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PC WORLD

November 1995 $4.95

ULTIMATE HOLIDAY BUYERS' GUIDE

THE TOP 100

20 Power Desktop PCs

20 Budget Desktop PCs

20 Notebook PCs

10 Printers

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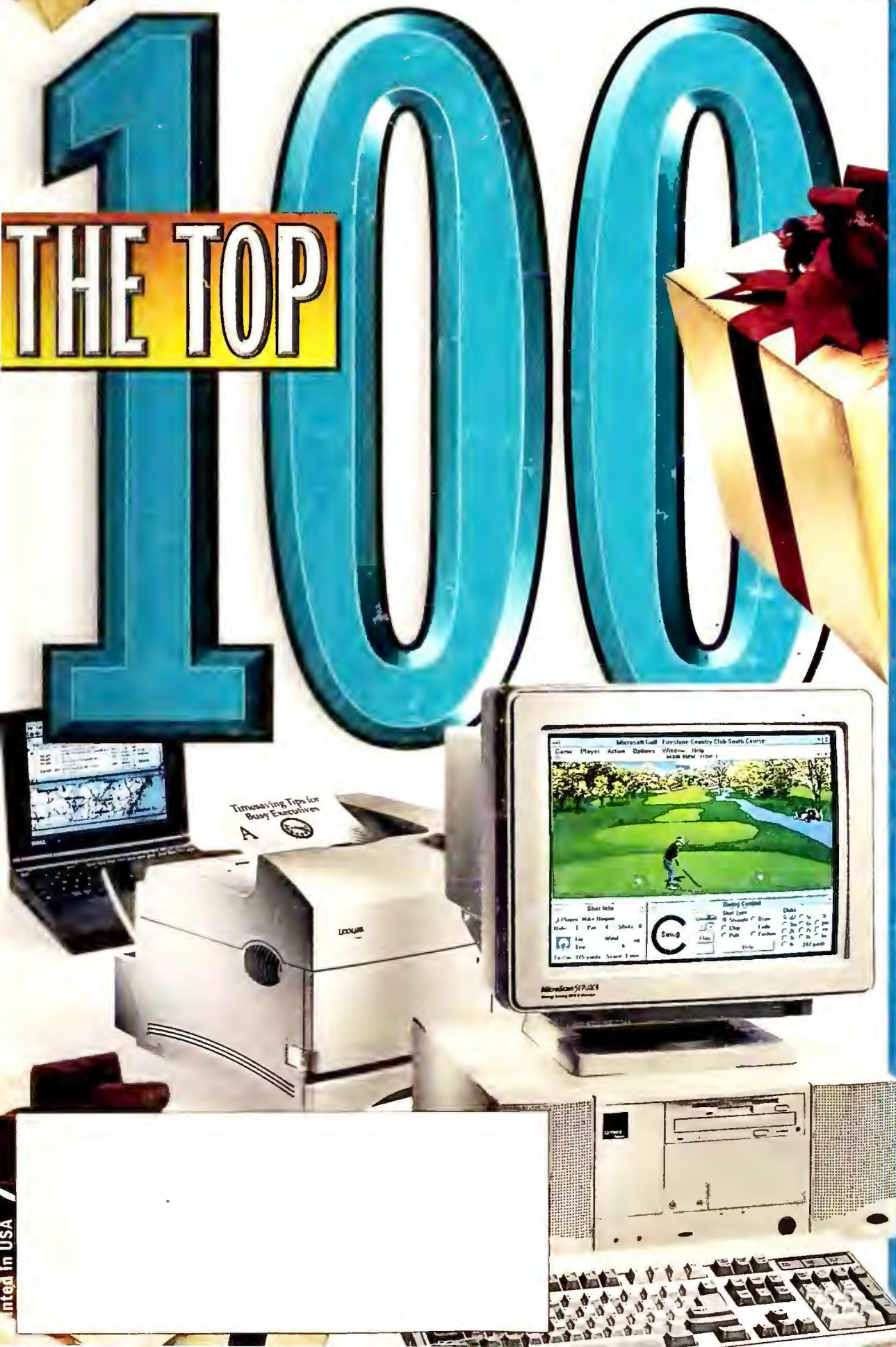
10 Modems

10 Graphics Boards



nted in USA

This wide-open

road brought to you by new Microsoft Office

Now fewer things will get between you and the way you want to work.

Start

Introducing new Microsoft Office for Windows 95

Software that reveals itself, removes the barriers between you and capabilities old and new. Software that doesn't get in your way when you're trying to work.

Features that can streamline the way you work now reveal themselves as you work. Everyday tasks as basic as entering text are easier. Spell-checking and formatting happen automatically, on the fly. Applications that you once used in a limited fashion now offer you new and easier ways to use them, to do more with them. One of those ways is the Answer Wizard. When you have a question you simply type it in. "How do I get this page to print sideways?" It will show you how. Other wizards are built into individual programs to walk you through complex tasks. To create a customer database from scratch, you simply ask the Database Wizard to show you how. This is called IntelliSense™ technology, and it senses what you are doing, and helps you do it with fewer steps. It lets you focus on your work, not on making your software work.

Now applications work together, work alike, work the way you always hoped they would.

New Microsoft® Excel, Word, PowerPoint,® Microsoft Access, and Schedule+. Use them to work more effectively, to access and share information throughout your company, to conduct more in-depth analysis. Pull information from one application into another seamlessly. Manage your key contacts in Schedule+ and drop addresses into Word when you write them letters. Use PowerPoint's Meeting Minder to take notes of your meeting, and then export them to Word to summarize. Use the new Office Binder to create a single document that uses components from all five programs. Combine a cover letter, financial projections, and professional-looking charts and graphs seamlessly into one document. Save and print it as one. Open it and have all the applications it uses launch at once. You spend less time going back and forth between programs. Less time working around obstacles. More time focusing on the task at hand.

Microsoft

WHERE DO YOU WANT TO GO TODAY?

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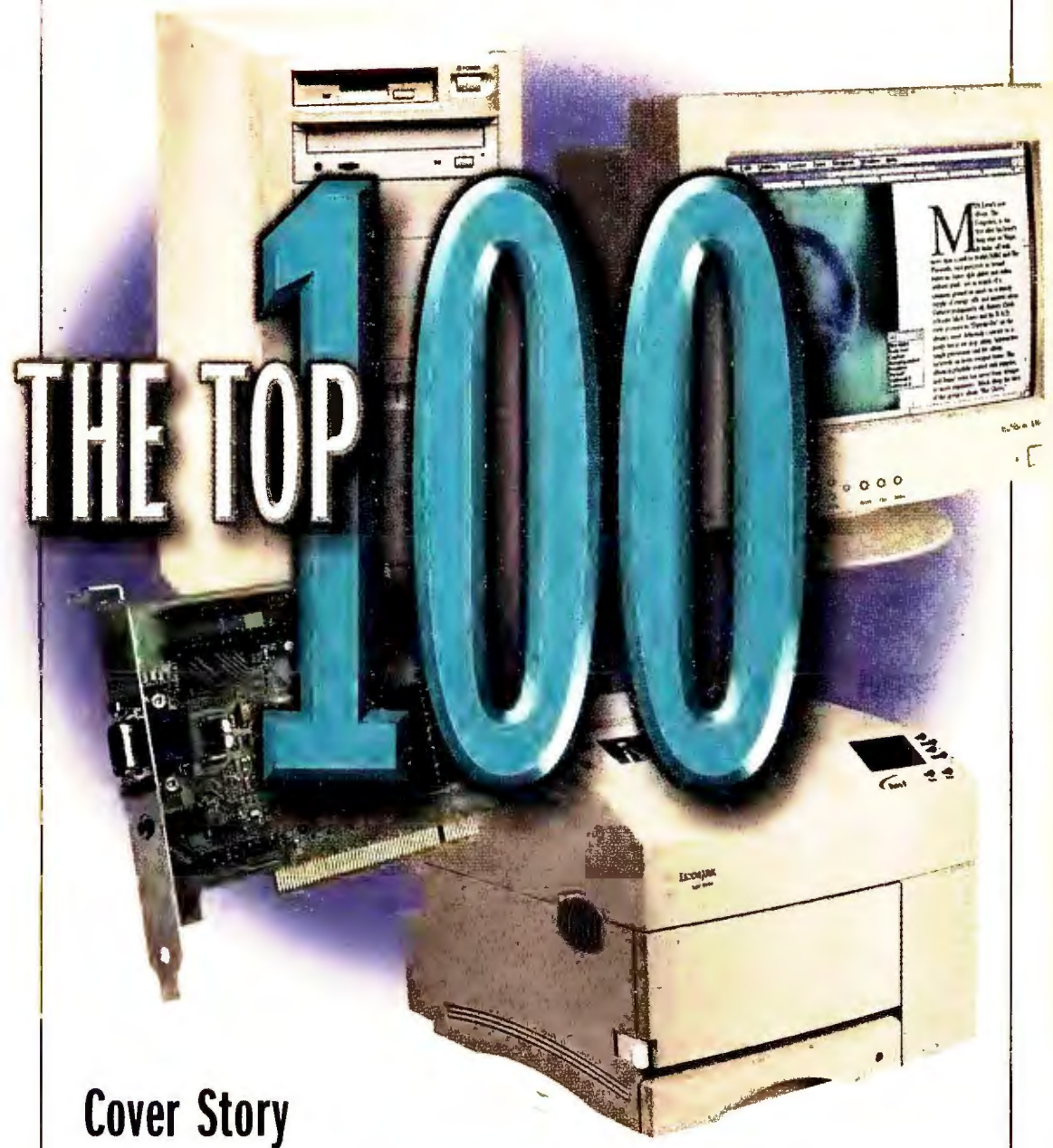
Together, the programs break down the barriers between you and other people. You find new ways to communicate, to share information, to collaborate.

Now you can use Microsoft Word as your e-mail editor with the Microsoft Exchange Inbox in Windows 95. Create your messages in Word, and use all of its functionality, its formatting options, to communicate more clearly, more convincingly. With Word's Internet Assistant, you can browse the World Wide Web and publish your own documents there. If you subscribe to The Microsoft Network, you can access it directly from Office. FindFast lets you search company servers and individual desktops for information you need by typing a phrase or key word. Even finding the information you need to schedule a meeting is made simpler with the Meeting Wizard in Schedule+. It can find a time when your list of people can meet, locate a conference room, and notify everyone of the time and place.

Now you can take full advantage of Windows 95.

New Microsoft Office was designed to work hand-in-hand with the Windows® 95 operating system and its simplified user interface. To make the most of 32-bit performance, long filenames, shortcuts, multitasking, and the Windows Explorer. Together, they make computing fundamentally easier and faster. They make it possible for you to spend less time computing, more time working effectively.

PC WORLD



Cover Story

192 Top 20 PCs: Attention, PC Shoppers
As holiday buying begins, year-end price cuts make office and home PCs hard to resist, with Pentium-75s for well under $2000, and Pentium-133s below $3500. This month's best: three Dell PCs—the Dimension XPS P133C, Xpi P90T, and Latitude LX 4100D—plus Micron's 4100 Magnum.

249 Top 10 Workgroup Printers: Lexmark, Hewlett-Packard Take Best Buys
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In our latest Top 10, check out 15 popular fax-modems priced from $174.

Cover Photography by Marc Simon

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277 Mobile Computing
Lessons for computing on the road no matter what your profession, from a wide range of businesspeople on the move—including, among others, an options trader, a lawyer, a toy company CFO, and a circus VP. Also, 15 products for the notebook-toting traveler, including a portable printer and a versatile cell phone.

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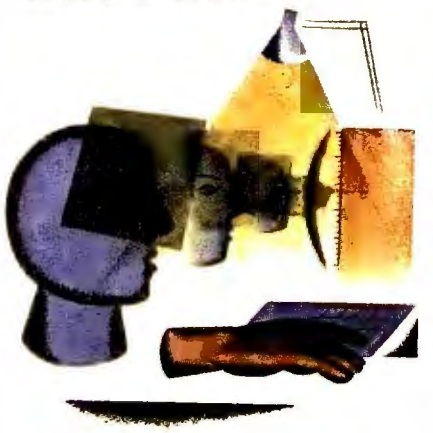
Publishing on the cheap.

Here's How



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The Right Tool For Your Job.

The ZEOS Pantera. Now with more speed, more memory, bigger hard drives, your choice of operating systems and new lower prices. It's today's modern solution to getting your job done right.

Step Up To The Best

At ZEOS, our philosophy is to make sure that you, our customer, get the best of everything. And that starts with performance. The heart of the Pantera is an award-winning ZEOS-designed motherboard. Already called "Overall performance leaders" by *PC Magazine*, the Pentium® processor-based Pantera line is now boosted even further with the addition of EDO DRAM, synchronous burst SRAM cache options and CPU choices all the way to the new 133MHz Pentium processor. In plain English, we've turned on the afterburners—giving you performance unlike anything you've seen before!

Beyond great performance, we also protect your investment. To ensure that your new ZEOS Pantera will serve you well for years to come, we build in more reliability, expandability and upgradability than anyone else.

For starters, all Pantera systems provide you with CPU upgradability—Pantera Pentium processor-based systems can be upgraded to a future OverDrive® Processor. Pentium processor-based Panteras include *six* memory sockets instead of the usual four. That means more room to grow—without having to throw away perfectly good memory when it's time to upgrade. Panteras with Pentium processors also include on-board PCI local bus SCSI and Ethernet options and the power to run all these goodies. Believe it or not, most companies are now building in small power supplies of 150 watts or less! That's great for reducing *their* costs, but it sure doesn't do much for *you*. Pantera power supplies are 200 watts *standard* and they're energy efficient—Panteras are EPA Energy Star compliant, meaning they can power down and use less energy.

The bottom line is that virtually no one else gives you any of these features to protect your investment. At ZEOS we give you them *all*!

More Than Great Hardware

In addition to the latest features, you need your new system to arrive promptly and you need it to work in *your* environment when you get it. That is why ZEOS Pantera systems include your choice of Windows® for Workgroups or the new Windows® 95, and that is why you also get compatibility with every major operating system on the market including Win NT®, Netware®, Unix® and OS/2®. That is also why we pioneered our *Computers Now*® program—many of our most popular configurations can be shipped the *very day you order* (even custom-built systems can be shipped in about a week). You could be taking delivery of your new Pantera tomorrow!

And after your purchase, we'll be here. ZEOS was the first to provide 24 hour-per-day, 365 day-per-year toll-free technical assistance, and it's the best there is. Add to that our easy accessibility through the major on-line services and through our automated fax-back system, and you can see that we support you like no one else.

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Unbeatable Value

The hottest performance for today and for tomorrow, compatibility, reliability, bundled software, the best service in the industry and incredible prices that'll leave you amazed at how much you get for so little. As *PC/Computing* said, the Pantera "...is a deal you simply can't pass up." So call your ZEOS Systems Consultant now at 800-554-5220. It's the best purchase decision you'll ever make.

