MB/1.3GB	BX	2999
Pro	133MHz	12.1" Active	16MB/2GB	BX	3499
Pro	150MHz	12.1" Active	16MB/2GB	BX	3999

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HP OmniBook 800

Model	CPU	Screen	RAM/HD	CD	Price
800CS	100MHz	10.0" Dual Scan	16/810MB	Opt.	$2449
800CT	133MHz	10.4" Active	16MB/1.4GB	Opt.	3469

HP OmniBook 5500

Model	CPU	Screen	RAM/HD	CD	Price
5500CTS	120MHz	10.4" Active	16MB/1.35GB	Opt.	$2749
5500CTS	133MHz	12.1" Active	16MB/1.35GB	Opt.	3279
5500CTS	133MHz	12.1" Active	16MB/2GB	Opt.	3549

HP OmniBook 800 Notebook PC

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Additional 5500 models available. Call for details.

TEXAS INSTRUMENTS

Extensa 660

Model	CPU	Screen	RAM/HD	CD	Price
660CD	166MHz MMX	12.1" Dual Scan	16MB/1.35GB	10X	$3179
660CDT	166MHz MMX	11.3" Active	16MB/2.1GB	10X	3949

TravelMate 6000

Model	CPU	Screen	RAM/HD	CD	Price
6030	133MHz	12.1" Active	16MB/1.35GB	10X	$3399
6050	150MHz	12.1" Active	16MB/1.35GB	10X	3699
6160	166MHz MMX	12.1" Active	32MB/2.1GB	10X	4899

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Extensa 660CDT
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CBE	166MHz MMX	32MB/3.2GB	16X	$2149
C9E	200MHz MMX	32MB/3.2GB	16X	2299
SBC	166MHz MMX	32MB/3.2GB	16X	2349
S9C	200MHz MMX	32MB/4.2 GB	16X	2599

Aptiva Monitors

Model	Size	View	Resolution	Price
MM50	15"	13.7"	1024 x 76B	$499
MM70	17"	15.7"	1024 x 76B	799

IBM Aptiva S Multimedia

Monitors priced separately

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Presario Multimedia

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Model	CPU	RAM/HD	CD	Price
4764	166MHz MMX	24MB/2.5GB	16X	$1899
4770	200MHz MMX	32MB/3.BGB	16X	2299

Presario Monitors

Model	Size	View	Resolution	Price
Presario	14"	12.9"	1024 x 76B	$399
Presario	15"	13.5"	1024 x 76B	479
Presario	17"	15.6"	12B0 x 1024	749

33.6 SPEED DATA/FAX MODEM

16X CD-ROM

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HP Pavilion Multimedia

16X CD-ROM

Pavilion Multimedia

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Model	CPU	RAM/HD	CD	Price
7320	166MHz MMX	16MB/2.1GB	16X	$1799
7360	200MHz MMX	32MB/3.8GB	16X	2399*

* Price after manufacturer's rebate

Pavilion Monitors

Model	Size	View	Resolution	Price
Pavilion	15"	13.8"	1024 x 76B	$449
Pavilion	17"	15.7"	1024 x 76B	749

Monitors priced separately

TOSHIBA

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Model	CPU	RAM/HD	CD	Price
7130	133MHz	16MB/1.6GB	BX	$1299
7160	166MHz	16MB/2.1GB	8X	1599
7161	166MHz MMX	32MB/2.4GB	12X	1999
7200	200MHz	16MB/3.0GB	BX	2199
7201	200MHz MMX	32MB/.3.0GB	12X	2399

Infinia Monitors

Model	Size	View	Resolution	Price
Infinia	15"	13.7B"	12B0 x 1024	$459
Infinia	17"	16.23"	12B0 x 1024	759

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NEC

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- Tons of FREE software
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Model	CPU	RAM/HD	CD	Price
9710	166MHz MMX	16MB/2.1GB	BX	$1799
9712	166MHz MMX	32MB/3.2GB	16X	1999
9716	200MHz MMX	32MB/3.2GB	16X	2199

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NEC Ready Multimedia *Product differs slightly from photo*

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DX1795E

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KD-1730

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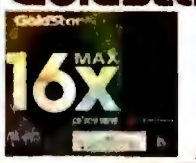

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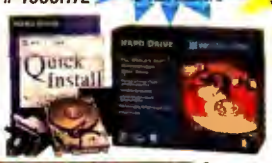

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Advantage Pro 486 SX33 SX25	4Meg/8Meg/16Meg/32Meg	23/49/109/186
Bravo LC	4Meg/8Meg/16Meg/32Meg	23/49/109/186
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Bravo MS	4Meg/8Meg/16Meg/32Meg	23/49/109/186
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Vectra VA 6/180, 6/200 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/99/199
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Aptiva C Series (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
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PC 330 Models 6571 6576	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 330 Model 6577 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 340 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 350 Model 6587 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
PC 360	4Meg/8Meg/16Meg/32Meg	39/59/109/199
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	39/59/109/199
PC 730 Model 6877 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
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PC 750 Model 6887 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/49/99/169
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PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	12/34
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	39/59/109/199
P/S 2, 555X, 65SX	4Meg	49
P/S 2, 53, 53LS, 56, 57	4Meg/8Meg	39/69
P/S 2, 95XP (ECC, pairs)	4Meg/8Meg	49/79
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Thinkpad 560	8Meg/16Meg/32Meg	69/139/389
Thinkpad 700, 720, 750, CL575X	4Meg/8Meg/16Meg/32Meg	39/79/159/268
Thinkpad 701, 701C	4Meg/8Meg/16Meg/32Meg	49/69/109/499
Thinkpad 730T, TE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 755C, CE, CD, CS	4Meg/8Meg/16Meg/32Meg	39/69/129/419
Thinkpad 760C, CD, L, LD	4Meg/8Meg/16Meg/32Meg	89/169/339
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Deskpro 3/25I, 33I, 4/25I5, 66I	2Meg/4Meg/8Meg	39/69/89
Deskpro 386, 486 M Series	2Meg/4Meg/8Meg	29/39/69
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Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Deskpro 575, 5120, 5133, 5150, 5160 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Deskpro 2000, 4000, 6000 Series (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Deskpro 5/60M 5/66M XE560 (quads)	2Meg/4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/239
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Presario 5538, 9232, 9234, 9240, 9250, 9260, 9642, 9660	1Meg Video	69
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Presario 833, 850, 860, 866	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Presario 5528, 7110, 7152	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Probant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Proxant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	39/64/119/239/599
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Prolinea (enhanced), MT	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 5100, 5120, 5133, 5150, 5166 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	69/119/239
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189

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Armada 1120, T	8Meg/16Meg/32Meg/64Meg	69/129/239/809
Armada 4100, 4110, 4120, 4130 (pairs)	8Meg/16Meg/32Meg	69/129/239
Concerto 4/25, 433	4Meg/8Meg/16Meg	49/79/139
Contura 4/25, C, CX	4Meg/8Meg/16Meg	49/79/139
Contura 400C, 400CX, 410C, 410CX	4Meg/8Meg/16Meg	49/79/139
Contura 420C, 420CX, 430C, 430CX	4Meg/8Meg/16Meg/24Meg	49/79/139/199
Contura Aero 4/25, 4/33	4Meg/8Meg/16Meg	39/79/109
LTE 5000, 5100, 5200, 5300, 5400	8Meg/16Meg/32Meg/64 Meg Kit	79/129/249/479
LTE Elite 440C, CX, 475CX	4Meg/8Meg/16Meg/24Meg	49/69/139/199
LTE Lite 4/25	4Meg/8Meg/16Meg	49/85/129
Presario 1000, 1010, 1020, 1030	8Meg/16Meg/32Meg	59/109/199