PC MAGAZINE EDITORS' CHOICE — Pentium-66 April 12, 1994; DX4-100 June 28, 1994

COMPUTER SHOPPER — Pentium-60 April 1994; Pentium-90 August 1994

PC WORLD BEST BUY — 486DX2-66 January 1994, February 1994, March 1994, June 1994, December 1994, January 1995, February 1995, March 1995, April 1995; DX4-100 October 1994, November 1994, December 1994; Pentium-60 December 1994, January 1995, February 1995, April 1995; Pentium-66 June 1994, July 1994, August 1994, September 1994; Pentium-90 August 1994, September 1994, October 1994, November 1994, January 1995, February 1995

PC Best — Pentium-66 May 1994; Pentium-90 February 1995

Windows Sources Experts Pick — Pentium-66 June 1994; Pentium-90 August 1994

Windows Magazine 1994 Recommended — Pentium-90 November 1994

WINDOWS 1995 WIN 100 — Pentium-90 May 1995

Package 1		Package 2		Package 3		Package 4	
486 & DX4 Processor-based Panteras							
486DX2-66	$1495	486DX2-66	CN! $2095	486DX2-66	CN! $2495	486DX2-66	$2995
DX4-100	$1595	DX4-100	$2195	DX4-100	$2595	DX4-100	$3095
Pentium® Processor-based Panteras							
75MHz	$1695	75 MHz	CN! $2295	75MHz	CN! $2695	75MHz	$3195
90MHz	$1795	90 MHz	$2395	90MHz	CN! $2795	90MHz	$3295
100MHz	$1945	100 MHz	$2545	100MHz	$2945	100MHz	CN! $3445
120MHz	$2145	120 MHz	$2745	120MHz	$3145	120MHz	CN! $3645
133MHz	$2295	133 MHz	$2895	133MHz	$3295	133MHz	$3795
➤ 8MB RAM (Pentium processor-based Panteras include EDO RAM)		➤ 16MB RAM (Pentium processor-based Panteras include EDO RAM)		➤ 24MB RAM (Pentium processor-based Panteras include EDO RAM)		➤ 32MB RAM (Pentium processor-based Panteras include EDO RAM)	
➤ **528MB** local bus EIDE hard drive, 14ms		➤ **850MB** local bus EIDE hard drive, 11ms		➤ **1.2GB** local bus EIDE hard drive, 10ms		➤ **1.6GB** local bus EIDE hard drive, 10ms	
➤ 3.5" 1.44MB floppy disk drive		➤ **4X CD-ROM** drive and 3.5" 1.44MB floppy drive		➤ **4X CD-ROM** drive and 3.5" 1.44MB floppy drive		➤ **4X CD-ROM** drive and 3.5" 1.44MB floppy drive	
➤ **Diamond Stealth 64** PCI local bus SVGA color graphics card with 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus SVGA color graphics card with 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus SVGA color graphics card with 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus SVGA color graphics card with 1MB DRAM	
➤ ZEOS 14" 1024 x 768 NI SVGA color monitor, .28mm dot pitch		➤ **ZEOS 15"** 1024 x 768 NI SVGA color monitor, .28mm dot pitch		➤ **ZEOS 15"** 1024 x 768 NI SVGA color monitor, .28mm dot pitch		➤ **ZEOS 15"** 1024 x 768 NI SVGA color monitor, .28mm dot pitch	
➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans	
➤ Microsoft Mouse		➤ Microsoft Mouse		➤ Microsoft Mouse		➤ Microsoft Mouse	
➤ **MS Windows 95,** or MS-DOS 6.2 & Windows for Workgroups 3.11		➤ **MS Windows 95,** or MS-DOS 6.2 & Windows for Workgroups 3.11		➤ **MS Windows 95,** or MS-DOS 6.2 & Windows for Workgroups 3.11		➤ **MS Windows 95,** or MS-DOS 6.2 & Windows for Workgroups 3.11	
➤ **MS Works 95** or MS Works		➤ **MS Office Pro 95 & Bookshelf 95 CD,** or MS Office Pro & Bookshelf		➤ **MS Office Pro 95 & Bookshelf 95 CD,** or MS Office Pro & Bookshelf		➤ **MS Office Pro 95 & Bookshelf 95 CD,** or MS Office Pro & Bookshelf	

Included With Every ZEOS Pantera:

- ➤ Genuine Intel® Processor. ZIF socket for easy upgrading.
- ➤ Diamond Stealth PCI local bus SVGA color graphics card with 1MB DRAM, upgradable to 2MB DRAM.
- ➤ Flash BIOS for easy upgrading.
- ➤ Two high-speed serial ports and one enhanced parallel port on the motherboard.
- ➤ Slots: Three PCI & 4 ISA (486 processor), 3 PCI & 5 ISA (Pentium processor).
- ➤ ZEOS 101-key space-saving keyboard.
- ➤ 200 watt power supply with built-in surge suppressor. Switchable between 115/230V.
- ➤ EPA Energy Star compliant.
- ➤ FCC Certified Class B; UL Listed.
- ➤ Complete ZEOS Customer Satisfaction Package.

486 & DX4 Processors:

- ➤ Upgradable to Pentium® OverDrive® CPU.
- ➤ RAM expandable to 128MB.

Pentium® Processors:

- ➤ Upgradable to a future OverDrive® Processor.
- ➤ 6 SIMM slots for low-cost memory upgrading. EDO RAM expandable to 384MB.
- ➤ On-board PCI local bus Fast SCSI-2 and Ethernet LAN options.

Favorite Options

7-Bay Mini-tower Case Upgrade..Free
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528MB to 1.2GB HDD Upgrade $195
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Fastest 64-bit accelerated video $249
Upgrade from a 14" to a 15" Monitor
ZEOS SVGA NI, 1024 x 768, flat screen $95
Upgrade from a 15" to a 17" Monitor
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Internal 28,800 bps V.34 bis Modem with 14,400 bps Send/Receive Fax $199
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32-bit PCI Ethernet LAN adapter. Includes 10Base5, 10Base2 and 10BaseT connections.....$139
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400 to 800MB (with compression), includes backup software.....$199
Multimedia Upgrade
Sound Blaster 16® sound card, stereo speakers...$128

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Microsoft® Applications Included!

All Pantera packages include your choice of Microsoft® Windows® 95 or MS-DOS 6.22 and Windows® for Workgroups 3.11, and Microsoft® Office Pro & Bookshelf® or Microsoft® Works.

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Go To The Head Of The Class.

ZEOS Meridian notebooks are the classiest acts in town, each the leader in its category, ready to give you the power, performance and mobility that you could only dream of until now!

While each Meridian product is distinct, they all have several intelligent features that set them apart including local bus video; an 84-key keyboard with a comfortable palm rest and integrated TruePoint™ pointing device; and the most solid construction available so that you won't be left smarting.

Meridian 400 Subnotebook

WINDOWS MAGAZINE 1995 WIN 100 May 1995

"ZEOS is out to prove that good things do come in small packages with its Meridian 400C subnotebook," reported *Windows Magazine.*

At 3.9 pounds, the Meridian 400 is molded with a special carbon-fiber material that cuts weight and improves durability. And with a DX4-100MHz processor *standard*, it may well be the highest performance subnotebook available; "faster than a speeding desktop" is how *Computer Shopper* described it.

In addition to great performance, you also get hard drives to 350MB, RAM that's user upgradable to 20MB, two Type II PCMCIA slots, an external ultra-light 3.5" 1.44MB floppy drive (included in Packages 2 and 3) and your choice of active matrix or dual scan color screens. Amazing!

Meridian 800 Notebook

WINDOWS MAGAZINE 1995 WIN 100 May 1995

"The 800C notebook offers sleek styling, solid construction and hot performance....one of the fastest notebooks we've ever tested," said *Windows Magazine.*

At 6.3 pounds, the Meridian 800 full-size notebook is light enough to travel anywhere yet, with its whopping 10.3" dual scan or 9.5" active matrix color display, is large enough to use for presentations and everyday computing.

To complete the package, you also get a DX4-100MHz CPU, up to 20MB of user-upgradable RAM, a removable hard drive to 528MB, a built-in 3.5" 1.44MB floppy drive and PCMCIA slots supporting two Type II or one Type III devices. Full desktop features that fit in your briefcase!

Meridian 850 Notebook

"On our Graphics Winmark 95 tests...ZEOS's Meridian 850C grabbed the top position. The ZEOS 850C again finished first on our Disk Winmark 95 tests," reported *PC Magazine.* Grade A+ for performance!

Imagine, today's most advance computing capabilities wrapped up in a 6.8 pound package. With features including your choice of Pentium® processors, a 256K synchronous SRAM cache, user-upgradable memory to 32MB, removable hard drives to 1.3GB, PCMCIA support for two Type II

or one Type III devices and a built-in 3.5" 1.44MB floppy drive, this is the notebook computer that rivals today's most advanced desktops!

With its blazing speed, your choice of a 10.3" SVGA (800 x 600) dual scan color display or 9.5" VGA active matrix color display *and* 16-bit Sound Blaster® compatible sound through audio jacks, your Meridian 850 is also a traveling multimedia whiz. Pure genius!

Buy With Confidence

No matter which Meridian notebook you purchase, you get the best service and support in the business! ZEOS has won seven *PC Magazine* Readers' Choice for Service & Reliability awards. And, ZEOS was the first to provide 24-hour toll-free technical support.

The ZEOS Meridian notebooks are a study in excellence. Their performance, quality, reliability and durability make them the class of the industry. And it's easy for you to get top honors, too. Just call your ZEOS Systems Consultant to order now at 800-554-5220. It's the smartest move you can make!

Package 1

	400C	800C
DX4-100	**$2195**	**$2495**

- 4MB RAM
- 260MB IDE hard drive
- 800: Internal 3.5" 1.44MB floppy drive
- **MS Windows® 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Works 95** or MS Works

	850C
Pentium® Processor	
75MHz	**$3195**
90MHz	**$3395**

- 8MB RAM, 256K synchronous SRAM cache
- 528MB IDE hard drive
- Internal 3.5" 1.44MB floppy drive
- Integrated 16-bit stereo sound
- **MS Windows 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Works 95** or MS Works

Package 2

	400C	800C
DX4-100	**$2495**	**$2695**

- 8MB RAM
- 350MB IDE hard drive
- 3.5" 1.44MB floppy drive. 400: External, 800: Internal
- Custom nylon carrying case
- **MS Windows 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Works 95** or MS Works

	850C
Pentium® Processor	
75MHz	***CN!*** **$3695**
90MHz	**$3895**

- 16MB RAM, 256K synchronous SRAM cache
- **810MB** IDE hard drive
- Internal 3.5" 1.44MB floppy drive
- Integrated 16-bit stereo sound
- Custom nylon carrying case
- Extra battery
- **MS Windows 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Office Pro 95,** or MS Office Pro

Package 3

	400C	800C
DX4-100	***CN!*** **$2795**	***CN!*** **$2995**

- 8MB RAM
- IDE hard drive. 400: 350MB, 800: 528MB
- 3.5" 1.44MB floppy drive. 400: External, 800: Internal
- **14.4 PCMCIA fax/modem**
- Custom carrying case. 400: Leather, 800: Nylon
- Extra battery
- **MS Windows 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Works 95** or MS Works

	850C
Pentium® Processor	
75MHz	***CN!*** **$4195**
90MHz	***CN!*** **$4395**

- 16MB RAM, 256K synchronous SRAM cache
- **1.3GB** IDE hard drive
- Internal 3.5" 1.44MB floppy drive
- Integrated 16-bit stereo sound
- External amplified speakers
- **28.8 PCMCIA fax/modem**
- Custom nylon carrying case
- Extra battery
- **MS Windows 95** or MS-DOS 6.2 & Windows for Workgroups 3.11
- **MS Office Pro 95,** or MS Office Pro

Prices shown include dual scan color display.

Upgrade to *ACTIVE* color display! Meridian 400 add only $700. Meridian 800 or 850 add only $800.

Included With Every ZEOS Meridian:

- 400 & 800: Intel® DX4-100 processor. 850: Intel® Pentium processor, 75MHz or 90MHz.
- 400 & 800: RAM expandable to 20MB. 850: RAM expandable to 32MB.
- IDE upgradable HDD. 400: to 350MB, 800: to 528MB, 850: to **1.3GB**.
- PCMCIA slots. 400: 2 Type II, 800 & 850: 2 Type II or 1 Type III.
- Local bus video with 1MB video RAM.
- Display: Color VGA backlit LCD, up to 256 colors. 400: 640 x 480 7.9" DSTN or active matrix. 800: 640 x 480 10.3" DSTN or 9.5" active matrix. 850: **800 x 600** 10.3" DSTN SVGA or 9.5" 640 x 480 active matrix.
- Supports an external SVGA color monitor at resolutions up to 1024 x 768.
- 84-key keyboard with embedded numeric keypad, 12 dedicated function keys and inverted "T" arrow keys. Integrated TruePoint pointing device.
- Ports: Serial, parallel (850: enhanced EPP & ECP), external SVGA video, external keyboard or PS/2 mouse (800 & 850 both). 400 also with external floppy drive. 850 also with mic-in and stereo speaker-out.
- Replaceable, rechargeable NiMH battery.
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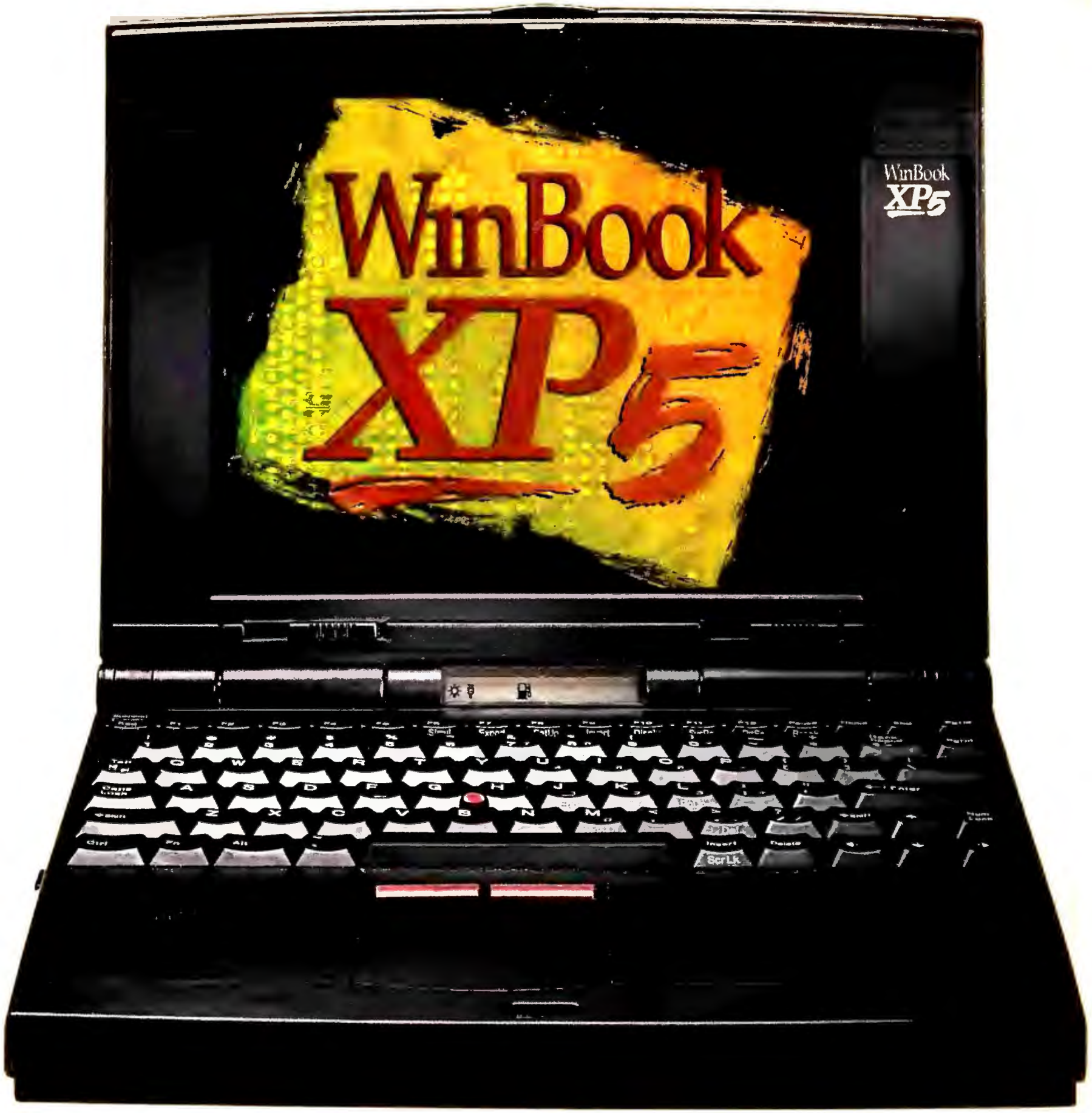

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To judge from all the talk at coffeehouses and cocktail parties, the world of personal computers is a man's world: 133-MHz screamers that pump up, rev up, and turbocharge Windows. Multigigabyte hard disks bigger than the guy's next door. Ads with images of rockets and race cars. A new culture of the digital elite that reveres pony-tailed programmers coding the next version of Doom, and '90s-style cowboys ridin' hard on the cyberspace range.

Give us a break! All this talk, all these images are hopelessly out of touch. The stereotypical male hacker fraternity—and much that it represents—has become a marginal minority. At the same time, women in business have become a far more powerful force. A few telling statistics: Last year, the number of women who influence business purchases of PCs grew by 20 percent, while the total number of influencers grew by just 7 percent. The number of women influencing home PC purchases grew 25 percent, again outpacing total growth and now representing 42 percent of all home PC buyers. And these women know their stuff. When assessing their level of PC skills, as many women as men rate themselves intermediate; more men than women rate themselves novice.

Women, though, as a rule, don't get carried away by "speeds and feeds" and seductions of some cool but mythical digital world. We like high-performance PCs if and when they help us excel at our jobs, manage our personal lives—and, yes, have fun. We don't care that Windows 95 uses a mix of 16- and 32-bit code. We do care that we can run all our software without our PCs constantly crashing. We don't care about memory models. But we don't want to endure aggravating 'Out of Memory' messages when we know damn well our PCs have plenty of RAM. We don't want to fiddle around with batch files. We don't want to download "fixes." And we don't want to obsess over patterns for our Windows wallpaper. We simply want to do our jobs—at work and home—with the best products available, and we want them to work as promised. When they do, *that's* cool.

Essentially, that attitude mirrors the mission of *PC World:* to help our readers, regardless of gender, buy and use computers to make their work and lives easier. In light of that mission, we're delighted to introduce several new features this month. First, you'll find a special section edited in collaboration with *Working Woman* magazine. Called "The Practical Guide to Business Software," this section focuses on helping readers—women and men alike—choose and use the best software for running small and growing businesses.

The lead article, "How to Succeed with Software," recounts lessons learned the hard way by small-business owners—from Lori Abramson, whose use of ProSystem Fx software helped turn around her accounting business, to Rose McElrath-Slade, whose Virginia-based software development and management consulting firm uses Microsoft Project to keep the business from degenerating into chaos. The second article, "Perfect Picks," recommends 35 programs for small-business owners: contact management software, fax/communications packages, accounting software, and more. Pick and choose the ones that make the most sense for you. Throughout the section, you'll also find profiles of women-owned businesses that use technology to serve customers better and increase revenues. All readers can learn from their successes—and failures.

Not by Specs Alone

What about recommendations for PCs and other hardware that work as promised? Turn to this month's system review, "Attention, PC Shoppers," for the start of the PC World Top 100 featured on our cover. As always, these monthly Top 20 and Top 10 charts will quickly direct you to the best products in critical categories: power desktop PCs, budget desktop systems, notebooks, printers, graphics boards, monitors, and now modems. Two new charts debut in this issue: first, the Top 10 17-Inch Monitors; and second, the Top 10 Modems, recommendations for a piece of equipment that more and more of us rely on every day.

Women don't, as a rule, get carried away by 'speeds and feeds' and seductions of some cool but mythical digital world.

For all Top 20 and Top 10 charts, we back up our Best Buy recommendations with real-world testing and common-sense evaluation. Use our Top 100 charts this month and every month, whether you're considering new PCs and hardware at work—or at home, for the women and men or girls and boys in your lives.

Cathryn Baskin, Editor

Photo credit: U.S. Navy air blast test, 1949/Courtesy UPI/Bettman

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PC MAGAZINE EDITORS' CHOICE
Nakia Multigraph 447X
September 28, 1994
Best of the Year 1994

IMAGING MAGAZINE PRODUCT OF THE YEAR 94
Product of the Year
Nokio Multigraph 445X

Windows SOURCES EXPERTS PICK
Nakia Multigraph 447X
August 1994

RATED
Nakia Multigraph 447X
October 1994

Best Buy FamilyPC
Nakio Multigraph 447L
June 1995

PC WORLD BEST BUY
Nokio Multigraph 447X
April 1995

BEST Home Office COMPUTING BUY
Home Office Computing
Nakia Valuegraph 447L
February 1995

1995 EDITORS' CHOICE HOMEPC 100 TOP PRODUCTS
Nakia Multigraph 447L
June 1995

WINDOWS MAGAZINE 1995 WIN 100
Nakia Valuegraph 447L
May 1995

EDITORS' Home Office COMPUTING PICK
Home Office Computing
Nakia Valuegraph 449E
January 1995

PC MAGAZINE EDITORS' CHOICE
Nakia Multigraph 449E
March 15, 1994

Ever since their introduction in the U.S., Nokia has been recognized by editors and sophisticated users alike as technologically superior. The displays are brilliant and tack-sharp. The ergonomics are an exuberant expression of Nokia's European home.

Nokia "firsts" read like a history of advanced monitor technology; including the world's first TCO and MPR II-certified emissions control and the first all digital monitors with on-screen menu controls.

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Circle 168 on reader service card

Installation Bliss, Notes From the @Home Front

Clear, Competent Guidance

My vote for the best Windows 95 installation help goes to *PC World*'s September issue. I read every article in every magazine that I could get my hands on, but your article "How Do I...Install Windows 95?" by Sharon Crawford and Charlie Russel was the one I had beside me through the entire process. I'm sure that my successful installation was due to the completeness of your information as well as the clear manner in which it was presented. Thanks for your help! Now that I'm up and running, I'm going through the remaining "How Do I..." articles, one by one, and finding them just as useful. Thanks for an excellent job.
Carole Zatz, Internet

On the Upside

I received my September issue in the mail today. I still insist, as I have in the past, that the Top 20 and Top 10 reviews are 40 to 60 pages per month of editorial waste, but I do have to compliment you on "Who's Afraid of Windows 95?" It is the best of any periodical's coverage, the most helpful, and it takes a very positive approach. Windows 95 is here, and what we users need is good, positive, clear help to get us going; not a lot of complaining about what someone thinks is missing or wrong with it. Great job!
David Ross, Fremont, California

A Done Deal

It is with some trepidation that I mail my subscription renewal check. I fear the next 12 issues will consist of 6 that will be mostly excuses and apologies for Bill Gates' biggest scam yet, and the next 6 extolling the virtues of Windows 96 (or 97) that will correct everything wrong with 95.

How about giving the few of us who don't believe that the sun rises and sets on Microsoft a break by at least keeping the *Star-Dot-Star* column free of advice on how to make Windows 95 run better?
George Lynch,
North Syracuse, New York

Editor's response: This month we're folding *Star-Dot-Star* into *Help Line*, so that you can find general how-to information in a single place. You'll note, however, that *Help Line* provides you with plenty of advice about non-Windows topics. —*Eric Bender*

To the Rescue

I enjoyed "Tips For a Trouble-Free Upgrade" in your September issue. The section "Rescue Me" may result in some problems for novices, however. The authors listed items that should be included on a bootable floppy. They listed edit.exe as the text editor; but the editor for MS-DOS versions 5.0 and above is named edit.com, not edit.exe. In addition, edit.com requires the file qbasic.exe in order to work.
Larry Harrington,
Edgewood, Maryland

Not on My System

I read your glowing report on Connectix's RAM Doubler [*New Software*, September], but it sure didn't work with my PC, a 90-MHz Dell Pentium with 8MB of RAM. It slowed my system down to a crawl and also caused a number of other problems. I wouldn't recommend it. The best thing to do is get more RAM. I can get 8MB from a large outlet in southern California for about $300.
Peter Erikson, Bakersfield, California

Editor's response: Of the several Windows 3.1 memory compression products that writer Reid Goldsborough examined, he ranked Connectix's RAM Doubler as one of the best. But you're right; these products cannot substitute for more RAM—if you have an application that requires 8MB of RAM, adding RAM Doubler or LandMark's MagnaRAM to a 4MB system won't help. These products allow you to run more apps simultaneously under Windows 3.1 by letting your system use RAM more efficiently.

Still, RAM Doubler should not slow system performance, Connectix says. The types of symptoms you mention might occur if you add RAM Doubler to a PC that uses memory hogs like print spoolers, disk caches like Windows SmartDrive, or RAM drives. One option with SmartDrive is to reduce the parameter 'Cache Size While Running Windows' to 512K or less. If this tactic doesn't work and technical support can't help you, then exercise Connectix's 30-day money-back guarantee, as Erikson did. —*Randy Ross*

Back to Front

I really enjoy the new *@Home* section of your magazine. The items covered in these articles are very useful to me

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as a home user. I will start reading *PC World* from the back from now on. Keep up the good work.
Steven Lisonbee, Orem, Utah

What Happened to Consumer Watch?

My favorite part of *PC World* magazine has always been the *Consumer Watch* department. Because of the wonderful work done by Roberta Furger, Christina Wood, and Peggy Nauts, I have recommended *PC World* and have sent gift subscriptions to many people.

After I received the August edition, I went to the table of contents but did not find *Consumer Watch* listed under Departments. I searched the front of the magazine. Eventually, I found a shell of the former *Consumer Watch* in your new *@Home* section.

I am extremely disappointed that your editorial staff, or some other department within your company, destroyed my favorite part of *PC World*. I hope you will restore *Consumer Watch* immediately to its former version.

At the moment, my belief is that *PC World* is headed the same way as the Ziff-Davis magazines. I dropped my subscriptions to all Ziff-Davis magazines.
Lanny Marcus, Cali, Colombia

Author's response: Although the look and location of *Consumer Watch* has changed, the column is still alive and well in *PC World*, as is *Shop Talk* (which has been renamed *Feedback*). We've moved the column as part of our expanded home coverage, but the mission of *Consumer Watch* remains the same: to provide readers with honest, straightforward advice and to investigate issues and problems of concern to consumers. Thank you for your support.
—Roberta Furger

Out With the Desktop

I notice that your Web site heavily advertises Symantec. Your magazine has even previewed the new Windows 95 Norton products ["New Apps: The First Wave," August]. Apparently I am one of the few who have noticed, but conspicuously missing from the Norton product lineup is a replacement for the Norton Desktop. This seems to have slipped past your "critical"

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Circle 9 on reader service card

review, and those of other publications. I have been a continued loyal customer of the product throughout its life, and so I was quite dismayed that Symantec has apparently decided not to release a Windows 95 version of the Norton Desktop.

The Desktop (and PC Tools as well) can be replaced only through purchase of three products, whose prices total more than a full retail version of Desktop and whose functionality adds little and loses a good deal. I guess it pays to buy out the competition (in this case, Central Point Software). Who says we shouldn't worry about all the consolidation in the software industry?
S. R. Jessee, Internet

Adding It Up and Laughing

In a world full of stress and conflict, it's always refreshing to take a break and enjoy some good humor writing, so I especially liked Steve Bass's "How Not to Upgrade to Windows 95" [September]. Imagine: Steve's mom (and you) can have almost, sort of, the functionality of some of the elements of Microsoft's $89.95 Windows 95 upgrade...for only $148.90! This weekend I installed Windows 95 on my computer (which went flawlessly using *PC World*'s excellent guide in the same issue). Then I sat back, reread Bass's column, and thought about the 50 to 60 bucks I just saved. What a sense of humor that guy has! But perhaps his mom isn't laughing.
Mark Roberts, Rochester, New York

Author's response: Okay, I agree, spending all that money on products that'll likely be useless in a few months isn't economically bright. But I also don't think it's necessary to buy all the products I mentioned. Most important, my point is that people should not hop into a new operating system just because Microsoft offers it. Many people haven't looked at which products will work with Windows 95; few have thoroughly examined their existing drivers or contacted vendors to see if upgrades are available. And those with an average, 8MB machine will be surprised at how sluggish it is with Windows 95. So overall, I don't think it's unwarranted to wait for release 1.*x* or even the one after that.

It's true, I don't dispense financial advice for a living. But I do take care of my mom's computer, and no doubt she won't upgrade until I do. —*Steve Bass*

Welcome to the World Wide Web

Bravo! I've been an avid reader of *PC World* for years and was excited, then discouraged, when the magazine ventured into the online world. For a while it seemed *PC World* would be confined to the bleak expanses of America Online. Now you've established a Web site, with a full-fledged FTP site to follow. I'm glad *PC World* has finally made its online resources available to the throngs of people on the Internet—many of whom would never go near AOL or a commercial service. Thanks!
Tony D. Lowe, Internet

Le Mot Juste III

One of your correspondents proposed the name *obloid* for a rectangle with rounded corners, and another suggested roundtangles [*Letters*, August]. However, a more appropriate name for such a figure already exists: *superellipse*. The superellipse was proposed by the Danish poet and scientist Piet Hein to serve as a shape mediating between circle and square—between roundness and orthogonality, if you will.
Lucian Chimene, Austin, Texas

Corrections and Clarifications

Versions of Visio Corporation's flagship drawing package for Windows NT/Power PC ("At Long Last, PowerPCs," July) and for Windows 95 ("New Apps: The First Wave," August) were listed incorrectly. The correct name of the product in both cases is Visio 4.0.

"Scanners Across the Spectrum" (September) incorrectly listed the software bundled with Visioneer's PaperPort sheetfed scanner. The scanner is bundled with WordScan OCR, according to Visioneer.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 12 for contact information.*

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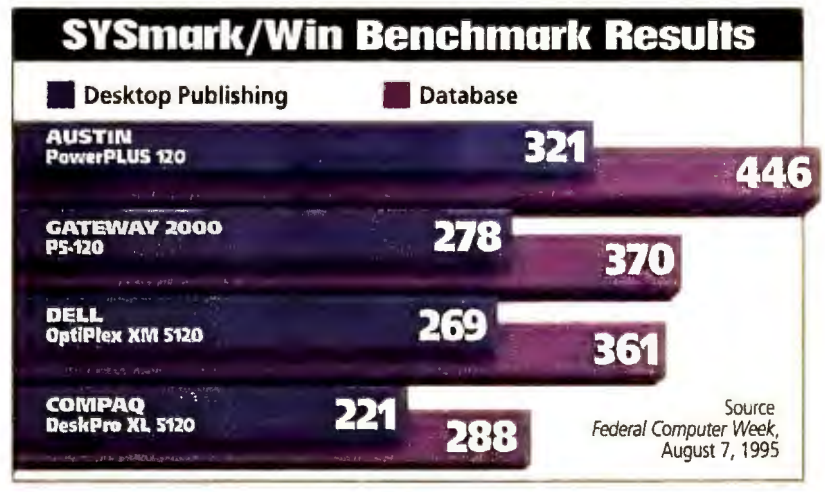

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Our new Ultra Fine monitor truly defines sharpness. With its ultra crisp, ultra brilliant image this powerful monitor is the intelligent choice for your business and graphics applications. Ultra Fine images are nothing new from ViewSonic. The ViewSonic 21PS was the first 21" monitor (19.7" diagonal viewable area) available with a 0.25mm dot pitch, and now it's offered on our top performing 17" monitor (15.7" diagonal viewable area).

The ViewSonic 17PS retains all the superior features that make ViewSonic monitors award winning market leaders. Our OnView™ on-screen control system, Super Contrast screen and exclusive ARAG® anti-reflection, anti-glare screen coating combine to produce the sharpest images possible. PC and Mac compatible, our new 17" monitor supports a maximum resolution of 1,600 x 1,280 and a 77Hz refresh rate at 1,280 x 1,024. The remarkably quick refresh rates and high resolutions offer you crystal clear, flicker-free images. In addition, the ViewSonic 17PS includes *Plug & Play +** for automatic graphic card configuration with Microsoft's Windows ®95, plus TCO certification, the strictest Swedish safety standard.

Designed for your critical desktop publishing, business graphics and CAD/CAM applications, the ViewSonic 17PS is an example of our ongoing commitment to offer you the best monitor at the best price.

Experience the new world class standard in 17" monitors – the ViewSonic 17PS. You'll See the Difference!

ViewSonic®

See The Difference!™

COMDEX BOOTH L402 FALL 1995

Tel: (800) 888-8583; Product Code 396
or (909) 869-7976 Fax (909) 869-7958
Call FaxSonic (909) 869-7318 (24-hour fax-on-demand)
Request Doc. 153 (17PS), 162 (21PS)
Internet: http://www.viewsonic.com

*Requires a DDC compatible card.

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Circle 224 on reader service card

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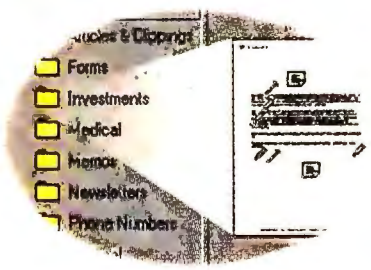
Windows 95 Compatible

INCLUDES $249 WORTH OF FREE SOFTWARE!

The easiest way to get paper into your PC.



Organize everything easily.
Mark-up your documents, then put them in files you create. Instantly find whatever you need with our powerful search tools.

Copy, fax, and edit—at your fingertips.
Just drag and drop your document to your fax, e-mail, word processors, printers—and more. You'll never again have to babysit the fax machine or wait in line for the copier.

With Visioneer's new PaperPort Vx, you can get paper into your PC in as little as two seconds—and put it to work with unmatched simplicity and speed.

Get paper in fast.

Just feed *any* piece of paper (up to 8.5" wide and 30" long)—a letter, photo, newsclip, receipt, business card—into PaperPort Vx. In seconds, it appears on your screen. Crisp and clear. Easy to read. And ready to be faxed or e-mailed, edited or copied, printed or filed with incredible ease.

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PaperPort Vx has direct links to hundreds of the most popular software applications, so you can automatically integrate paper into the applications you use everyday—your fax, on-line service, word processor, contact manager, spreadsheet, and many more.

Do even more with $249 worth of free software.

PaperPort Vx includes the latest OmniPage LITE™ OCR software to transform scanned paper into editable text; Corex CardScan SE™ to automatically turn your pile of business cards into an electronic card-file of contacts; and PictureWorks Copier™ to turn your computer and printer into an instant copy machine—with powerful features to resize your image and put multiple items (like receipts and business cards) on a single page.

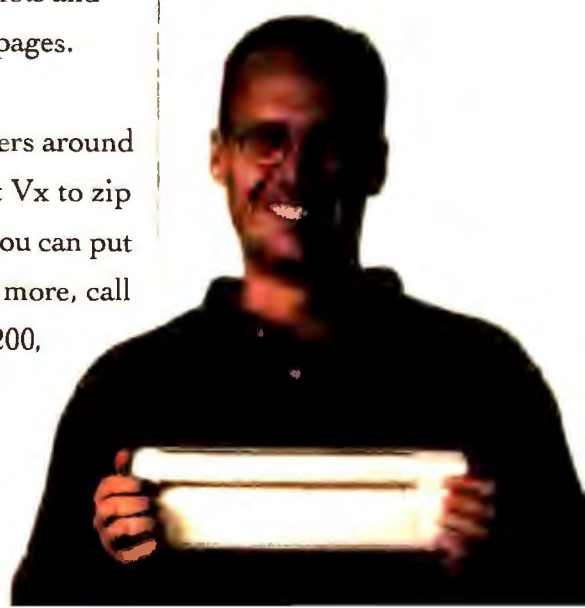
Superior readability, superior results.

Only PaperPort Vx gives you exclusive SharpPage™ technology. So you get crisper scanned text—and your fax recipients get extremely legible pages, with no unreadable black blotches. And with up to 256 shades of gray, PaperPort Vx accurately captures your snapshots and graphics—even magazine pages.

So, instead of running papers around your office, use PaperPort Vx to zip them into your PC where you can put them to work. To find out more, call us at 1-800-787-7007, Ext. 200, or see your local dealer.

Super-small, super convenient.
PaperPort Vx fits between your keyboard and monitor, and installation couldn't be easier. Just plug it into a serial or parallel port—no cards required.

Award-winning.
PaperPort has won the most prestigious awards for its usability and design.