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Canon LBP 430	–	–	39	–	–	–	39	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	19	–	–	39	–	–	69	89	179
Canon LBP4, 4Lite, 4plus	–	–	129	179	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	79	–	–	149	–	–	–	–	–
Epson Action Laser 1100, 1600	–	–	19	29	–	–	59	–	–	89	99	–
Epson Action Laser II	–	–	74	–	173	–	–	272	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	89	–	173	–	–	272	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	49	–	–	98	–	–	–	–	–
HP 2, 2D–	–	–	–	59	–	–	79	–	–	–	–	–
HP 3, 3D, 3P, 3P 3P+	–	–	–	*59*	–	–	*79*	–	–	–	–	–
HP 4, 4M, 4Si, 4SMMX	–	–	–	19	–	–	49	–	–	79	–	–
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HP 4L	–	–	29	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	9	–	–	–	39	–	–	69	–	–
HP 5L	–	–	39	49	–	–	67	–	–	99	–	–
HP 5P, 5MP, 4V, 4MV, 6P, 6MP	–	–	9	19	–	–	39	–	–	69	*99*	–
HP Design Jet 600, 650, 200	–	–	–	19	–	–	39	–	–	69	109	199
HP Design Jet 700, 750C Plus	–	–	–	–	–	–	29	–	–	49	89	179
HP Deskjet 500, 500C, 510, 550, 560	*29*	–	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	39	–	–	49	–	–	89	–	–
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IBM Laser 4019, 4019E	–	–	–	–	–	109	–	–	–	–	–	–
IBM Laser 4029 4037	–	–	–	–	–	–	49	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	*39*	–	–	*69*	–	–	*99*	–	–
Konica LP-3110, 3115	–	–	89	119	159	–	–	–	–	–	–	–
Lexmark Medley 4C, 4x, 4SX	–	–	Call	Call	Call	–	–	–	–	–	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	39	–	–	59	89	169
Lexmark Valuewriter 300,600	–	–	29	39	–	–	89	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	89	–	–	–	–	–
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	59	–	–	–	–	–	–	–	–
Okl 400	–	–	–	59	–	–	–	–	–	–	–	–
Okl 400E, 400EX, 410E, 410EX	–	–	67	89	169	–	189	–	–	–	–	–
Okl 810E, EX, 600E, EX, 610E, EX	–	–	29	79	–	–	119	–	–	119	229	–
Okl 830, 840	–	–	–	59	–	–	–	–	–	–	–	–
Okl 2350, 2450	–	–	Call	Call	–	–	–	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	79	–	–	109	–	–	–	–	–
Panasonic 4410/4430	–	–	–	*59*	–	–	*89*	–	–	–	–	–
Panasonic 4450	–	–	89	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	49	69	–	–	109	–	–	–	–	–
Panasonic 4440, 5410	–	–	69	–	–	–	109	–	–	–	–	–
Panasonic 6500	–	–	14	29	–	–	79	–	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	–	49	69	–	–	119	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	49	–	–	–	236	–	–	–	–	–
TI Microlaser Pro E, Powerpro, Pro 600	–	–	39	49	–	–	59	–	–	99	–	–
TI Microwriter	–	–	39	69	–	–	–	–	–	–	–	–

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Compaq LTe 5000 Series	139	TI Exstensa 450, 455, 510, 515	139
Epson Action Note 650, 660	119	TI Exstensa 550, 555, 560, 570	149
Epson Action Note 800, 866, 880, 910	119	TI Exstensa 600, 605, 650	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	105
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NEC Versa 2400, 2405, 2430, 2435	159	Toshiba T4500, T4600	159

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Tecra 500/P650	*8Meg/16Meg/32Meg/48Meg/128Meg*	*79/118/209/369/599/1249*
Tecra 700 (SDRAM)	*8Meg/16Meg/32Meg*	*79/139/243*
Tecra 710, 720	*8Meg/16Meg/32Meg/64Meg/128Meg*	*79/129/229/849/1684*
Tecra 730 CDT, 730x CDT, 740 CDT	*8Meg/16Meg/32Meg/64Meg*	*Call*
T2000SXE/2200SX/T1600, 1850, C	8Meg	94.00
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg	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	139/243
T3400CT, T2400, T3600	4Meg/8Meg/16Meg/24Meg	59/79/149/199
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T400, 405, 410, 415, 420, 425, 430	*8Meg/16Meg/32Meg*	*79/129/229*
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ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg	49/69/129
ACERNote Light 350, 352, 355	4Meg/8Meg/16Meg	49/69/129
ACERNote Light 356, 358, 359, 361 (pairs)	4Meg/8Meg/16Meg	49/69/129
ACERNote Nuovo 971, 972	*8Meg/16Meg/32Meg*	*69/125/239*
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg	59/79/139
Ambra N Series	*4Meg/8Meg/12Meg/16 Meg*	*69/99/119/139*
Ambra SN Series	4Meg/16 Meg	69/149
Ambra N-75, N-100	4Meg/8/16	49/79/139
AST Ascentia A Series	*8Meg/16Meg/32Meg/64Meg*	*79/139/329/675*
AST Ascentia P30, P50	*8Meg/16Meg/32Meg*	*79/149/269*
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AST Ascentia 950	8Meg/16Meg	79/132
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Austin 0X4, 0X2, SX2, SX Series	4Meg/16Meg	69/189
Austin Edge	*8Meg/16Meg*	*89/149*
Austin Edge Duet	*16Meg/32Meg*	*129/229*
Austin Vista	*4Meg/8Meg/16Meg/24Meg*	*49/79/129/199*
Canon 1100	4Meg/8Meg/16Meg	59/79/119
Canon Innova Book 150, 175	4Meg/16Meg	59/139
Canon Innova Book 200LS	4Meg/8Meg/16Meg/24Meg	59/89/179/249
Canon Innova Book 350CD, 360, 475	*8Meg/16Meg*	*59/129*
Canon Innova Book 480, 490	*8Meg/16Meg*	*89/149*
CTX EZ Book 500, 500, 700 Pent, Series	*4Meg/8Meg/16Meg*	*59/89/139*
OEC HiNote, Ultra HiNote	4Meg/8Meg/16Meg	59/89/139
OEC HiNote Ultra, Ultra II	*4Meg/8Meg/16Meg*	*49/69/119*
OEC HiNote VP 520, 525, 535	*8Meg/16Meg/32Meg*	*89/139/269*
OEC HiNote VP 5100, 5120	*8Meg/16Meg/32Meg/64Meg*	*79/139/219/899*
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Dell Latitude XP, XPi	4 Meg/8Meg/16Meg	59/79/129
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg	39/79/139
Epson ActionNote 700, 700c, 700cx	4Meg/16Meg	89/149
Epson ActionNote 880, 866c, 890	4Meg/8Meg/16Meg/20Meg	49/79/139/199
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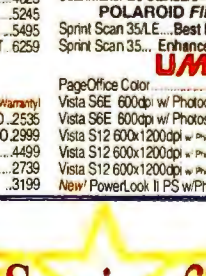

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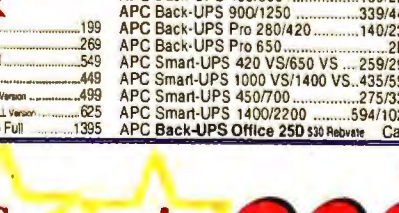

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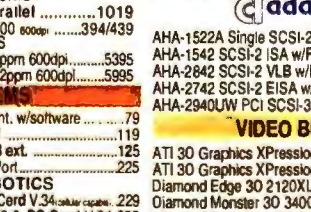