VISIONEER

PAPERPORT Vx

Circle 187 on reader service card

Meeting Your Customers Halfway

Face-to-face contact with your customers is hard to beat, but it's not always practical or even possible. Leave it to technology to offer a solution: videoconferencing systems and Integrated Services Digital Network phone lines. When matched with the appropriate hardware and software at both ends, the fast ISDN lines enable remote clients and colleagues to collaborate in real time—getting information, filling out forms and documents, even sharing software applications.

At U.S. Bank in Portland, Oregon, a new collaborative system is allowing bank customers to open accounts and fill out forms without waiting in line. This month Mike Cebula, U.S. Bank's assistant vice president and product manager for ATM and video banking, describes how installing ISDN lines and a videoconferencing system is making a difference in the way his company does business. —*Ed.*

Cutting Costs, Winning Hearts

In the 1990s it seems that the dictum from just about every CEO is to cut costs. Faced with increasingly demanding and competitive markets, many companies are finding that the costs of building and maintaining offices full of equipment and trained employees are harder and harder to meet.

Like everyone else, we at U.S. Bank are also under pressure to lower our operating costs. With 435 branch offices in Oregon, Washington, Nevada, Idaho, and northern California, we're always looking for new ways to deliver products and services while avoiding the stiff overhead of running fully staffed branch offices.

One way to cut costs is to offer "convenience banking" services: Our 1200 automated teller machines, toll-free telephone lines for account information, and home PC banking services for Microsoft Money users allow us to provide services without having to open a branch office in every town. One popular mode of convenience banking is the in-branch kiosk, usually consisting of a dedicated telephone at a booth where you can press different keys to access account information and other services.

Last year a few of our competitors brought in-lobby kiosks into the computer age by installing computers and hooking them to ISDN lines available from telephone companies. ISDN is a high-bandwidth digital technology that can transmit data and images as well as voice. The $110 installation charge and $69 monthly service fee—paid to U.S. West, a regional telephone company—are slightly higher than the cost of a standard business telephone line, but still affordable. The ISDN-capable kiosks allow customers to see as well as hear a service representative, and fill out forms using videoconferencing hardware and software.

Knowing that our competitors were installing remote kiosks, we began investigating the possibility of doing likewise. We evaluated video and data-sharing technologies from AT&T, Intel, Northern Telecom, and PictureTel, all of which cost around $1000, run on PCs, and allow users to share data, sound, and images. Ultimately, we chose the $999 ProShare Video System 200 videoconferencing system from Intel, largely because it was widely available through Intel's resellers.

Given the marketing push that Intel is putting into promoting and selling the ProShare system, we also felt that it was just a matter of time before our more convenience-minded customers had ProShare and ISDN in their own homes and offices. Taking the first steps now, we reasoned, would allow us to deliver our services right to our customers' desks tomorrow.

Mike Cebula oversees video banking and ATMs for U.S. Bank in Portland, Oregon.

STEVE BLOCH

The ProShare package comes with a camera, a microphone, and software, plus an ISDN card and video capture card that fit into a PC's ISA slots. If two ProShare users on opposite ends of an ISDN line are running the same software application, both of them can see and collaborate on it. Obviously, if we could load the appropriate applications on a publicly available computer and give our customers access to it, we'd be providing them with an ideal way to interact directly with U.S. Bank.

So in the lobby of our Portland main branch, we installed ProShare on a Hewlett-Packard Vectra Pentium-90 PC outfitted with an IBM touch-screen monitor. When a customer approaches the videoconferencing PC in our lobby, a top-mounted camera records their face and displays it on the right side of

Save Disk Space

PKZIP®

PKZIP® version 2.0

PC WORLD

PKWARE® introduces the next generation of its award winning compression utility. PKZIP 2.0 yields greater performance levels than achieved with previous releases of the software. PKZIP compresses and archives files. This saves disk space and reduces file transfer time.

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PKLITE increases your valuable disk space by compressing DOS executable (.EXE and .COM) files by an average of 45%. The operation of PKLITE is transparent, all you will notice is more available disk space!

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The PKWARE Data Compression Library® products allow you to incorporate data compression technology into your software applications. The application program controls all the input and output of data, allowing data to be compressed or extracted to or from any device or area of memory. Not compatible with files created by PKZIP.

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the screen. The screen also offers the customer a choice between taking a self-running "tour" of the different products and services we sell and speaking with a representative.

A person choosing the latter option is connected through the ISDN line to a customer service agent who is using the same equipment; the customer can ask questions or see forms as needed. If they want to open a new account, for example, the appropriate form appears on the screen so they can work interactively as the banker asks questions. When the form is filled out, it's printed at the kiosk; the customer can then sign the form and drop it in a box for immediate processing.

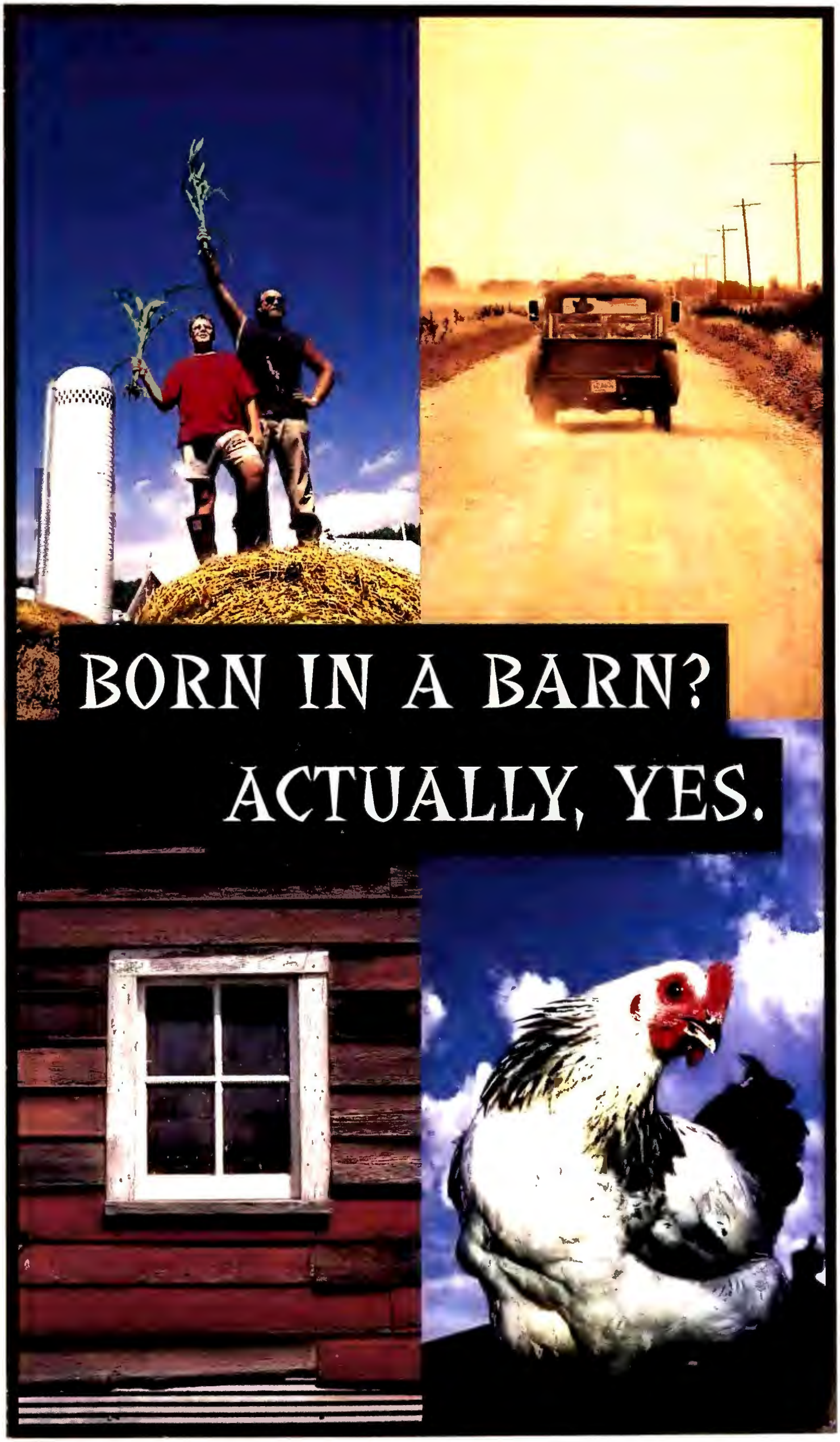
Once the information is collected, it's easy for U.S. Bank to use it in other situations. For example, if a customer needs an ATM card, a bank employee simply copies the electronic information to a new form and sends it to the printer so the customer can sign it. We avoid the labor and time involved in filling out multiple forms and at the same time prevent the kinds of errors typical of paper data collection. Plus we can fulfill customers' needs without their having to make numerous visits to the bank.

We have discovered that our ProShare-equipped PC has already paid for itself in terms of new accounts and customer satisfaction, particularly among those people who already prefer convenience banking and are familiar with computerized tools. We're hoping to install the new kiosks in locations where it would not be feasible or cost-effective to open a branch—in an office building, an airport, a shopping mall, or a grocery store, for instance. By also providing an ATM next to each kiosk, we should be able to offer almost all the services of a branch office.

- **Intel ProShare Video System 200** $999; Intel Corp.; 800/538-3373
  Reader service no. 621

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 12 for contact information.*


BORN IN A BARN?
ACTUALLY, YES.

We are Gateway 2000. We share the vision of being our customers' only logical choice.

August 1985
"Hey, Mike ... coll me crozy but I've hod this craving all day to start a computer company!"
Ted Waitt

August 1985
Ted's grandma, "Momo," takes a leap of faith and becomes Gateway's first principal investor, securing a $10,000 loon.

April 2, 1986
The Livestock Exchange at the Sioux City Stock Gateway's first home c home.

April 3, 1986
UPS man gets stuck in tor for the first of many Begins thinking of stair alternative.

1986
The Livestock Exchange Building cockrooches were this big.

March 1988
Phone system expanded to 10 lines!

1988
Earle Grueskin, our first former Sioux City mayor, joins the payroll.

February 1988
25 systems built and shipped in one day! All 10 phones ringing off the hook from Gateway's first major ad in *Computer Shopper*, "Computers From Iowa?"

1989
It doesn't get any better than this — standard VGA monitors on all PCs!

June 1989
Gateway goes online with GW2k BBS.

December 1989
McGraw-Hill purchases 386-20s and achieves immortality as Gateway's first major Fortune 500 customer.

Industry First!

January 15, 1990
Gateway moves to new digs in North Sioux City, SD. 185 employees are shipping 225 PCs per day.

February 1990
Ted thinks, *"G tting kind of big — better think of a slogan."* New Gateway logo and *"You've got a friend in the b siness"* are introduced.

1991
Gateway becomes first company to win all four *Computer Shopper* Best Buy desktop awards.

Industry First!

February 1991
Gateway is first to introduce non-interlaced monitors on all systems.

April 1991
First cow-spotted boxes ship!

January 1991
Ted and Mike: "Will you sell us about a gazillion processors?" Intel: "Umm ... No."

April 1991
Gateway debuts new cool gray case design: mini desktop model and standard AnyKey keyboard.

July 1992
Gateway's "Race" ad hits.

Industry First!

February 1992
Customers rejoice! Gateway begins offering choice of application software with new systems at no extra charge.

The best place to buy a PC on the planet!

March 1992
Ted and Mike: "Now will you sell us about a gazillion processors?" Intel: "Umm ... OK."

1992
Barely seven years old and already Microsoft PC Manufacturer of the Year.

April 1993
Gateway named a Fortune 500 company and North Sioux City gets its *first* 4-way stop sign.

1993
Gateway offers first Family PC multimedia system for $1,995.

March 1993
Gateway hires its 2000th employee.

April 1993
Gateway's one millionth PC ships to Jerry Herak in Spokane, Washington.

May 1993
Cow spots painted on Gateway's North Sioux City facility. Employees wonder what's next.

Industry First!

August 1993
The ColorBook and HandBook 486 enter Gateway's stellar product lineup.

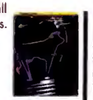
May 1994
Gateway announces a three-year warranty for all desktop PCs and monitors.

July 1, 1994
Gateway opens a showroom in Paris, Franc

July 1994
CD-ROM d es standard on all Gat y systems

September 994
OK, now i reland, France and Germ . Ted considers foreign lar age lessons.

Industry First!



March 1995
Premier issue of GW2k: Gateway Magazine.

May 1995
Gateway's P5-120 is named the "fastest PC in the world," by *PC/Computing*.

May 1995
Technical support completes 12,046 calls in one day! All techs treated to sparkling cider in plastic champagne glasses.

July 1995
Gateway ranks first among Intel/Windows PC manufacturers in brand loyalty

September 5, 1995
6,000 employees worldwide bra Gat 10th Ann

September 6, 1995
Expansion must be our middle name! Plans announced for Gateway Japan.

vember 1985
d springs for anksgiving dinner for entire Gateway workforce (Mike Hammond).

1986
North Sioux City, South Dakota, gets a water tower.

1986
Gateway 2000 ships its first PC.

sing ascot won.)

August 3, 1986
Shipping clerk covers for Ted over lunch and becomes Gateway's first sales rep.

Instruments PC ners exchange TI PCs ateway 2000 IBM patibles.

uary 1987 and Mike get sick oking at each . Up go the first de walls!

clerk/sales rep can't e "peripherals." So we systems and ship our PC for $2,295.

Industry First!

1988
EGA color monitors standard on all systems.

1988
Ted hires high school kid (future Manufacturing Director) to spray paint Gateway logo on plain white boxes.

September 1988
Gateway herd finds greener pastures in Sergeant Bluff, Iowa (we moved there).

September 1988
Gateway sells 386-20 PC for $2,995, receives *Byte* magazine's Award of Distinction.

1990
The population of North Sioux City reaches a whopping 2,019.

October 1990
Gateway's first 486 system hits the market value-priced at $5,295.

Industry First!

May 1990
Microsoft Windows is now standard on all Gateway systems.

You've got a friend in the business.

April 1991
Technical support completes a record number 2,800 calls in one day!

1991
Inc. magazine proclaims Gateway the fastest-growing company in the nation.

August 1991
Gateway's Robin Hood I ad hits.

July 1992
Gateway pours first paved parking lot. Employees throw away hip waders.

March 1992
Technical support holding queue is empty for the first time in company history.

Industry First!

May 1992
Going mobile with our first portable computers, including the HandBook, the industry's first subnotebook.

November 1993
Another Gateway facility opens! This time in Sioux Falls, SD.

October 1993
Gateway Europe sets up shop in Dublin, Ireland, marketing to Ireland and the UK.

1993
Gateway hires second former Sioux City mayor, Jim Wharton.

December 1993
Gateway becomes a public company.

September 1993
Gateway introduces first VESA system.

Industry First!

October 1993
Gateway offers our first Pentium system, the P5-60, for $3,595 and sweeps *Computer Shopper's* Best Buy awards for third consecutive year.

October 1994
North Sioux City welcomes the first "golden arches" of McDonalds.

November 1994
New Gateway facility opens in Kansas City.

D nber 1994
Ti berty small n ook makes its out.

De nber 1994
Go way's Holiday ad insert, "Fee Like A Kid Again" hits.

Industry First!

June 16, 1995
Gateway is first to offer Windows 95 as a free upgrade on all standard configurations.

July 28, 1995
Gateway goes "down under" to Australia.

August 1, 1995
Gateway Gold service and support program unveiled

1996
North Sioux City gets its first traffic lights.

2015
Gateway continues its dedication to bringing all PC buyers the highest performance, technology and service — all at the best value.

2020
"Hey Mike ... call me crazy, but I think this whole computer company idea is gonna fly."
Ted Waitt

We've always been happy, but we will never be satisfied.

Gateway 2000® Family PC™ Systems

P5-75 FAMILY PC

- Intel® 75MHz Pentium® Processor
- 8MB DRAM
- 850MB 10ms DMA Mode 1 EIDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X EIDE CD-ROM, 16-Bit Sound Card & Altec™ ACS-40 Speakers
- TelePath® 14.4 Fax/Modem Communication Center
- 3.5" Diskette Drive
- 15" .28dp CrystalScan® Monitor
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **Microsoft® Windows® 95**
- [redacted]Generations Software Collection
- **Gateway Gold™Service & Support**

$1899

P5-100 FAMILY PC

- Intel 100MHz Pentium Processor
- 8MB EDO Performance-Enhanced Memory
- **1GB 9ms DMA Mode 2 EIDE Hard Drive**
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X EIDE CD ROM, 16-Bit Sound Card & Altec ACS-40 Speakers
- **TelePath 28.8 Fax/Modem Communication Center**
- 3.5" Diskette Drive
- **15" .26dp Vivitron™Color Monitor**
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- [redacted]Generations Software Collection
- **Gateway Gold Service & Support**

$2399

P5-120 FAMILY PC

- Intel 120MHz Pentium Processor
- 8MB EDO Performance-Enhanced Memory
- 256K Pipelined Burst Cache
- **1GB 9ms DMA Mode 2 EIDE Hard Drive**
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X EIDE CD-ROM, 16-Bit Sound Card & Altec ACS-40 Speakers
- **TelePath 28.8 Fax/Modem Communication Center**
- 3.5" Diskette Drive
- 17" .28 CrystalScan® Color Monitor
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- [redacted]Generations Software Collection
- **Gateway Gold Service & Support**

$2899

[redacted]Generations SOFTWARE COLLECTION

- Microsoft® Encarta®'95 • MS Bob™ • MS Money 3.0 • MS Works 3.0 • MS Publisher 2.0 • MS Publisher Design Pack • MS Cinemania®'95 • MS Bookshelf® 95 • MS Composer Collection: Beethoven, Mozart and Schubert • MS Wine • MS Arcade: Missile Command™, Asteroids, Tempest™, Centipede® and Battlezone™ • MS Dinosaurs • Mayo Clinic® Family Health Book • and Mayo Clinic Family Pharmacist • plus 31 popular MS entertainment games.

Gateway 2000 Manufacturing, North Sioux City, South Dakota, is ISO 9002 Certified.

Professional Systems

[redacted]P5-75

- Intel 75MHz Pentium Processor
- 8MB DRAM
- 850MB 10ms DMA Mode 1 EIDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- 14" .28dp CrystalScan Color Monitor
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- **MS Works 95**
- **Gateway Gold Service & Support**

$1599

[redacted]P5-100

- Intel 100MHz Pentium Processor
- 8MB EDO Performance-Enhanced Memory
- 850MB 10ms DMA Mode 1 EIDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- 15" .28dp CrystalScan Color Monitor
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- **MS Office 95, Professional Edition* with Bookshelf 95**
- **Gateway Gold Service & Support**

$1999

[redacted]

- Intel 120MHz Pentium Processor
- 16MB EDO Performance-Enhanced Memory
- 256K Pipelined Burst Cache
- **1GB 9ms DMA Mode 2 EIDE Hard Drive**
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- 15" .28dp CrystalScan Color Monitor
- 7-Bay Desktop Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- **MS Office 95, Professional Edition* with Bookshelf 95**
- **Gateway Gold Service & Support**

$2699

[redacted]

- Intel 133MHz Pentium Processor
- 16MB EDO Performance-Enhanced Memory
- 256K Pipelined Burst Cache
- **1GB 9ms DMA Mode 2 EIDE Hard Drive**
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- **15" .26dp Vivitron Color Monitor**
- 9-Bay Tower Case
- **104+ Keyboard** & MS Mouse 2.0
- **MS Windows 95**
- **MS Office 95, Professional Edition* with Bookshelf 95**
- **Gateway Gold Service & Support**

$2999

While supplies last!

[redacted]

- Intel 133MHz Pentium Processor
- 16MB EDO Performance-Enhanced Memory
- 256K Pipelined Burst Cache
- **1.62GB 9ms DMA Mode 2 EIDE Hard Drive**
- PCI Enhanced IDE Interface
- **Matrox® MGA™ Millennium™ 2MB WRAM Graphics Accelerator**
- **6X EIDE CD-ROM Drive**
- 16-Bit Ensoniq® Wavetable Sound Card
- **Altec Lansing Surround Sound Speakers w/ Subwoofer**
- **TelePath 28.8 Fax/Modem Communication Center**
- 3.5" Diskette Drive
- **17" .26dp Vivitron Color Monitor**
- 9-Bay 10th Anniversary Tower Case
- **AnyKey+ Keyboard**
- MS Mouse 2.0
- **MS Windows 95**
- **10th Anniversary System Software Collection: MS Office 95, Professional Edition* with Bookshelf 95 and Generations.**
- **Gateway Gold Premium Service**

$3999

[redacted]

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- Free Software Technical Support for all Gateway-provided operating systems & applications (includes Windows 95 Support)
- Industry-Leading Response Times For Toll-Free Support
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- Next Business Day Response On-Site Service†
- Extended On-Site Service Hours (6a.m.-10p.m. Monday-Friday, 8a.m.-5p.m. Saturdays)
- Scheduled On-Site Service (2-hour appointment window)
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- Express Replacement Parts Delivery
- Club Gateway™ Membership
- *GW2k™: Gateway Magazine*
- Gateway Bulletin Board (BBS) Service
- Automated FaxBack Service

†Pending parts delivery.

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Industry-leading values from Gateway 2000.® Peripherals and software sold only with the purchase of a system.

Multimedia

Audio Multimedia Kits

Everything you need to add multimedia to a Gateway PC. Choose a Gateway 16-bit CD-quality sound card or an Ensoniq® Soundscape™ 16-bit wavetable sound card. Both Sound Blaster compatible and include two Altec ACS-40 speakers.

$95 *(Gateway 16-bit sound card and ACS-40 speakers)*
$115 *(Ensoniq Soundscape 16-bit wavetable and ACS-40 speakers)*

Multimedia Speaker Upgrade

Upgrade the speakers in any Gateway multimedia kit. Add the all-new ACS-250 subwoofer to provide up to 40 watts of additional bass.

$75 *(upgrade from systems which include Altec ACS-40 speakers)*

Communications & Storage

TelePath® 28.8 Fax/Modem Communication Center

Internal fax/modem, 28,800bps modem, V.34, with 28,800bps fax capability. Sends and receives data and faxes, and also includes full voice mail capabilities. Includes trial memberships to CompuServe®, AOL and Prodigy®.

$149 *(TelePath 14.4 Fax/Modem $79)*

Colorado Memory Systems® Jumbo™ 1400 TBU

CMS Jumbo 1400 internal tape backup unit with up to 1.36GB compressed (680MB native) storage capacity per tape. Comes with MS Windows®and DOS® software, one tape and cable. **$199**

Networking

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Fit and Finish: Anyone Want a Yugo?

Somebody is falling asleep on the assembly line, and the boss doesn't seem to care. In fit and finish, today's software is starting to resemble a vintage Yugo. The chrome keeps falling off, the paint is peeling, and the rattles are so irritating that you thank your lucky stars the engine and transmission stay together.

Take Microsoft's Schedule+, the calendar program that used to be hidden in Windows for Workgroups. After a much-needed makeover, it has become a part of the company's Office 95 suite, complete with a rousing collection of wizards, maxims, and other self-help detritus based on Stephen R. Covey's best-seller, *The Seven Habits of Highly Effective People.*

None of those habits appears to involve a strong interest in quality control. For an example, click *Help•Seven Habits Help Topics•The Six Step Process•Urgency vs. Importance.* Paragraph two of the resulting screen offers the following advice: "In order to focus on the issues of urgency and importance more effectively, look at the Time Management matrix below," and where this massively meaningful matrix should be, there is instead a shining example of Microsoft's quality control efforts.

This embedded picture is too large for the Microsoft Help Compiler. *See* ***Converting Pictures into Help Graphics*** *in the* ***ROBOHELP*** *documentation.*

Now, I've always thought that most help screens had a kind of robotic mindlessness—but just think what a howler like this suggests.

This, after all, is not some little bug that's buried and waiting to explode amid thousands of lines of code. It's as plain as the nose on Bill Gates' face. If nobody catches something this obvious, how confident can we be that anybody is checking the things that are far tougher to sniff out?

Strange Behavior

Not very confident, I'm afraid. The more you work with Windows 95, the more strange behavior you discover. My favorite screw-up comes straight from the famous Start button, the one you see in every commercial. Let's say you run your system at 1024 by 768 resolution with a total of 30 folders and applications on the first level of your Start menu. Now you need to switch resolutions to run a multimedia program. So you head to the Control Panel, and from the Display Properties dialog box you choose the Settings tab and adjust the slider for 640 by 480 resolution.

Windows 95 may or may not reboot your system, but that doesn't matter. When the 640 by 480 mode comes up, you discover something rather startling: The topmost items of your Start menu have been chopped off. You can't move your mouse to them, and you can't get at them with the arrow keys. The menu's limit is now 21 items if you're lucky, 14 if you're not, both including the seven permanent residents you cannot remove. Sorry.

And, naturally, the Start menu insists on alphabetizing your selections instead of letting you line them up your way. So if the multimedia program you want to run begins with the letter A, you are probably out of luck. Of course, you can always run it from the Explorer—provided you can find it. If you've added the Explorer to your Start menu, it's probably off the screen too.

It's Yugo time again, since Microsoft's programmers clearly understood what should have happened. If you doubt this, try the second and third menu levels, which do the right thing: They fold themselves into two parts or otherwise move intelligently about the screen when you reduce resolution.

The crazy thing is, the CD-ROM Microsoft Dogs, of all things, handles the situation better than the operating system itself. Start off with a 1024 by 768 screen and Dogs will switch automatically into the 640 by 480 mode it requires. But the program knows enough to switch you back if you <Alt>-<Tab> to something else. That's more than Control Panel can do.

Chrome keeps falling off, the paint is peeling, and the rattles are so irritating that you thank your lucky stars the engine stays together.

How about Microsoft Word for Windows 95? Change to a lower resolution, and items on the toolbars may fall off the right edge of the screen. Switch back, and the right-hand part of the ruler bar may disappear. Remind me: Wasn't the same company responsible for the new operating system and for this program that is supposed to work perfectly with it?

Perfectly, hah! Not even close. In the realm of software quality, it's a Yugo, Yugo, Yugo, Yugo world.

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).*

By Stephen Manes

ERIK BUTLER

For years, your sharpest ideas had to be entrusted to the dullest overhead projectors.

And then you discovered that a presentation with film and sound and animation can fit in a briefcase.

And you discovered that you can slip 200 megabytes of product, pricing and competitive updates into a coat pocket.

And you discovered that you can add French subtitles to a product

And you discovered

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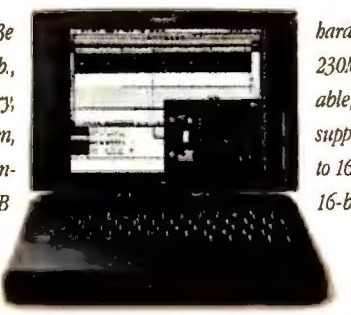

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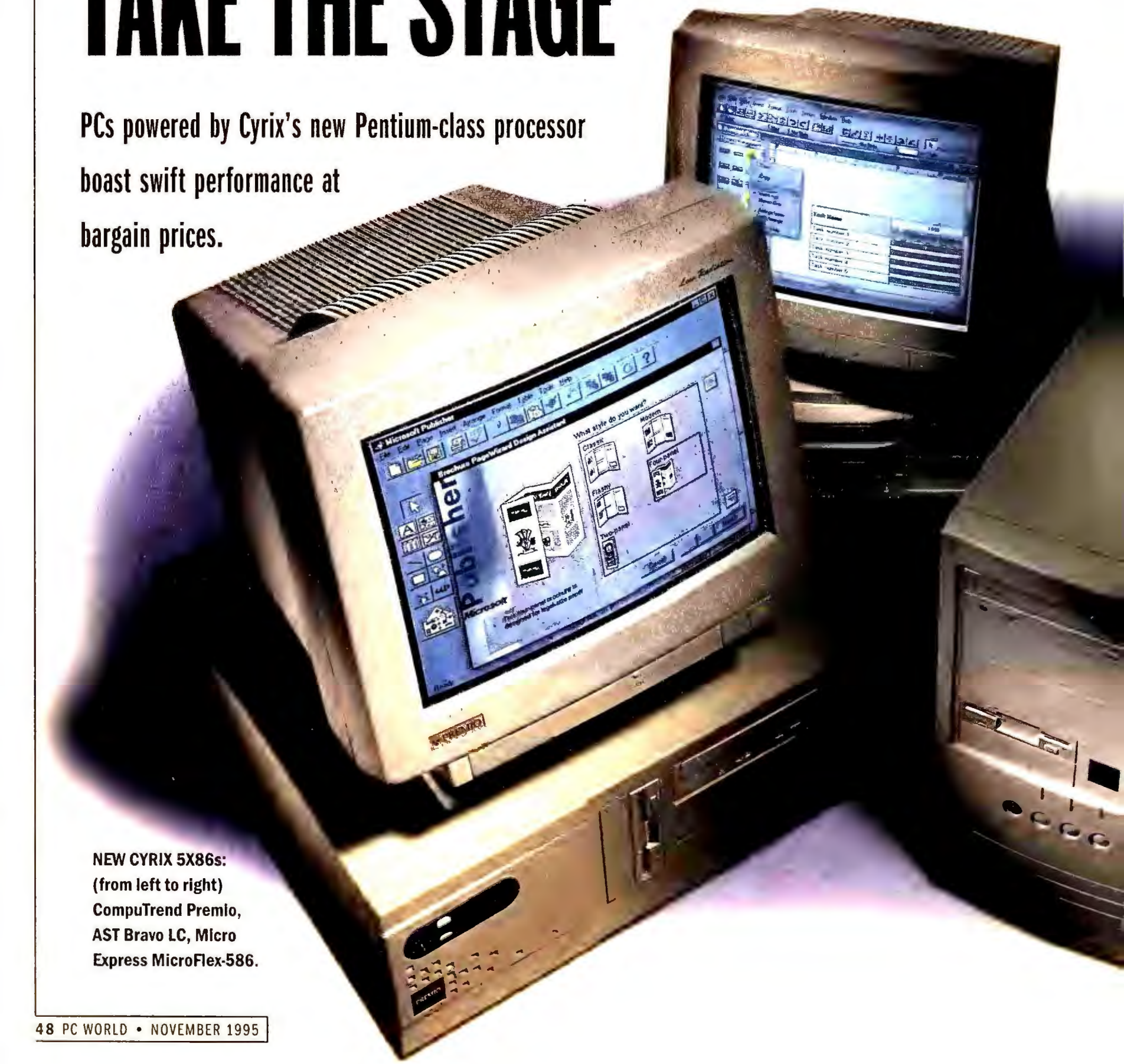
PENTIUM RIVALS TAKE THE STAGE

PCs powered by Cyrix's new Pentium-class processor boast swift performance at bargain prices.



NEW CYRIX 5X86s: (from left to right) CompuTrend Premio, AST Bravo LC, Micro Express MicroFlex-586.

Edited by Andy Reinhardt

The battle for the heart of your PC rages on: After years of anticipation, Cyrix is challenging Intel with two new processors that offer Pentium-class performance for less money. At the lower end of the market, systems sporting Cyrix's 5x86 will be shipping by the time you read this. According to PC World Test Center results,

the first 100-MHz 5x86 systems rival the performance of more expensive 75-MHz Pentium machines. Street prices for 5x86 PCs with 16MB of RAM range from $1800 at the low end to $2100 or more for a packed unit. Similarly configured Pentium-75 systems start at $1900 and go up to $2400.

If you're looking for an entry-level system, 5x86 and Pentium-75 models will be your best bets. Forget about buying a 100-MHz DX4: Analysts say prices won't dip much lower than 5x86 PCs'.

If you put a premium on power, you'll want to consider systems based on the new Cyrix 6x86, which debut as early as November. A machine with a 100-MHz 6x86 will perform like a 133-MHz Pentium PC, early *PC World* tests show. But street prices for 6x86-100 PCs will be less than $3000, about the same cost as 120-MHz Pentium machines, predicts Bruce Stephen, vice president of worldwide personal systems research at IDC. Epson and AST will likely be the first to introduce 6x86 PCs, but their systems were not yet available for testing.

5x86 Versus Pentium-75

The 5x86 differs from Intel's Pentium in several ways. First, the Cyrix chip costs vendors less to use, the company says: It fits into the same CPU sockets and supports the same ancillary chip sets as Intel's 486. This means vendors can plug the Cyrix chip and a new BIOS ROM into existing 486 motherboards, which cost about $100 less than Pentium motherboards.

Second, the 5x86 has a 32-bit data path instead of the Pentium's wider, 64-bit data path. This difference matters because PC performanee depends heavily on the bandwidth between the processor and memory.

Finally, the 5x86 is not *superscalar.* Chips that are, such as the Pentium, have more than one intemal pipeline, allowing them to run multiple instructions simultaneously.

Cache Compensation

To boost performance, the 5x86 emphasizes other architectural features that maximize efficiency. For instance, says chip analyst Dean McCarron of Mercury Research, the 5x86 has a better primary cache design than the Pentium. In fact, in *PC World* tests, 5x86 machines performed almost identically to Pentium-75s. We also found no incompatibilities running common desktop applications. This means you can focus on the PC's overall configuration and its vendor, not whose chip is inside.

At press time five vendors had announced 5x86 PCs, three of which we had the chance to test. CompuTrend's Premio 5x86-100, with a street price of $1799, offers the best value. It was the fastest of the three, nudging out its nearest competitor, the Micro Express MicroFlex-586, by about 10 percent. Moreover, the Premio was only 7 percent slower than the fastest 16MB P-75 system we've tested. CompuTrend doesn't skimp on components: The Premio comes with 16MB of RAM, a 256K

Breaking News

NO HEXIUM, NO SEXIUM: Intel has announced that its next-generation processor, code-named P6, will be called the Pentium Pro. Among the first vendors to deliver a desktop PC using the chip will be Dell. Sources close to the company say it plans to roll out a 150-MHz Pentium Pro Dimension system costing $3999 in early December. The system will include 16MB of RAM, a 1GB or larger hard drive, a 17-inch monitor, a 4X CD-ROM drive, and a 1.44MB floppy drive. Other vendors are also reportedly developing Pentium Pro desktops for around the same price. —L. M.