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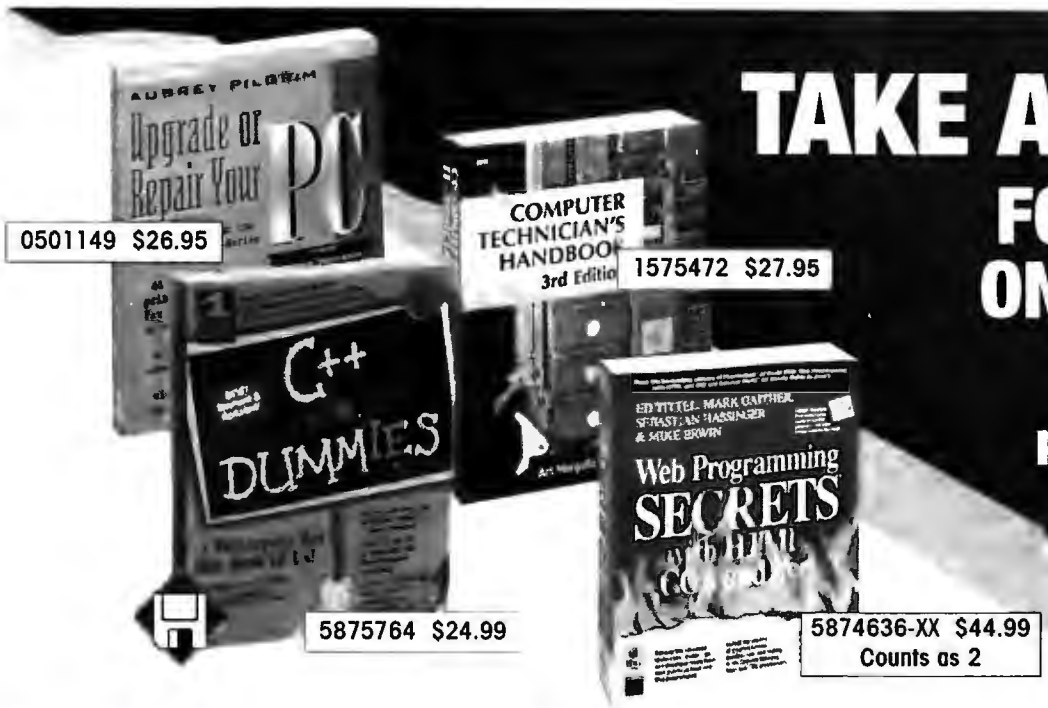

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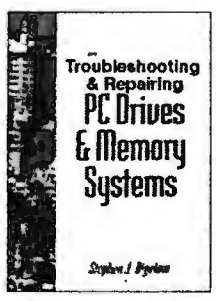

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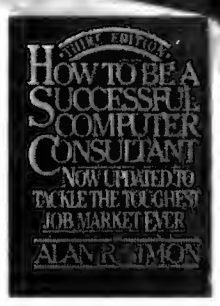

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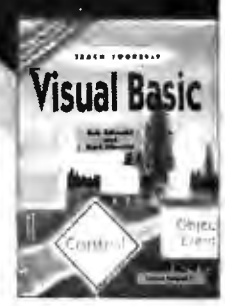

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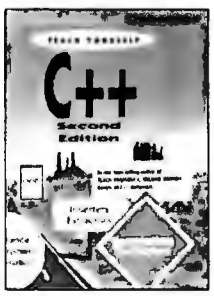

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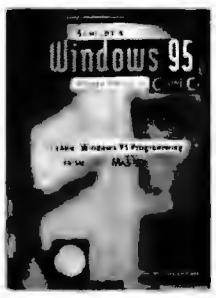

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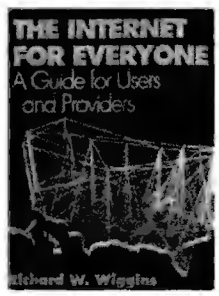

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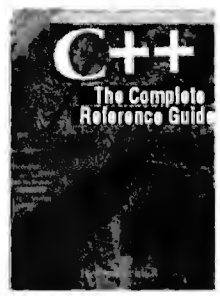

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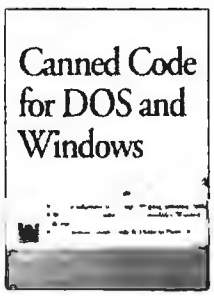

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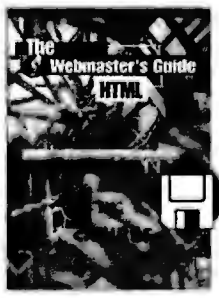

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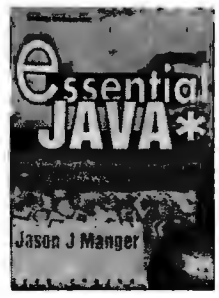

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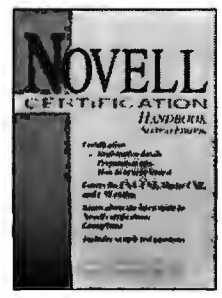

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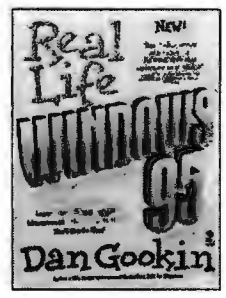

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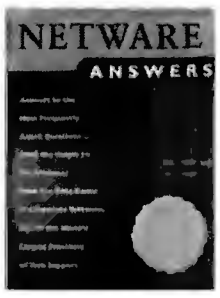

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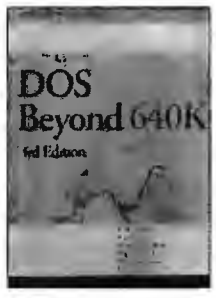

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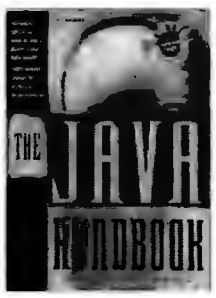

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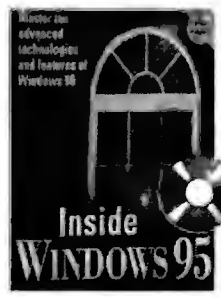

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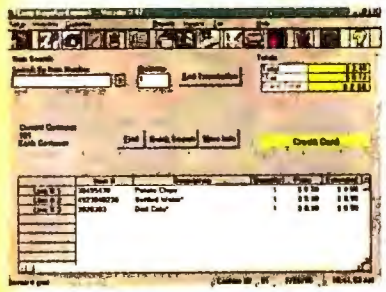

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230MB	Smart Storage Solutions SCSI	$339
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2.6Gig	Maxoptix	$1669
2.6Gig	Hewlett Packard	$2069
52Gig	Sony 20 slot Juke box w/ 2.6 Gig drive	$4599

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Compatible w/ SyQuest 270MB media. SCSI Int/Ext $249/$299

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Smart Storage Solutions	2X Write 6X Read	$429
Hewlett Packard	2X Write 6X Read	$509
Smart Storage Solutions	4X Write 4X Read	$769

• CD ROM DRIVES •

SCSI Brand	Spin	Model	Speed	Int	Ext
Plextor	12X	PX12TS	105ms	$265	$355
PLextor	12X	PX12CS	105ms	$309	$399
Toshiba	12X	XM5701B	115ms	$169	$259
Toshiba	15X	XM3801B	99ms	$259	$349
NEC	16X	CDR1610	100ms	$199	$289
ATAPI IDE				**Int**	**Int kit**
Mitsumi	8X	CRMCFX800	150ms	$109	$139
Cyber	12X	CYBER12X	150ms	$115	$145
Lite On	12X	LTN126A	155ms	$115	$145
Acer	12X	AC612A	125ms	$119	$149
Toshiba	12X	XM5702B	115ms	$145	$175
Teac	12X	CD512E	160ms	$145	$175
Mitsumi	12X	CRMCFX12X	150ms	$125	$155
Lite On	16X	LTN262A	120ms	$145	$175
Mitsumi	16X	CRMCFX16X	120ms	$155	$185
Acer	16X	AC706A	120ms	$155	$185
NEC	16X	CDR1600	100ms	$165	$195
Acer	18X	AC616A	120ms	$160	$190

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Sound Blaster 16 PnP $99 AWE64Pnp $180

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NEC	4X	CDR4X4	4 Disk	250ms	$99
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NEC	8X	CDR4X8	4 Disk	165ms	$175
Panasonic	10X	SQTC510N	5 Disk	130ms	$249

SCSI CD ROM CHANGERS

Nakamichi	8X	MJ48S	4 Disk	150ms	$279

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800MB	Seagate	TST800R	$119
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48-96GB	Seagate	C4586NP 12 tape autoloader		$2399

SCSI 8mm DAT

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1200MB	14ms	4103	JTS	JTS1200	3	$179
1275MB	12ms	4500	Seagate	ST31276A	3	$195
1280MB	11ms	4500	Quantum	TM31280A	3	$192
1281MB	11ms	5200	Western Digital	WDAC11200	3	$199
1624MB	10ms	5200	Western Digital	WDAC21600	3	$209
1670MB	11ms	4480	Maxtor	MB1750A	3	$210
1700MB	**10ms**	**5400**	**Fujitsu**	**M1623T**	**3**	**$194**
1700MB	12ms	4500	Seagate	ST31720A	3	$205
2000MB	14ms	4103	JTS	JTS2000	3	$219
2100MB	9ms	5400	Fujitsu	M1624T	3	$224
2111MB	12ms	5200	Western Digital	WDAC22100	3	$229
2132MB	12.5ms	4500	Seagate	ST32132A	3	$229
2151MB	10ms	5400	Quantum	FB32160A	3	$259
2168MB	10.5ms	4500	Quantum	TM32160A	3	$235
2187MB	12ms	4480	Maxtor	MB21B7A	3	$239
2500MB	**9ms**	**5400**	**Fujitsu**	**M1638T**	**3**	**$229**
2550MB	15ms	3600	Quantum	BF2500A	3	$225
2550MB	10.5ms	4500	Quantum	TM32550A	3	$249
2559MB	11ms	5200	Western Digital	WDAC32500	3	$255
2560MB	11ms	5400	Seagate	ST52520A	3	$249
2560MB	10ms	5400	Maxtor	MB2560A	3	$259
3166MB	12ms	5200	Western Digital	WDAC33100	3	$295
3228MB	10ms	5400	Quantum	FB33240A	3	$309
3245MB	12ms	4500	Seagate	ST33240A	3	$315
3254MB	10.5ms	4500	Quantum	TM33200A	3	$285
3500MB	12ms	4480	Maxtor	MB3500A	3	$329
3840MB	**10.5ms**	**4500**	**Quantum**	**TM33840A**	**3**	**$315**
4000MB	12ms	5200	Western Digital	WDAC34000	3	$375
4310MB	10ms	5400	Quantum	FB34320A	3	$375
4326MB	12ms	4500	Seagate	ST34340A	3	$Call
4335MB	14ms	3600	Quantum	BF4335A	3	$294
5120MB	10ms	5400	Maxtor	MB5120A	3	$449
6448MB	10ms	5400	Quantum	FB36480A	3	$539
6510MB	14ms	3600	Quantum	BF6510A	3	$439

• SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	$299	$369
1280MB	12ms	4500	Quantum	TM31280S	3	$269	$339
2110MB	10.5ms	4500	Quantum	TM32110S	3	$309	$379
2150MB	9ms	5400	Seagate	ST32155N	5	$475	$545
2150MB	8ms	7200	Seagate	ST32171N	5	$649	$719
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**	**$739**	**$809**
4310MB	10ms	5400	Quantum	FB34320S	3	$479	$549
4350MB	8ms	7200	Seagate	ST34371N	5	$989	$1059
4400MB	8ms	7200	Fujitsu	M2954S	5	$799	$869
4550MB	8ms	7200	Quantum	XP34550S	5	$879	$949
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	$1869	$1939
9100MB	8ms	7200	Quantum	XP39100S	5	$1399	$1469
9100MB	10ms	7200	Fujitsu	M2949S	5	$1439	$1509
23.3GB	13ms	5400	Seagate	ST423451N	5	$3869	$3969
WIDE SCSI							
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2150MB	9ms	5400	Seagate	ST32155W	5	$499	$629
2150MB	8ms	7200	Seagate	ST32171W	5	$679	$819
4294MB	8ms	7200	Micropolis	MC3243W	5	$799	$929
4294MB	8ms	7200	Micropolis	MC3243WAV	5	$829	$959
4350MB	8ms	7200	Seagate	ST34371W	5	$1039	$1169
4400MB	**8ms**	**7200**	**Fujitsu**	**M2954W**	**5**	**$849**	**$979**
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	$1399	$1529
4550MB	8ms	7200	Quantum	XP34550W	5	$939	$1069
9091MB	**8.5ms**	**7200**	**Micropolis**	**MC3391W**	**5**	**$1455**	**$1585**
9091MB	8.5ms	7200	Micropolis	MC3391WAV	5	$1569	$1699
9100MB	8ms	7200	Quantum	XP39100W	5	$1599	$1739
9100MB	8ms	7200	Fujitsu	M2949W	5	$1559	$1689
9100MB	8ms	7200	Seagate	ST19171W	5	$2149	$2289
9100MB	8ms	10,000	Seagate	ST19101W	5	$3599	$3739
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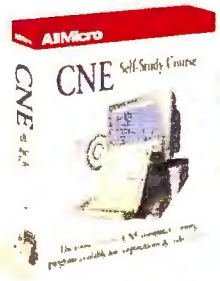

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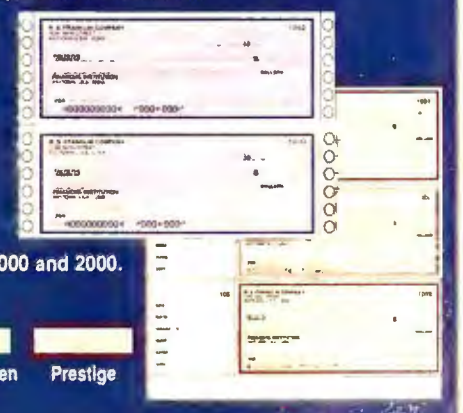

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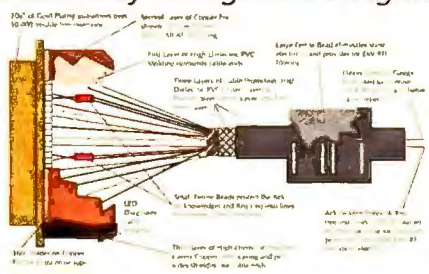