FIRST 8X CD-ROM DRIVE: Diamond Multimedia Systems is offering an 8X CD-ROM drive as part of a multimedia upgrade kit. Diamond's Ultra Kit 8000 will sell for $649, and the CD-ROM drive, made by Optic Storage, has a data transfer rate of 1200 kilobytes per second. While this drive should improve performance of data-only CD-ROMs like databases, you won't notice any improvement with most multimedia titles, which are only now being designed to take advantage of 4X CD-ROM drives. Titles optimized for 8X drives are not expected to be available for at least 18 months, says Dan Lavin, analyst for Dataquest. —E. H.

NO MORE FREE DOMAINS: Bowing to the mounting administrative costs of registering and maintainlng domaln

(continued on page 51)

PHOTO: JOHN GREENLEIGH; ILLUSTRATION: JEFFREY PELO

secondary cache, a 1GB hard drive, and a 4X CD-ROM drive. For graphics, it offers a Number Nine Vision 32-bit PCI video card with 1MB of VRAM and a 15-inch monitor. Windows 95 is included.

Micro Express's unit costs the same as the Premio. Though it was slower, the MicroFlex-586 still performed well, keeping pace with our Pentium-75 system averages. It comes with the same memory, cache, disk, and CD-ROM configuration as the Premio; for graphics, there's an S3 32-bit PCI video card with 2MB of VRAM, and a 15-inch monitor. The system includes Windows 3.1; add $50 for Win 95.

By comparison, the AST Bravo LC P/75 offers less PC. Its speed and configuration were similar to the MicroFlex-586's, but for $1700 it includes only an 850MB hard drive and no monitor or CD-ROM drive. (Add $268 for a 14-inch monitor, $399 for a 15-inch monitor, and $186 for a 4X CD-ROM drive.) Graphics are supplied by a Trident 32-bit PCI video subsystem with 1MB of VRAM. The system comes with Windows for Workgroups 3.11 and Windows 95; you can choose which to install.

Diamond Technologies and Epson also plan 5x86 PCs. The $2065 Diamond DT CY100 will offer a good package for multimedia mavens: the same memory, cache, graphics controller, and storage as the Micro Express, plus a 32-bit sound card and surround sound speakers. Other goodies include a 15-inch monitor, Win 95, a Win 95 keyboard, and a 14.4-kbps fax-modem.

Epson's ActionTower 8400 is pricey compared to other 5x86s. Expected to ship in October for $1899 to $1999 (plus $250 for a 14-inch monitor or $350 for a 15-inch monitor), it comes with 8MB of RAM, a 256K cache, a 1.2GB drive, and a 4X CD-ROM

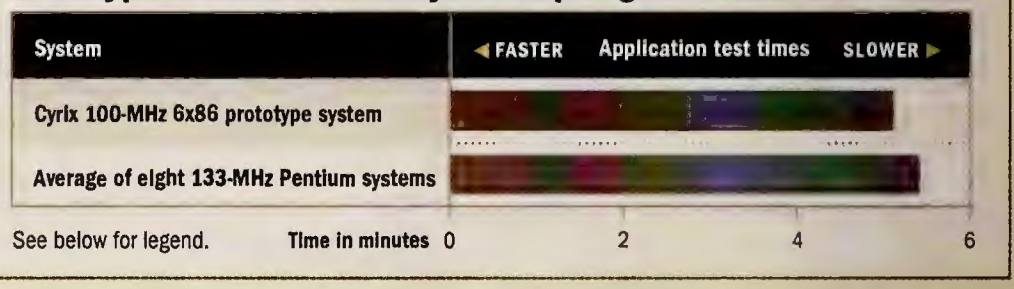
First Look: 6x86 vs. Pentium

To test Cyrix's claim that the 100-MHz 6x86 delivers performance equivalent to the 133-MHz Pentium's, we ran our benchmarks on a 6x86 prototype system supplied by Cyrix. Name-brand PCs will likely exhibit similar performance.

The Cyrix reference system was richly configured, with 32MB of RAM, 1MB of secondary cache, a 33-MHz VESA local bus, a 1.2GB hard drive, and a Diamond Stealth 64-bit graphics controller with 2MB of VRAM. (A similarly configured PCI bus P-133 from Dell—with only a 512K cache and a 1GB drive—costs $3300. Comparable VL bus systems don't exist.)

Our results: The 6x86 PC beat average ratings for P-133s with 16MB of RAM and a 512K cache but didn't surpass the fastest P-133s we've tested. (We don't have ratings for P-133s with 32MB of RAM and 1MB of cache.) These early numbers reinforce the point that performance is determined by more than clock speed alone.

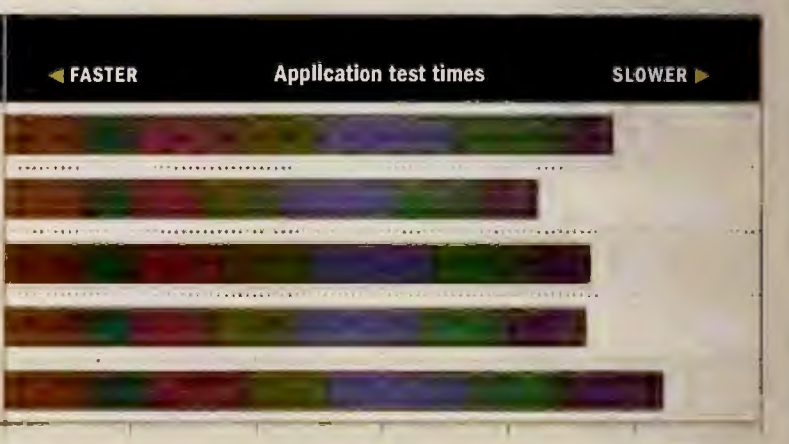
Prototype 100-MHz 6x86 System Upstages Pentium-133 PCs



TEST REPORT

Photo Finish: 100-MHz Cyrix 5x86 PCs Rival Pentium-75s in Performance

System	CPU	RAM (MB)	Secondary cache (K)
AST Bravo LC P/75	100-MHz Cyrix 5x86	16	256
CompuTrend Premio 5x86-100	100-MHz Cyrix 5x86	16	256
Micro Express MicroFlex-586	100-MHz Cyrix 5x86	16	256
Average of 17 Pentium-75 systems	75-MHz Intel Pentium	16	256
Average of 9 DX4-100 systems	100-MHz Intel or AMD DX4	16	256



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Word 2.0 for Windows · Excel 4.0 · Paradox 1.0 for Windows · Freelance 1.0 for Windows · WordPerfect 6.0 for DOS · 1-2-3 release 3.4 for DOS · Paradox 3.5 for DOS

drive. Though short on RAM, the system bundles a wavetable sound card, speakers, a 28.8-kbps voice/fax-modem with telephony functions, and Windows 95.

6x86: The Next Generation

Cyrix's new top-of-the-line 6x86 processor is slated to appear in systems before the end of the year. The 6x86 is superscalar and has a 64-bit data path. Cyrix says it will be easy for vendors to incorporate it into existing Pentium power desktop designs.

How did Cyrix squeeze 133-MHz Pentium speed out of a 100-MHz chip? The 6x86 has architectural features the Pentium lacks. For instance, it compensates for software not designed to exploit more than one pipeline, minimizing or eliminating delays that occur when one pipeline is awaiting data from another, Cyrix says.

Two other enhancements reduce performance bottlenecks: *Speculative execution* lets the 6x86 process instructions before it needs to run them, and *out-of-order execution* lets it tackle programs in the sequence best suited to available resources—instead of the order in which they are written. These techniques should help the 6x86 perform well for 16-bit and 32-bit operating systems and programs, says Linley Gwennap, editor of *Microprocessor Report.*

The first 6x86 systems will actually use a slower version of the chip. In late November AST aims to ship the Bravo LC P/100, which will be powered by an 80-MHz 6x86 and cost $1700 with 8MB of RAM, a 256K cache, an 850MB hard drive, and a 64-bit ATI video card with 1MB of VRAM (plus $300 to $400 for a monitor). AST, the only vendor slated to offer 6x86-80s, says they'll perform like 100-MHz Pentiums. Most manufacturers will jump instead to 100-MHz 6x86s, says Cyrix. By December look for such systems from Epson and others, as well as from AST.

Buyer's Market

Of course, Intel and other chip makers aren't sitting still. NexGen offers the Nx-586-100. AMD is expected to release its K5 Pentium competitor in early 1996. And before the end of this year, Intel will reduce prices, release a 150-MHz Pentium, and roll out the high-end Pentium Pro processor, formerly known as the P6, says Gwennap. But early Pentium Pro systems will be pricey—for instance, Dell plans a $4000 desktop—and won't give much of a boost to people using Windows 3.1 or Win 95.

In response, Cyrix plans to bump the 6x86 to 120-, 133-, and 150-MHz speeds; the first 120-MHz 6x86 PCs could hit the market as early as next March. This competition could lead to excellent prices in 1996. "This is a fresh start for Cyrix," says IDC's Stephen. "If you're looking for maximum bang for the buck, consider it."

—Laurianne McLaughlin

AST Bravo LC P/75

Pricing: $1700, plus $268 for 14-inch monitor or $399 for 15-inch monitor; 4X CD-ROM drive $186
AST Computer, 800/876-4278, 714/727-4141
Reader service no. 832

CompuTrend Premio 5x86-100

Pricing: $1799
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Reader service no. 833

Diamond DT CY100

Pricing: $2065
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Epson ActionTower 8400

Pricing: $1899 to $1999, plus $250 for 14-inch or $350 for 15-inch monitor
Epson America, 800/289-3776 ext. 3000, 310/782-0770

Micro Express MicroFlex-586

Pricing: $1799
Micro Express, 800/989-9900, 714/852-1400
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JEFFREY PELO

Breaking News

(continued from page 49)

names (a domain is an electronic address on the Net, like pcworld.com), the National Science Foundation will no longer subsidize administrative charges for top-level domains, such as .com, .gov, .org, and .net. (NSF will still cover .edu domains, however.) New registrants—possibly a whopping 20,000 per month by the end of the year—will have to pay $100 to secure domain names. And owners of the roughly 110,000 domains already registered will have to start paying a yearly $50 maintenance fee. For more information, go to http//rs.internic.net/announcements/fee-policy.html. —G. M.

ROLL YOUR OWN CD-ROMs: Creating CD-ROMs just got more affordable. Hewlett-Packard has announced the first CD-Recordable drive expected to sell for less than $1000. Products in this category previously cost about twice as much. The internally mounted HP SureStore CD-Writer 4020i comes with a software suite that lets you record audio; view, process, and export Kodak Photo CD images; create databases; and write selected files, directories, or entire volumes onto a single disc. —E. H.

BAD NETIQUETTE: Microsoft's Internet Explorer, included in its Windows 95 Plus add-on, is a Web browser with an attitude. Upon installation, it may preempt your existing Web browser's file associations and replace its TCP/IP

(continued on page 53)

Is Windows 95 Faster?...Take 2

It's new, it's improved, but is it quicker? Windows 95's better user interface, hardware support, and stability are obvious by now to those who jumped on the bandwagon. But will you get your work done faster with Windows 95 than you did with its predecessor?

Contrary to some early indications, the answer appears to be yes—but there are still a couple of significant gotchas. We found that new, 32-bit Windows 95 applications run faster on the shipping version of the new operating system than their 16-bit Windows 3.1 ancestors do—often dramatically so—either because they're better tuned, or simply because 32-bit technology is inherently more efficient. But some older programs, including the 16-bit versions of Microsoft Word and Excel, took longer to complete *PC World* benchmark tests when running on Windows 95 than they did on Windows for Workgroups 3.11. And Win 95 performance does appear to be highly sensitive to memory configuration: Systems with only 8MB of memory generally posted lukewarm results, while those with 16MB did much better.

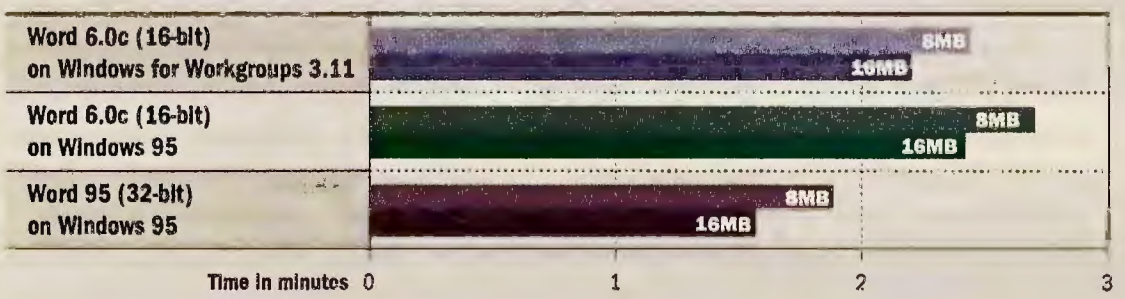
Real-World Tests

Back in August, preliminary PC World Test Center results showed that 16-bit Windows 3.1 applications (such as those included in Microsoft Office) performed better under Windows for Workgroups 3.11 than under Windows 95—bad news if you were hoping Windows 95 would give your existing software a boost. Worse, the tests showed that native Windows 95 programs were not faster than 16-bit applications running on Windows for Workgroups 3.11 on 8MB systems. We ran these early tests using the latest beta versions of Win 95 and 32-bit apps available at that time, and promised to repeat them as soon as shrink-wrapped versions became available.

This time around we tested shipping copies of Windows 95, Word, and Excel. And we changed our tests to more closely resemble real-world usage patterns: Instead of putting an application through its paces in isolation, we loaded our test sys-

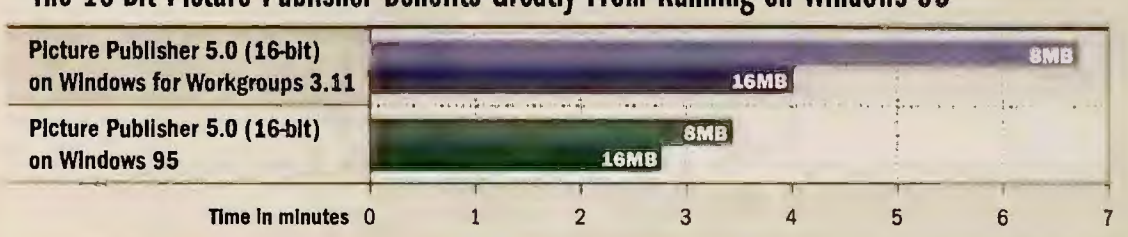
TEST REPORT

Word 6.0c Runs Slower on Windows 95, but Word 95 Is Fastest



Excel Follows the Same Pattern, but Excel 95 Doesn't Show as Much Gain

The 16-Bit Picture Publisher Benefits Greatly From Running on Windows 95



Methodology

Tests were conducted on two Micron Pentium-90 PCs with 256K secondary caches and 820MB EIDE hard drives. Windows for Workgroups 3.11 used a 59MB permanent swap file and 16-bit disk access; SmartDrive was in double-buffer mode. Microsoft Office 4.3 was installed using typical settings.

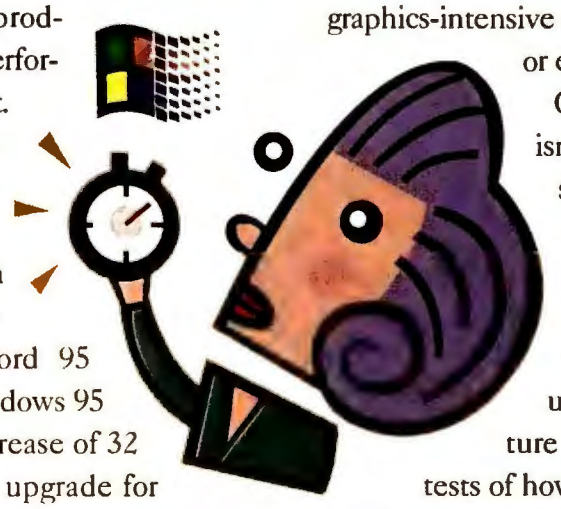
The Word tests open large and small files; combine files; insert text; auto-format; search and replace; import graphics; import a 500-name database; and print and save several times. The Excel tests recalculate a large adjustable-rate loan amortization; sort another database on multiple fields; create auto-filters; create charts; insert and delete rows; change fields; import a 500-name database; and print and save several times. The Picture Publisher tests open numerous pictures, manipulate them with special effects such as masks, inversion, tinting, cutting, and texture imposition, and add large, scaled text with color and special effects.

During the Word tests, we loaded in the background Lotus's cc:Mail Mobile; Microsoft's Schedule+, Excel, Paint, and PowerPoint; and Delrina's WinFax 3.0. During the Excel tests, we loaded in the background cc:Mail Mobile; Schedule+; a second copy of Excel; Paint; WinFax 3.0; and Word. During the Picture Publisher tests, we loaded in the background Schedule+, Excel, PowerPoint, and Word. WinFax 3.0 was in auto-answer mode. All background applications were maximized and idle.

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

tems with as many as seven programs and then timed the speed of the foreground application. The background programs were loaded but idle. While this scheme doesn't evaluate true multitasking, it does show whether Windows 95's better resource management lets you load more applications and run the foreground task more quickly than 16-bit Windows does.

If you were holding your breath—or your checkbook—for the results, go ahead and exhale. Thanks to last-minute tuning in both Windows 95 and Office 95, the final versions of these products offer obvious performance improvement. On a 90-MHz Pentium PC with 8MB of RAM, upgrading from Word 6.0c on Windows for Workgroups 3.11 to Word 95 (version 7.0) on Windows 95 yielded a speed increase of 32 percent. The same upgrade for Excel gave a more modest—but nevertheless noticeable—gain of 15 percent. If you rushed out and upgraded Office and Windows on August 24, congratulations.