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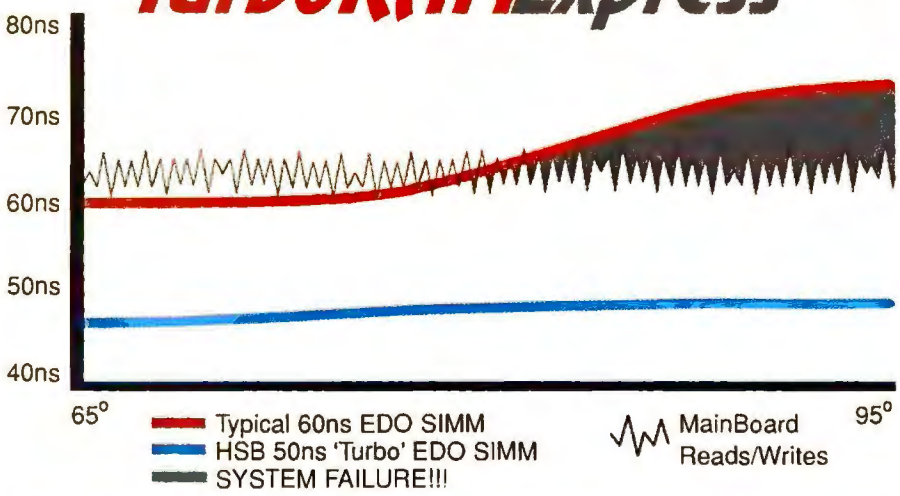

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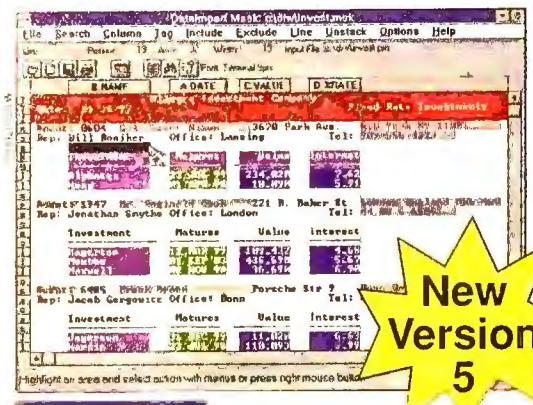

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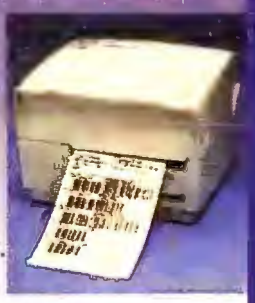

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221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

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601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

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951 Desktop computers
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
960 Utilities
961 Mail order companies
962 Storage devices

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
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101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
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5/97

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Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951 Desktop computers	955 Accounting software	959 Multimedia products
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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	97
-	Acer Components	33
-	Acer Components	35
-	Adaptec Inc.	16
3	ADI Systems	50
32	Adobe Systems	158-159
19	AIMS Labs Inc.	240
38	Alaris	213-215
202	ALLCLEAR	243
9	ALR	30
-	Anthro Corporation	32
45	APC	90-91
17	APC	261
-	Apple Computer	44-45
20	Artmedia Usa	238
-	AT&T	277
5	ATI Technologies	221
-	Avermedia	163
-	Banner Blue	249
91	Caere Corporation	259
-	Canon Computer Systems	2-3
-	Cardinal	279
-	Chevrolet Monte Carlo	15
51	Compaq Direct Corporation	51A-B
47	Compaq Direct Corporation	172-173
44	Computer Discount Warehouse	84-85
46	Computer Discount Warehouse	289
68	Computer Discount Warehouse	290-291
-	Computers Made Easy	316
78	Corel Corporation	157
70	Corel Corporation	201
54	Creative Labs Inc.	267
59	Creative Labs Inc.	269

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INDEX

Reader service number		Page
69	Creative Labs Inc.	271
56	Crucial Technology	179
64	CTX Int'l	167
74	Cybermax	182-183
81	Dataviz, Inc.	181
-	Dell	102-103
-	Dell	161
-	Dell	271B
-	Dell	C5-C8
37	DeLorme	79
-	Dodge Stratus	194-195
84	DTK	275B
85	Earthlink	129
-	EPS	224A-F
-	EXABYTE/Eagle Division	317
94	Fujitsu-ICL Systems	52-53
-	Futurus	263B
-	Gateway 2000	69-74
-	Gateway 2000	75
125	Hansol Multitech, Inc.	127
97	Hayes	121
-	Hewlett-Packard	38-39
-	Hewlett-Packard	134-135
-	Hewlett-Packard	226
110	Hyundai Electronics America	197
-	IBM Corporation	254-255
111	Imation	87
-	Iomega Corporation	95
-	Iomega Corporation	100-101
113	ITT Sheraton	26
104	ITT Sheraton	27
170	KDS	251
105	Keystone Learning Systems	241
128	Kingston Technology Corp.	229
-	LA TRADE	288
96	LG Electronics U.S.A.	42
138	Lotus Domino	273A-B
148	Lotus Smart Suite	164-165
143	Matrox Graphics Inc.	40-41
-	McGraw Hill	293
147	MegaHaus Hard Drives	297
142	MGI Software Corp.	239
149	Micron Electronics	9
145	Micron Electronics	10-11
160	Micron Electronics	12-13
-	Micron Electronics	147-152
-	Microsoft	104-105
-	Microsoft	264-265
-	Microsoft	C2-1
157	Midwest Computer Works	292
168	Minuteman UPS	251B
143	Mitsubishi Electronics America	211
154	Monorail	81
203	NEC Laptop	28-29
163	NEC Printer	131

Reader service number		Page
-	Netcom	66
167	Nexar	89
126	Nimantics	49A-B
164	Nokia	22
161	Nomai	200
-	NRI Schools	177
162	Olivetti	234
171	Palm Computing	141
173	Palm Computing	143
177	Palm Computing	145
166	Panasonic	223
195	PC America	296
165	PC Connection	294-295
-	PC Expo 1997	251C
172	PC World Online	225
129	PCs Compleat	284-287
212	PKWARE	36
175	Plextor	233
196	Power Quest	242
152	Princeton Graphics Systems	4-5
151	Princeton Graphics Systems	20-21
184	ProGen Systems	46
183	Proven Edge	93
186	Psion	263A
193	Qualcomm	113
-	Quantex	168A-H
190	Quarterdeck Office Systems	61
189	Quarterdeck Office Systems	63
185	Quarterdeck Office Systems	65
204	Ricoh Corporation	83
198	Ricoh DMS	37
194	Rose Electronics	115
197	Sampo	203
209	Seagate Software	185
188	Seiko Instruments	98
207	Shinho Electronics	133
206	Smile, Int'l	247
211	Smith Micro	275
-	Spot Magic	263
253	SPSS	48
208	STATE OF THE ART SW	49
210	STB Systems	230
218	Stefra Corporation	315
217	Symantec	34
232	SYNCRONYS SW	186
124	Tektronix Inc.	199
221	Telecommuting + Home Office Expo	251A
229	Tiger Direct	256
228	Toshiba America	116-118
243	Traveling SW	184
-	U.S. Robotics	204-205
-	UMAX Computer Corporation	257
231	USA Flex	283

Reader service number		Page
255	V-COMMUNICATIONS	176
260	ValueWeb	244
247	ViewSonic	24-25
246	ViewSonic	99
251	Western Digital	273
254	WinBook	18-19
257	Xerox	281

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

HARDWARE

Boards/Cards/Chips

5	ATI Technologies	221
54	Creative Labs Inc.	267
59	Creative Labs Inc.	269
69	Creative Labs Inc.	271
56	Crucial Technology	179
128	Kingston Technology Corp.	229
143	Matrox Graphics Inc.	40-41
210	STB Systems	230

Communication

-	Cardinal	279
97	Hayes	121
-	U.S. Robotics	204-205

Desktop Computers

9	ALR	30
74	Cybermax	182
-	Dell	161
-	Dell	102-103
-	Dell	C5-C8
84	DTK	275B
-	EPS	224A-F
-	Gateway 2000	69-74
-	Gateway 2000	75
-	Hewlett-Packard	134-135
160	Micron Electronics	12-13
-	Micron Electronics	147-152
154	Monorail	81
167	Nexar	89
184	ProGen Systems	46
186	Psion	263A
-	Quantex	168A-H
228	Toshiba America	116-118

Desktop Publishing

51	Compaq Direct Corporation	51A
47	Compaq Direct Corporation	172-173

File Servers

-	Dell	271B
160	Micron Electronics	12-13

Laptop/Notebook

-	Acer America	97
64	CTX Int'l	167
94	Fujitsu-ICL Systems	52-53
-	Gateway 2000	69-74
-	Gateway 2000	75
-	IBM Corporation	254-255
145	Micron Electronics	10-11
-	Micron Electronics	147-152
203	NEC Laptop	28-29
126	Nimantics	49A
162	Olivetti	234
171	Palm Computing	141
173	Palm Computing	143
177	Palm Computing	145
254	WinBook	18-19

Local Area Networks

194	Rose Electronics	115

Monitors/Displays

-	Acer Components	33
-	Acer Components	35
3	ADI Systems	50
20	Artmedia Usa	238
125	Hansol Multitech, Inc.	127
110	Hyundai Electronics America	197
170	KDS	251
96	LG Electronics U.S.A.	42
143	Mitsubishi Electronics America	211
164	Nokia	22
166	Panasonic	223
152	Princeton Graphics Systems	4-5
151	Princeton Graphics Systems	20-21
197	Sampo	203
207	Shinho Electronics	133
206	Smile, Int'l	247
247	ViewSonic	24-25
246	ViewSonic	99

Multimedia

142	MGI Software Corp.	239
198	Ricoh DMS	37

Other

19	AIMS Labs Inc.	240
-	Avermedia	163

Peripherals/Sharing Devices

-	Adaptec Inc.	16
243	Traveling SW	184
-	EXABYTE/Eagle Division	317
111	Imation	87
-	Iomega Corporation	95
-	Iomega Corporation	100-101
161	Nomai	200
175	Plextor	233
196	Power Quest	242
194	Rose Electronics	115
209	Seagate Software	185

Reader service number		Page
251	Western Digital	273
-	UMAX Computer Corporation	257
	Printers/Plotters	
17	APC	261
45	APC	90-91
168	Minuteman UPS	251B
-	Canon Computer Systems	2-3
-	Hewlett-Packard	38-39
163	NEC Printer	131
204	Ricoh Corporation	83
188	Seiko Instruments	98
124	Tektronix Inc.	199
	Storage/Backup Devices	
147	MegaHaus Hard Drives	297

SOFTWARE

	Accounting	
183	Proven Edge	93
208	STATE OF THE ART SW	49
	Communications/Fax/ Modems	
193	Qualcomm	113
211	Smith Micro	275
260	Value Web	244
	Data Conversion	
81	Dataviz, Inc.	181
	Desktop Mapping	
37	DeLorme	79
	Desktop Publishing	
32	Adobe Systems	158-159
	Graphics	
202	ALLCLEAR	243
	Management	
195	PC America	296
	Operating Systems	
-	Apple Computer	44-45
	Optical Character Recognition	
257	Xerox	281
	Other	
-	Banner Blue	249
	Schedule Software	
-	Futurus	263B
	Software Suites	
78	Corel Corporation	157
148	Lotus Smart Suite	164-165
-	Microsoft	104-105
-	Microsoft	C2-1
	Spreadsheets/Templates/ Forms	
91	Caere Corporation	259
202	ALLCLEAR	243
	Statistics	
253	SPSS	48
	Utilities	
212	PKWARE	36
196	Power Quest	242
190	Quarterdeck Office Systems	61
189	Quarterdeck Office Systems	63
185	Quarterdeck Office Systems	65
217	Symantec	34
232	SYNCRONYS SW	186
255	V-COMMUNICATIONS	176
	Video	
38	Alaris	213-215
105	Keystone Learning Systems	241
211	Smith Micro	275
218	Stefra Corporation	315
	Web Authoring Tools	
-	Spot Magic	263
260	ValueWeb	244
	Windows	
212	PKWARE	36
	Word Processing/Aids	
70	Corel Corporation	201

MISCELLANEOUS

	Automobiles	
-	Chevrolet Monte Carlo	15
-	Dodge Stratus	194-195
	Books/Periodicals/ Subscriptions	
-	McGraw Hill	293
-	Microsoft	264-265
	Hotels	
113	ITT Sheraton	26
104	ITT Sheraton	27
	Internet Services	
138	Lotus Domino	273A-B
	Mail Order	
44	Computer Discount Warehouse	84-85
46	Computer Discount Warehouse	289
68	Computer Discount Warehouse	290-291
-	EPS	224A-F
-	LA TRADE	288
147	MegaHaus Hard Drives	297
157	Midwest Computer Works	292
154	Monorail	81
165	PC Connection	294-295
129	PCs Compleat	284-287
229	Tiger Direct	256
231	USA Flex	283
	Online Services	
-	AT&T	277
85	Earthlink	129
-	Netcom	66
172	PC World Online	225
	Other	
-	Anthro Corporation	32
-	Computers Made Easy	316
149	Micron Electronics	9
	Supplies	
-	Hewlett-Packard	226
	Trade Shows	
-	PC Expo 1997	251C
221	Telecommuting + Home Office Expo	251A
	Training	
105	Keystone Learining Systems	241
-	NRI Schools	177

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

Reader service number		Page
	Backup/Storage	
777	SL Waber UPStart Network 550	100
	CD-ROM Repair	
734	Fix-a-Disc, MacTec Products	80
	Communications Accelerator	
606	Hayes ESP	276
	Database	
738	Info Select 4.0, Micro Logic Corp.	86
	Desktop Computers	
618	Compaq Deskpro Model 5200/1080	190
635	CyberMax Cyrix Max C3 P166+	206
638	CyberMax Cyrix Max C4 P200+	206
731	Dell Dimension M200a	78
625	Dell Dimension P133v	206
601	Dell Dimension P200 v	248
608	Dell Dimension XPS M200s	190
609	Dell Dimension XPS Pro200n	190
628	Dell OptiPlex GS+ 5200L	206
610	Dell OptiPlex GX Pro 200	190
611	Dell OptiPlex GXi 200	190
640	DFI Landmarq IHX Prime P150+	206
623	DFI Landmarq IHX Pro P200 MMX	190
636	Diamond Mid Tower P166	206
641	Diamond Technologies P133	206
631	DirectWave Blue Thunder P133 MVP Pro	206
643	First Computer FCS P-133	206
629	Gateway 2000 G6-180	206
613	Gateway 2000 G6-200	190
627	Gateway 2000 P5-133	206
603	HP Pavilion 7350P	248
602	HP Pavilion 7370V	248
617	HP Pavilion 7350P	190
615	HP Pavilion 7370V	190
614	HP Vectra VA 6/200 MT	190
633	HP Vectra VE 5/133	206
619	HP Vectra VL Series 4 5/200MT	190
634	HP Vectra XM5/120 Series 4	206
-	IBM PC 350 (Pentium-166)	206
-	IBM PC 350 (Pentium-200)	190
-	IBM PC 350 (Pentium MMX-200)	190
-	IBM PC 365	190
630	Kingdom 6x86 P166+ Super Value	206
616	Micron Home MPC P200	190
604	Micron Home MPC	248
626	Micron Millennia LXA P133	206
612	Micron Millennia Pro2 200 B	190
621	Netis N6200PCI	190
624	Polywell Poly 5200 MX8	190
639	ProGen Discover MPEG II P150	206
637	Quantex QP5/166 SM-2	206
774	Quantex QP5-200 SM-3	68
632	Quantex QP6/200 SM-1	206
620	Quantex QP6/200 SM-4	190
622	Royal 3D-MMX	190
605	Sony PCV-70	248