Not-So-Sweet 16-Bits

If you're still waiting for 32-bit versions of your favorite applications, however, the news is mixed. Some 16-bit programs (like Word and Excel) performed more slowly under the new OS than under Windows for Workgroups 3.11. On the other hand, the 16-bit Picture Publisher from Micrografx really perked up under Win 95, perhaps due to better memory management.

Predictably, you can boost performance by throwing in more RAM. When we put 16-bit applications through the same tests on a system with 16MB installed, performance under Windows 95 jumped. So, if you're stuck with 16-bit Windows applications for the time being, you have three options: Stay with 16-bit versions of Windows 3.*x*, upgrade to Windows 95 and suffer a potential performance penalty, or add more memory to your system.

More Memory Matters

Your 32-bit applications will also thank you for upgrading to 16MB. If you read the fine print on the Office 95 Standard box, you'll see that Microsoft recommends 8MB to run only two Office applications, and more memory to run additional programs, such as PowerPoint or Schedule+. When we bumped system memory from 8MB to 16MB, Word ran our macro tests more than 20 percent faster, and Excel ran them more than 50 percent faster. Many users, especially those who work with voracious, graphics-intensive applications, find 24MB or even 32MB a must.

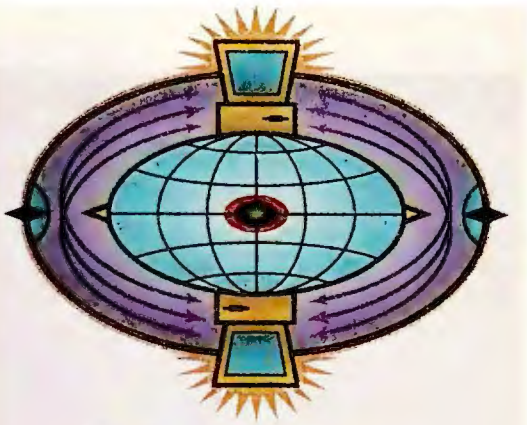
Of course, sheer speed isn't everything. Our tests show how well individual applications perform, but that's only part of the story. Few of us spend all our time using only Word. In future issues, we'll report on tests of how well Windows 95 runs multiple applications *simultaneously.*

Windows 95's improved multitasking delivers a big boost to perceived performance. After all, you must have encountered the situation where you give a 16-bit program a command under Windows 3.*x*, only to have the keyboard freeze while some unknown process takes control of your PC. Or how about this: You're typing merrily away when the fax-modem initiates a system coup d'état, locking up the document you're working on.

Working in a purely 32-bit world mitigates most of these irritations, but you have to go all the way: Even one ill-behaved 16-bit Windows app can spoil Windows 95's carefully designed multitasking. The same is true of overall stability. Native Windows 95 applications must follow strict memory usage rules that make them less likely to crash or bring down other applications, including Windows itself. But because backward compatibility is a Windows 95 watchword, one bad 16-bit apple can still spoil the whole barrel.

—Scott Spanbauer

LEFT: GORDON STUDER; TOP RIGHT: JEFFREY PELO



Breaking News

(continued from page 51)

drivers. Then, when you try jumping to a Web site from your desktop, surprise! The Internet Explorer comes up instead. You can say good-bye to all those shortcuts to the Internet you painstakingly set up in your previous browser—at least, until you reinstall it. Microsoft says the driver problem occurs only with applications that aren't compliant with its Windows Sockets interface. The company was planning a November release for version 2.0 of the Internet Explorer. —G. M.

MODEM GLITCH: Some new V.34 modems won't connect at their full 28.8-kilobits-per-second rated speed, instead reaching only 24 kbps or 26.4 kbps, tests by the PC World Test Center reveal. The problem occurs in modems that use a new Rockwell data pump (the R6682-26) with an older version of the modem controller chip (Rockwell's L39*xx-xx* with firmware previous to version 1.3). The only way to determine whether your modem is affected is to open it up and examine the chips, so you may be better off simply contacting your vendor. Some firmware can be updated via software or a chip upgrade, and the latest revisions from some modem makers will even let you boost modem speed beyond 28.8 kbps. The moral of the story: Buy upgradable modems and check frequently with the vendor for firmware updates. —A. R.

Edited by Randy Ross

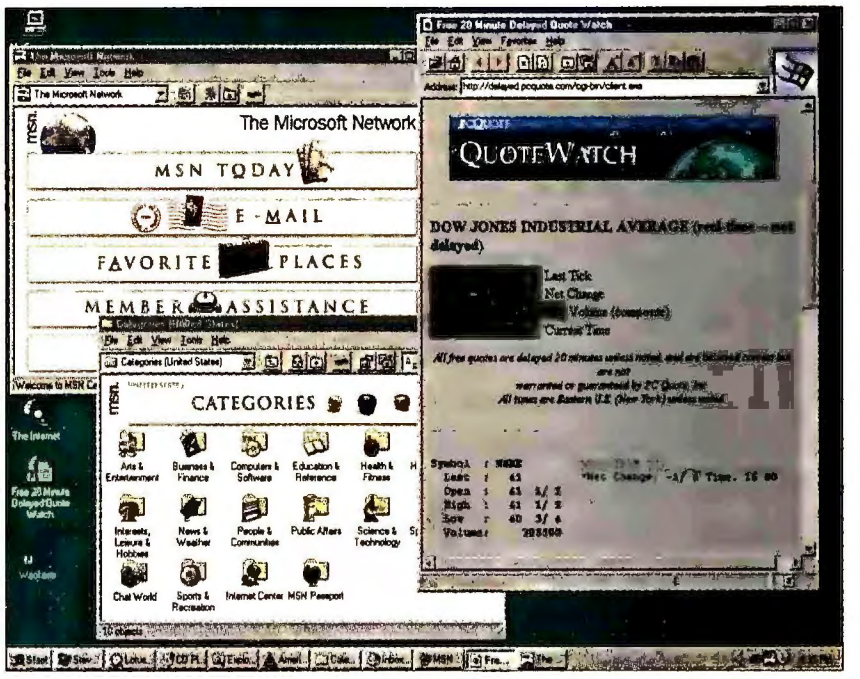
Online Services Take the Web for a Spin

The "big three" online services—America Online, CompuServe, and Prodigy—are gearing up to combat two giants stalking their midst: the new Microsoft Network and the fast-growing World Wide Web. With reduced and simplified pricing plans, improved user interfaces, and alliances with content providers, the three market leaders are trying to send a firm message that their days are far from numbered.

The Microsoft Network, with its icon built into the Windows 95 desktop, could turn out to be a paper tiger: It's already being criticized for a lack of content, and some users find its interface bland. The greater competitor for online services today is the Internet's World Wide Web. So instead of fighting the Web, online services have decided to join it.

"All online services are incorporating the World Wide Web into their strategy," says Karen Burka, analyst with consulting firm SIMBA Information. If they don't, she says, they could have a limited future because the Web is where the greatest amount of new content is being created.

Microsoft agrees. "We are embracing the Web 100 percent," says Larry Cohen, a lead product manager for MSN. In the long run, he says, online services won't be judged as much for their unique content as for how well they integrate what's available on the Web and Internet. Prodigy added a Web browser this spring. AOL gave members access to Internet newsgroups, Gopher, and Wide Area Information Servers early in the year. Both AOL and CompuServe had their own Web browsers available by summer. Now the three are focusing on helping users create and publish their own home pages to give them a taste of what they can do on the Web.



MICROSOFT'S WEB BROWSER is integrated into MSN so you can launch the browser while scanning the service.

Lower Prices

The heated battle among the big three means not only more services and better software but also lower prices. CompuServe, for example, recently eliminated special charges for almost all of its 3000 services, including Internet e-mail, to bring its complex pricing structure in line with competitors'. Only specialized information databases and magazine indexes cost extra. The price of connect time beyond 5 free hours per month with a standard $9.95 membership has dropped from $4.80 to $2.95 per hour.

For heavy users, both CompuServe and Prodigy offer plans that make them a better deal than AOL. CompuServe's $24.95 plan offers 20 free hours and costs $1.95 per additional hour. Prodigy's 30/30 plan lets you chat, e-mail, and cruise the Internet for 30 hours for $30; additional hours are $2.95 each.

Prodigy Goes Modern

Prodigy version 1.1, released this summer, gave the service a huge face-lift, doing away with its long-criticized clunky computer fonts and cartoonlike graphics. The e-mail system was also enhanced with integrated Internet e-mail access and a new spelling checker.

PRODIGY'S GREATLY IMPROVED NEW INTERFACE sports slick graphics and World Wide Web links integrated directly into the service.

Version 1.1 advanced Prodigy's Internet accessibility: The whole service is being rewritten in Hypertext Markup Language (HTML), the graphical layout language used to author Web pages. By September only about 35 percent of Prodigy's screens had been translated, but those comprised 80 percent of the most popular ones, the company says.

Though Prodigy aims to eventually integrate completely with the Web, release 1.1 won't be finished until the end of this year. (The version number will not change between now and then.) This makeover was far from finished in the iteration I tested, and I still had to launch a separate browser to link to World Wide Web sites.

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Prodigy is reinventing itself, moving away from being a supplier of original editorial material into the role of a publisher. The service offers 50 specialty boards, monitored by experts, that list pertinent Prodigy screens and related Web sites. Thus, if you were interested in fly-fishing, the fly-fishing interest group would offer you direct links to Web sites as well as to Prodigy online chat areas.

Prodigy considers these interest groups a miniservice unto themselves and expects to establish another 50 by the end of the year. The groups are now exclusive to Prodigy but may be opened up someday to non-Prodigy members, accessible from the Web for a fee.

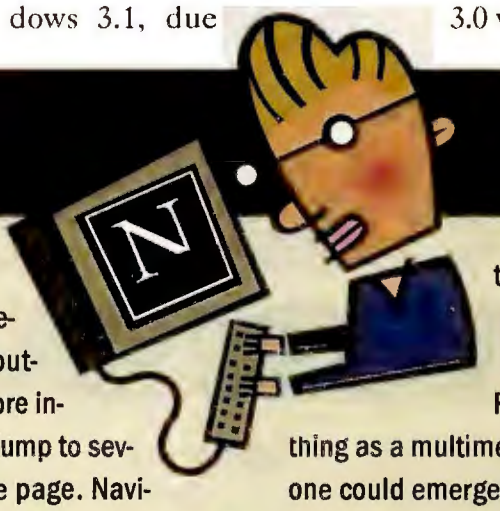
If content comes from the Net, why pay for an online service rather than using an Internet provider? Prodigy spokesperson Mike Darcy responds that people choose online services to obtain a few key features they value. "We've found people pay for one or three things they have a passion for, and we're using that to build our Internet service," he says.

New CompuServes

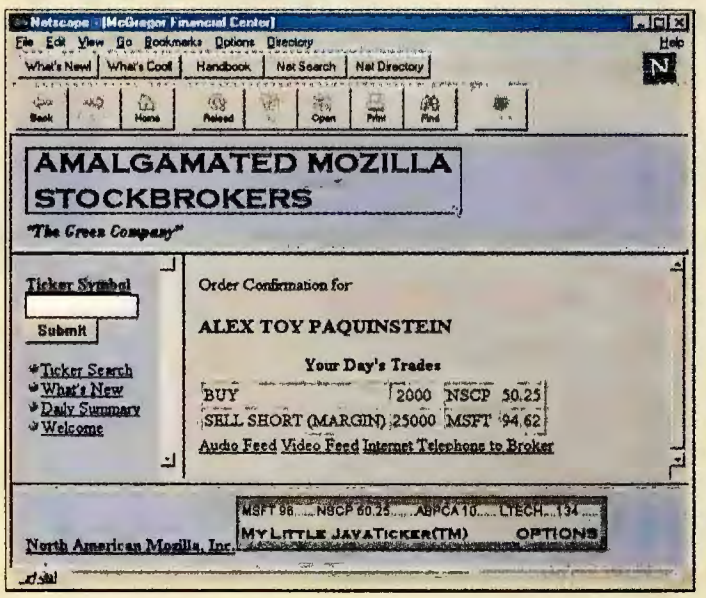
WinCIM 2.0, CompuServe Information Manager for Windows 3.1, due out by October, includes a Web browser integrated into the application; until version 2.0, subscribers had to quit WinCIM and log on separately to the Web. CompuServe will get a major interface upgrade with WinCIM 3.0, due to ship for Windows 95, Windows 3.1, the Macintosh, and OS/2 in the first quarter of 1996.

CompuServe says WinCIM 3.0 will be more graphically in-

Netscape Pulls Further Ahead



Online services are rushing to add Web browsers, but they're playing catch-up with Netscape Communications, the Mountain View, California, firm whose Navigator browser has become the de facto industry standard. [*PC World*'s parent, IDG, has an equity investment in Netscape.] The new Netscape Navigator 2.0, due in December for Windows 3.1 and Windows 95, adds a veritable greatest hits of Web innovations. The beta version we previewed offered



on-screen animation, multimedia viewers, multithreading, and e-mail.

The interface looks like its predecessor's, with one major exception: A new Frames capability lets Navigator display multiple, independent miniwindows if you're linked to a site that can serve them up. Compatible Web servers can fill these frames with scrollable text or static images, such as advertisements and header buttons, letting you see more information at once and jump to several links from a single page. Navigator 2.0 also has better bookmarking, so you can drag links into folders.

Netscape's new Live Objects technology lets you link external applets to Navigator. With Live Objects, if you jump to a Macromedia Director or Adobe Acrobat file across the Web, the appropriate viewer is automatically invoked and the document appears correctly on your screen. (You currently have to load an external viewer.) Navigator 2.0 will include applets supporting audio, video, animation, and formatted documents. It also supports animated Java applets, eclectic little programs (available now only from Sun Microsystems) that can display a stock ticker, play sounds from the Net, or make icons and letters dance.

Navigator's e-mail client is growing into a full-fledged package, but with an added bonus: No other product lets you send and receive messages with embedded live hyperlinks. It also offers improved Usenet reading, including full threading and compliance with the MIME standard, so you can browse and read multimedia news messages. Right now there's no such thing as a multimedia Usenet message. But one could emerge because the rule lately is "If Netscape builds it, they will come." The firm has an estimated 70 percent share of the 6 million–unit market for Web browsers. "[They've] gained tremendous mind share by making their browser freely available using a shareware model," says Eric Sink, Mosaic project leader at competitor Spyglass.

Ahead of the Standards

However, some observers say Netscape has jumped the gun, implementing new HTML extensions before standards bodies have sorted them out. Navigator users benefit from these features, but users of other browsers—such as those on AOL and Prodigy—sometimes can't read all the elements of Web pages made with Netscape technology.

Competitors may grouse, but most also admit that the fast-growing Web benefits from innovation. "Nobody's got time to wait for some standards committee to fix things up," says Scott Germaise, a product manager in Prodigy's communications department.

Free for educational and nonprofit users, Navigator regularly sells for $49. Netscape Communications; 415/528-2555, **http://www.netscape.com.** Reader service no. 831

—Richard Overton

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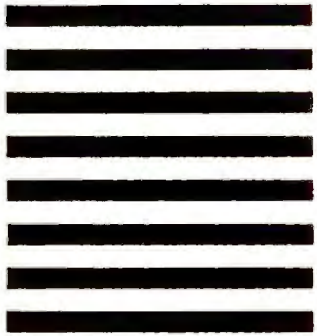

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tuitive than the current software. It will also feature multitasking (regardless of the operating system) so that you can save money by doing several tasks at once while online; for example, downloading files in the background while chatting in a forum. Another big change will be the end—at last—of CompuServe's cryptic numeric identifiers: You'll be able to pick your own user name. This feature is separate from the software upgrade and is set to be in effect by the end of 1995.

Electronic mail will be enhanced in WinCIM 3.0 with advanced filtering and agent-like capabilities. You'll be able to search messages by keyword or ask the system to sort incoming mail into categories you define. This means that the urgent note from your boss or spouse won't get lost in the scores of messages you get from mailing lists. CompuServe will also generate automatic replies to e-mail messages if you're unavailable—a great help when you're on vacation or a business trip. And if you want your messages immediately, the new service can even send them directly to a pager.

CompuServe's interface is still targeted at its traditional computer-literate members. But the company is also planning to launch a new service—as yet unnamed but internally called Wow—in the first quarter of 1996. Wow will be designed for first-time computer buyers. No other information was available about it at press time.

Even as CompuServe builds new features into its existing service, it's also moving ahead with Internet access products. The $9.95 Mosaic in a Box, available for Windows 3.1 or Windows 95, combines Spry Mosaic with CompuServe Wallet, an "electronic wallet" developed by Checkfree. The wallet encrypts and stores your credit card information, letting you safely shop for products via the Web. Mosaic in a Box is intended for novices and works only with the CompuServe Network. More advanced users will probably want the $99 Internet in a Box 2.0, which includes Spry Mosaic and tools like Telnet, Gopher, and FTP, plus a copy of WinCIM.

To connect to the Net with either product, you can use CompuServe's extensive dial-up network for a monthly fee of $9.95 for 7 connect hours or $19.95 for 20 hours. Or you can sign up with a third-party Internet provider of your choice.