Reader service number		Page
729	Toshiba Equium 5200D	76
776	Toshiba Infinia	68
642	USA Flex Family Special	206
	DVD	
774	Creative PC DVD, Creative Labs	68
775	DVD Theater Upgrade Kit, STB	68
	E-Mail Utilities	
607	Aloha, Media Synergy	276
760	MyMailManager, MySoftware Co.	88
	Encryption	
769	DataSafe, Authentix Software	96
770	PC-Crypto, McAfee Associates	96
	Entertainment/Game	
688	Obsidian, SegaSoft	246
	Fonts	
762	TrueType, Signature Software	88
	Graphics Boards	
680	ATI 3D Pro Turbo PC2TV	235
677	ATI 3D Xpression+ PC2TV	235
733	ATI All-in-Wonder	80
681	Diamond Stealth 3D 2000XL	235
675	Diamond Stealth 3D 3000XL	235
676	Hercules Terminator 3D	235
682	Matrox Millennium	235
674	Matrox Mystique	235
679	STB Lightspeed 128	235
673	STB Velocity 3D	235
685	VideoLogic Apocalypse 3D	245
678	VideoLogic GrafixStar 600	235
	Graphics Suite	
764	Infini-D 3.5, Specular	94
	Hard Drive	
768	Seagate Medalist Pro 6450	96
	Input Device	
739	Palm Mouse, Fujitsu Takamisawa America, Inc.	86
	Interior Design Software	
689	Picture This Home! Kitchen, Autodesk	246
	Internet/Communications Suites	
743	Communicator Standard Edition, Netscape	132
742	Internet Explorer, Microsoft	130
	Internet/E-Mail Connectivity	
771	InterJet, Whistle Communications	98
	Labelwriter Printer	
761	CoStar LabelWriter XL Plus with Easy Software Suite	88
	Mail and News Reader	
665	Agent .99, Forte Systems Inc.	253
	Modems	
744	Boca 56K Internet Modem	64
745	Cardinal Connecta 56 series	64
703	Diamond Multimedia Supra Fax Modem 336e	237
746	Hayes Accura, Optima	64
705	Megahertz XJ4336	237
747	Microcom OfficePorte Voice, DeskPorte P.	64
702	Motorola ISG Premier 33.6	237
748	Motorola ModemSurfr 56K, VoiceSurfr 56K	64
704	Motorola Montana 33.6	237
749	Multi-Tech MT5634ZDX, MT5634ZPW, MT5634ZPX	64
750	Practical Peripherals 56K Data/Fax Modem series.	64
699	Practical Peripherals PC288LCD V.34	237
706	Practical Peripherals ProClass 288 V.34 Data/Fax Modem with EZ-Port	237
707	TDK CyberExpress 3000	237
751	U.S. Robotics Sportster 56K Faxmodem, Courier V.Everything 56Kbps	64
700	U.S.R. Courier V.Everything 33.6.	237
708	Zoom PCMCIA V.34C Plus Model 2870	237
701	Zoom V.34X PLUS	237
	Monitors	
735	Arcadia Home Monitors, Princeton Graphic Systems	80
726	ArtMedia TN-2185T	231
722	Compaq QV210	231
723	Cornerstone Imaging Color 21/81fp	231
727	Cornerstone Imaging Color 50-115	231
724	Hitachi SuperScan Elite 802	231
725	Iiyama Vision Master Pro 21	231
719	Mitsubishi 91TXM	231
728	Panasonic PanaSync S21	231
721	Samsung SyncMaster 20GLsi	231
720	ViewSonic G810	231
	Notebook Carrying Cases	
740	SaddleBag, Kensington Microware	86
741	Zero Halliburton Attaché	86
	Notebook Computers	
658	AcerNote Light Multimedia 373	217
650	AcerNote Nuovo	217
663	Broadax BSI NP8320T	217
655	Compaq Armada 1130T	217
656	CTX EzBook 720CS	217
644	Dell Latitude LM P133S	217
645	Dell Latitude XPi P133ST	217
657	Gateway 2000 Solo 2100 S5-120	217
649	Gateway 2000 Solo 2200	217
651	HP OmniBook 800CT	217
654	HP Omnibook 5500CS	217
652	HP OmniBook 5500CT	217
660	Mega Image MegaBook 911	217
647	Micron TransPort MRX	217
661	Samsung Sens Pro 500	217
653	Sceptre Soundx Series 4000	217
662	Toshiba Satellite 110CT	217
659	Toshiba Satellite Pro 420CDS	217
648	WinBook FX	217
646	WinBook LM	217
	Palmtop Computers	
709	Apple MessagePad 130	156
714	Casio Cassiopeia	168
715	Compaq PC Companion	168
710	HP OmniGo 100	160
716	NEC MobilePro	168
711	Psion Series 3c	162
712	Sharp Zaurus ZR-3500X	162
713	U.S.Robotics Pilot 1000	166
	Personal Finance	
668	CheckFree	36
767	Debt Analyzer, Insight Software	96
669	Managing Your Money	36
670	Microsoft Money 97	36
–	Quicken 6.0, Intuit	36
	Personal Information Manager	
684	Day-Timer HomeLife	245
	Photo Printer	
686	Panasonic TruPhoto Printer	245
	Presentations	
766	Scala Multimedia MM200	94
	Printers	
–	Epson Stylus Color 400, 600, and 800	92
697	HP Color LaserJet 5M	227
694	HP DeskJet 1600CM	227
692	HP LaserJet 5M	227
763	HP OfficeJet Pro 115C	92
–	IBM Network Printer 12	227
690	Lexmark Optra Lx+	227
691	Lexmark Optra R+	227
693	Okidata OL1200/PS	227
695	Tektronix Phaser 350	227
698	Tektronix Phaser 550	227
696	Xerox XPrint 4920 Plus	227
	Reference	
687	A Guide to Alternative Medicine, Isis Interactive	246
683	Britannica CD 97, Encyclopedia Britannica, Inc	245
	Remote Control Software	
765	Reachout 7.0, Stac	94
	SCSI Adapter	
672	SCSI Ultra controllers, Adaptec	672
	SCSI Drives	
671	Cheetah ST34501W, Seagate	250
732	Syquest SyJet SCSI Drives	78
	Security	
667	StopLight 95 ELS, Safetynet, Inc.	255
666	Win-Secure-It, Shetef Solutions Ltd.	255
	Server	
664	PointCast I-Server	48
	Telephony/E-Mail	
730	Intelifone, InteliData Technologies, Inc.	77
	Videoconferencing	
737	Bigpicture Video Kit, U.S. Robotics	82
736	ViaTV, 8x8, Inc.	82

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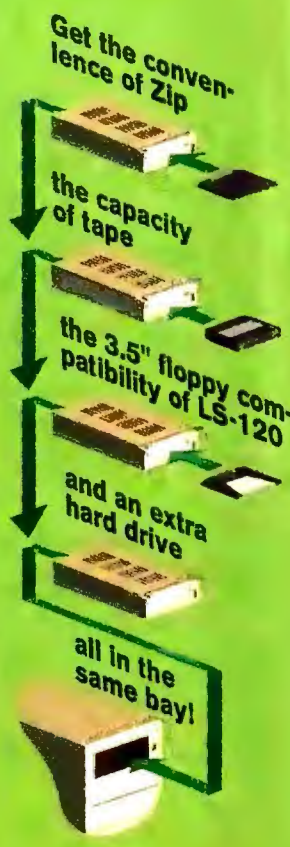

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WELCOME TO THE PLAYGROUND of the electronic world! I'm not talking about a Silicon Valley café with sixteen T3 lines or a certain high-tech mogul's house approaching completion near Seattle. No, I'm talking about your hard disk. That dull-as-rust warehouse has become the hip venue of an ongoing party for every software developer, content provider, and hacker in the digital universe.

By now, of course, you've already given several hundred megabytes of it to Windows 95 and the apps you use every day. And if you decide to hang onto the promotional goodies that came preloaded on your new PC—you never know, someday you might actually try them—you can kiss a few hundred more megs good-bye.

The latest culprit is the Internet. Odds are your connection is slower than a broken-down Yugo, so savvy Web developers grab chunks of your hard drive to make things appear to move more smoothly. The unstated assumption: Bandwidth is limited, but your hard disk isn't.

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THE MOST OBVIOUS EXAMPLE of this free-loading is your Web browser, which stores a cache of recently accessed files so it can display sites faster when you return to them. Depending on your browser and the way you set it up, that cache can easily swallow a tenth or more of your hard drive.

Then there are the "push" systems like PointCast that bring news and data to your machine on a regular basis, then leave it there until you get around to deleting it. And when Web sites stick program components on your disk, they stay there. So the next time you need the program, it'll be ready without another long, painful download. Great concept—until your disk fills up.

Trust me, it will. Nothing's getting smaller. Take RealPlayer, the client part of Progressive Networks' RealVideo. This single add-on component does essentially one thing: decoding video in real time (and not very well, at that). The beta version demands a whopping 2MB. One function, two megs: the future of "component software."

It's hardly alone. Rifff, one of the less-than-thrilling new "shows" on The Microsoft Network, downloads more than 4MB to your hard drive. Supposedly you can uninstall it, but good luck figuring out how—the item doesn't appear by name in the Add/Remove Programs window. At least Java applets don't access your hard drive. But that will change—just wait.

Even stuff you actively seek out on the Web may have its own hidden agenda. Sure, you can usually find out file sizes and estimated download times. What you don't always know is how much room the thing may take *after* installation, or where it will reside. And such files have a way of sticking around past their pull date. On my PC there's a nearly 10MB file that seems to be a copy of Internet Explorer. It's actually an old setup file. Do I still need it? Who knows?

PARTY OUT OF BOUNDS

WHAT CAN WE DO about all this? Short of keeping caches small, avoiding unnecessary downloads, and encouraging providers to clean up after themselves, not much. It's hard to manage your hard drive when you can't figure out what the files on it actually do.

Take Microsoft's Internet Explorer Web page, which once confronted me with an on-screen certificate asking, "Do you wish to download and run Internet Explorer Timer Control?"

How the heck do I know? What does it do? Is it a 2K download, or 70MB? I won't find out unless I let the bits trickle onto my disk, where they'll be stored under some inscrutable file name that will forever keep me from figuring out whether I want to delete them. But if I turn down the offer, the site won't work right.

So resign yourself to the future. Give up trying to control that disk you used to call your own. Enjoy the party, avoid thinking about digital pranksters and snoops, and don't hog the bean dip.

Oh, and I hate to bring it up, but think about clearing out some of your stuff or investing in a bigger drive. This warehouse of yours is beginning to get a little crowded.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).* ■

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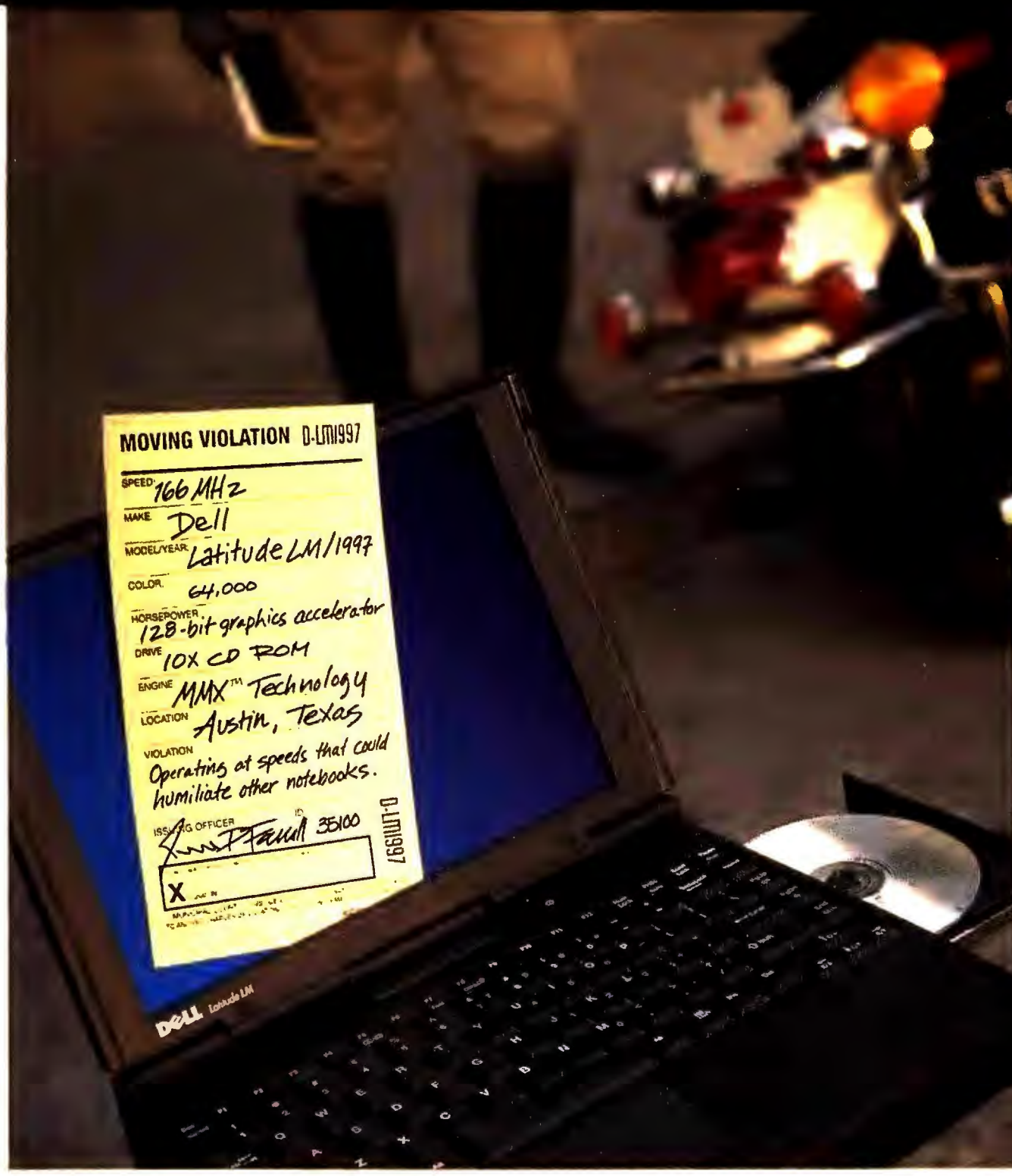

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