If You Can't Beat 'em, Buy 'em

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	WAIS	search tools
	WebCrawler	search tools
CompuServe	Network Publishing	Internet access provider
	Spry	browser, server software
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Microsoft	Spyglass[2]	browser
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Prodigy	Terisa Systems[1]	security

Source: SIMBA Information [1]*Minority investment.* [2]*Licensing deal.*

MATING DANCE: Online service providers are striking deals with many partners.

COMPUSERVE'S WEB PAGE includes information on its online service as well as help on getting around the Internet.

AOL Embraces the Internet

America Online updated its look earlier this year and continues to add new art elements. (AOL users can attest it's no fun waiting for new art to download every time they go online.) In early summer the company released version 2.5 of its Windows 3.1 interface, which added a Web browser. Now members can use AOL as their Internet access provider and link to the Web from within the familiar AOL screen.

Like CompuServe, AOL is also beefing up Internet offerings that are separate from its primary online service. AOL acquired Global Network Navigator, one of the first commercial Web sites, from O'Reilly & Associates and is relaunching it as part of an Internet access service. Now in beta testing, GNN will allow local access to the Net from some 600 cities nationwide. The service will feature one-button installation of a browser interface to all Internet components, including the Web, Gopher, and FTP, plus newsgroups and e-mail. Pricing and launch date were not set at press time.

Become a Publisher

One of the most intriguing trends in online services is their rush to offer tools that let users create and post their own Web pages. Prodigy, CompuServe, and AOL all offer these publishing programs—and will even maintain your pages.

Prodigy's approach, Personal Web Pages, includes about ten

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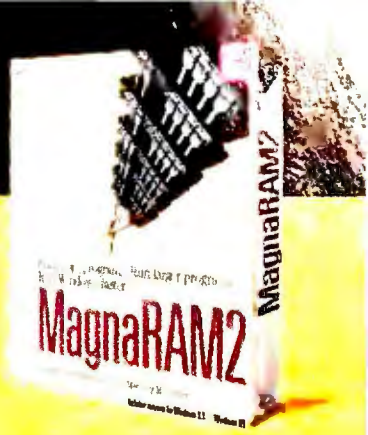


RAM.

RAM DOUBLERS.

MAGNARAM.

Now that MagnaRAM's around, you'll be seeing a lot fewer "RAM doublers" in the neighborhood. How can they possibly compete against the 32-bit memory multiplying power of MagnaRAM?

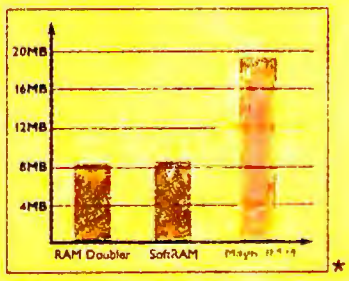
MagnaRAM doesn't double. It multiplies. It takes your physical memory and compresses it until you have maximum memory. And it combines this ultra-safe compression technology with a proprietary method for improving virtual memory speed.

It's a good combination because it means you have more usable memory for Windows® 95 and Windows 3.1. You can open more and bigger programs without getting that annoying little "out of memory" box. And because you don't go to the disk as often, the programs run much faster.

The proof is charted on a simple, graphical screen. If you want to see how much your system's memory and performance has improved, you can easily find out.

If you want to fine-tune speed and memory, you can do that, too. MagnaRAM is fully configurable.

It's all very simple. There are no chips to install, no technicians to pay. You can install it in seconds, and it runs in the background.



Best of all, MagnaRAM costs a lot less than you'd pay for RAM chips or SIMM modules.*

To find out more, see your retailer, visit our website at www.qdeck.com, or give us a call at 1-800-683-6696.

(No cute little puppies were harmed in the making of this ad.)

Circle 190 on reader service card

*Test was performed using an HP Vectra 486s/33XM, 16 MB RAM running Windows 3.1, Solitaire Microsoft Works, Lotus 1-2-3 MS-DOS, Shoot Video Light Corel Draw 5.0 Adobe Photoshop, VidGrid and Corel Chart Test conducted with products available at the time

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home page design templates. An early version, 0.8, was available this summer and allowed members to use only limited graphics and text. Version 1.0, expected to ship in mid-October, will let you upload any graphics, sound, or video file to your Web page. At press time Prodigy was offering to store up to 200K worth of Web page material per member at no extra charge, and this amount may increase in the future to accommodate memory-hungry multimedia files.

In September CompuServe released betas of an authoring system called Home Page Wizard and a publishing system called Publishing Wizard. Subscribers can download the software for free and will be able to design their own pages, even including digitized photographs. (As a bonus, if you don't have a scanner to digitize photos, you can send them to CompuServe to do it for you.)

On the current version of AOL, you can type in the keyword 'personal publisher' and software will guide you step-by-step through creating a home page based on your member profile. You can add graphics and sounds as well as links to other Web sites and AOL locations. Your work is done online and stored by AOL, and you choose whether to make your page visible only to yourself, to other AOL members, or to any Web surfer; links within AOL, however, will be available only to other AOL members. AOL will store up to 10MB worth of data for each user at no extra charge.

If you have more serious Web publishing aspirations, $99 gets you NaviPress, a graphical authoring package from NaviSoft, an authoring tools company owned by AOL. NaviPress lets you create pages in one window while browsing the Web in another. Adding links to your pages is a matter of simply copying their addresses (URLs) from the Web window. Once you're done, you save the pages you create directly to NaviSoft's server. Individuals pay $14.95 a month (the first month is free) to store up to 20MB of data. Included in the price is a monthly report on the number of visits, or "hits," to your page. NaviSoft also offers advanced services, such as help obtaining domain names and tracking usage, and will even run dedicated Internet servers for companies that don't want to do it themselves.

Prodigy's Darcy said he expects personal home pages to someday be as ubiquitous as e-mail addresses. Not only is creating your own home page a neat idea, but home pages expand the communities of online services, he says. It's as if users put windows into the walls around their private estates—with the Internet itself acting as the highway connecting all the estates. New features like personal Web page packages and greater Internet access will keep online services on the map for some time.

—Jiri Weiss

America Online 2.5

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AOL, 800/827-6364
Reader service no. 826

CompuServe WinCIM 2.0

Pricing: $9.95 per month for 5 hours; additional hours $2.95; volume discount available
CompuServe Inc., 800/848-8199
Reader service no. 830

Internet in a Box, Mosaic in a Box

Pricing: Internet in a Box $99, Mosaic in a Box $9.95
CompuServe Internet Division, 800/777-9638
Reader service no. 827

NaviPress

Pricing: $99
NaviSoft, 800/879-6882
Reader service no. 828

Prodigy 1.1

Pricing: $9.95 per month for 5 hours of online access; additional hours $2.95; volume discount available
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The Web Browser Shopping for Software on the Net

Shopping malls may be mobbed during the holiday season, but you can browse for software in peace on the World Wide Web. Most software makers are easy to find: You don't need an intelligent agent to track down http://www.symantec.com, http://www.novell.com, or http://www.lotus.com. For the addresses of hundreds of other vendors, try the list of pointers at http://www.planet-hawaii.com/global/manhp.html...Maybe you'd rather comparison shop. The closest thing to a virtual Egghead is software.net, an online market at http://software.net. You can thumb through product reviews, then order (by phone or via the Net with an encrypted credit card number) from more than 8000 commercial software programs at prices competitive with discount superstores'...If shareware's your thing, the University of Slovenia's Virtual Shareware Library has resurfaced in San Francisco with 130,000 titles and a new name: Virtual Software Library. The renovated site at http://vsl.cnet.com/ boasts a clever search interface and help menu...In the spirit of the Web's boundless self-promotion, we'd be remiss not to mention *PC World*'s own archives at http://www.pcworld.com/resources/softwarelibrary/. Free software and advice from these very pages! —Richard Overton

SOFTWARE.NET'S ATTRACTIVE USER INTERFACE and wide selection of products make it especially useful for bargain hunters who like shopping online.

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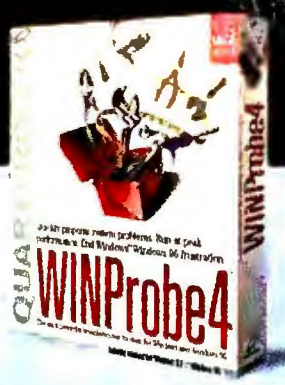

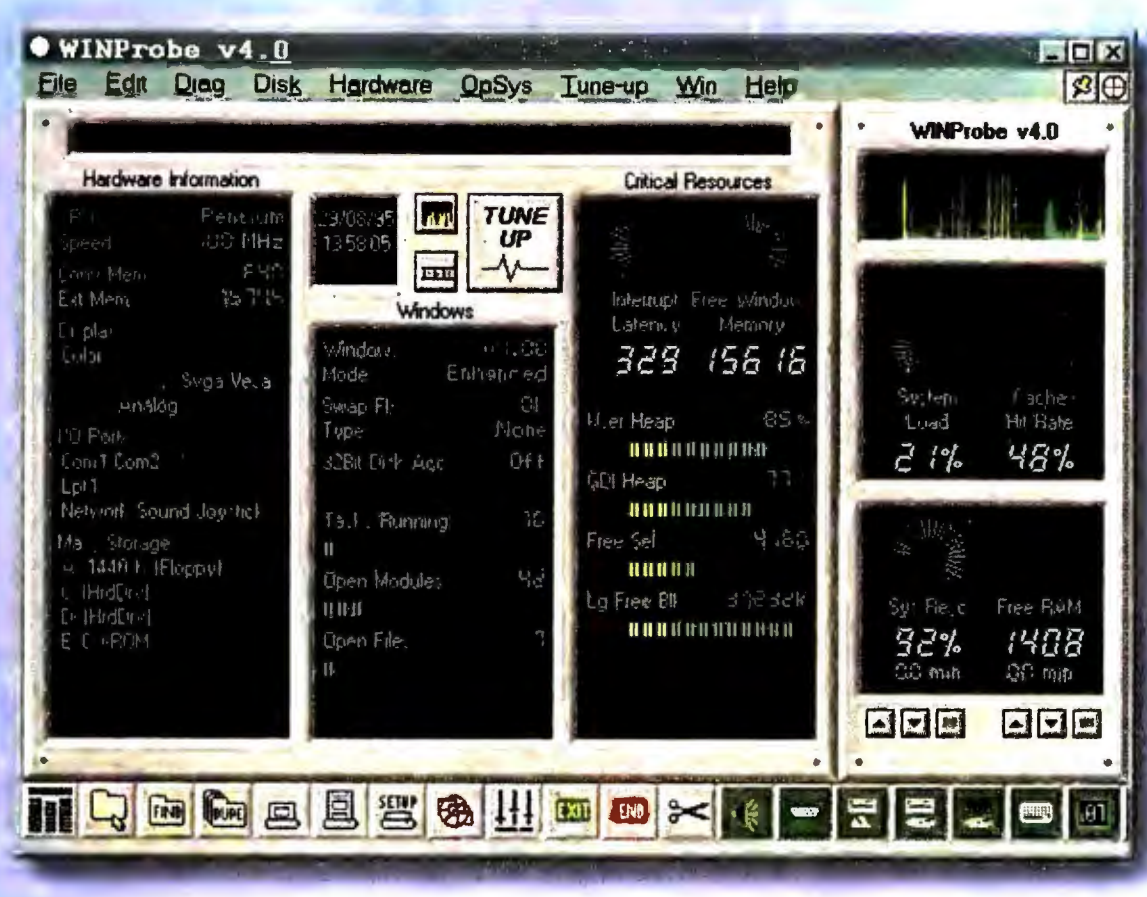

IT SAYS YOUR MEMORY IS FRAGMENTED, YOU HAVE A FAULTY RAM CHIP, YOUR SYSTEM REQUIRES OPTIMIZING, YOU HAVE A CACHE HIT RATE OF 48% AND YOUR FLYING TOASTER SCREEN SAVER IS GETTING A LITTLE MONOTONOUS.

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Using non-destructive testing technology, WinProbe searches out problems, performs more than 200 tests, automatically optimizes your system resources – even gives you more available RAM by automatically defragmenting your Windows and Windows 95 memory. And all the while it keeps you informed on a real-time status panel like the one above.

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Good Impressions With Win 95

FREELANCE GRAPHICS 96 FOR WINDOWS 95 adds slide thumbnails and a handy InfoBox for changing object properties.

TEST DRIVE

If you can't afford to hire Johnnie Cochran to prepare the charts for your next presentation, consider using one of the new 32-bit presentation graphics packages for Windows 95. Lotus Development's Freelance Graphics 96 and Software Publishing's Harvard Graphics 4.0 are both solid upgrades for current users who've made the transition to Win 95. However, Windows 3.1 diehards may be left out in the cold: Neither Lotus nor SPC has stated plans to enhance their Windows 3.1 versions.

As Windows 95–compliant products, the new Freelance and Harvard both have redesigned interfaces. Both packages also offer OLE 2.0 client-server support, which makes it easy to drag and drop files from other apps into a Freelance 96 or Harvard 4.0 presentation, as well as perform in-place editing of embedded OLE objects, such as manipulating a bit-map image using Microsoft Paint.

Since our look at early beta versions of Freelance and other presentation graphics packages (see "New Software for Windows 95," October), we've examined the latest betas of both Freelance 96 and Harvard 4.0. We created presentations with bulleted text, graphs, organization charts, bit-map images, multimedia clips, and more. Both products accomplished most tasks without difficulty but encountered a few problems (especially with importing bit maps) that the vendors assured us would be corrected in shipping versions.

Of the two, Freelance 96 is the better upgrade for current users because it offers a larger selection of new features and enhancements. We also recommend it to Windows 95 users picking their first presentation package or those who need group editing. Harvard 4.0 is more of a direct conversion of its previous version. Committed Harvard 3.0 users may want to upgrade just to enjoy the product's improved interface and performance under Win 95.

Freelance 96: Most Improved

Freelance 96's biggest addition is its Team Computing workgroup feature. This collection of tools streamlines the all-too-common process wherein feedback from several people is needed to produce a presentation. With the TeamReview tool, you can distribute a presenta-

Freelance Graphics 96 for Windows 95

Pricing: $355, upgrade $105
Availability: November
Lotus Development Corp., 800/343-5414, 617/577-8500
Reader service no. 824

Harvard Graphics 4.0 for Windows 95

Pricing: $289, upgrade $99
Availability: Immediate
Software Publishing Corp., 800/336-8360
Reader service no. 825

And It Makes Color Copies, Too!

The HP CopyJet offers workgroups and small businesses a breakthrough convenience: color ink jet printing and color copying from a single machine. Expected to sell for $2495 on the street, this is the first device of its kind. The CopyJet produces economical copies that cost from about 7 cents for a page with spot color to 42 cents for a color-filled page, says HP. Compare this to sending someone to a copy center, where each color page is $1 to $1.20, not counting wasted time.

I found the CopyJet easy to use. In our tests, the printer put out about 7 pages per minute in 600-by-300-dpi monochrome, about 1 page per minute in 300-by-300-dpi color, and about 2 to 3 pages per minute for mixed text and color. Color and text print quality were excellent.

The hinged top protects an 8½-by-14-inch glass plate where you lay documents to make copies. The CopyJet makes reproductions using its ink jet engine. (Note that you can't use the CopyJet as a scanner to import electronic images. We bet HP will add this capability later.) You can resize images from 50 to 400 percent and produce up to 99 copies in one job.

The CopyJet attaches to your LAN with an optional $369 HP JetDirect ethernet card. It's a great way to add color to your work life. Hewlett-Packard, 800/752-0900. Reader service no. 823

—Laurianne McLaughlin

HP CopyJet

JOHN GREENLEIGH

Window To Your Mind's Eye

Samtron's 17" monitors offer pictures so crisp, so clear, they truly provide a window to your mind's eye. Winner of *Byte Magazine's* Best Monitor Overall for Image Quality award, praised by *Windows Magazine* ("You'll Like What You See") and highly recommended by *PC Digest & Ratings Report*, Samtron's 17" monitors offer flicker-free resolution, sharp edge-to-edge focus and energy-saving features perfect for the home or office.

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Resellers circle 204 on reader service card

HARVARD GRAPHICS 4.0 FOR WINDOWS 95 sports an improved design checker that suggests ways to fix design problems.

tion to colleagues for review by saving it on a floppy, posting it on a network directory, or sending it by e-mail—all from within a dialog box. Associates use the program's mark-up tools (color-coded comments, circles, and arrows) to annotate your slides. Once you have everyone's input, Freelance 96 helps you incorporate the remarks into the original presentation. (Microsoft's new PowerPoint for Windows 95 has a Meeting Minder feature that compiles comments at the end of a presentation, but it lacks mark-up tools for a slide-by-slide review by different people.)

A TeamShow tool allows you to deliver presentations to remote users via modem or over your LAN. No other major presentation package now offers better workgroup support. Another big improvement is enhanced SmartMaster templates, which now include detailed content suggestions for dozens of presentations. For example, a business plan template provides suggestions on information to include on each page. This content feature makes Freelance 96 the best choice for novices.

Other notable additions: a Guide Me icon offers design tips and step-by-step instructions, and an on-screen timer (with start/stop/pause buttons) lets you rehearse your presentation. You can also jazz up Freelance shows with ready-made animations that you insert into presentations as objects. Our favorite improvement is the enhanced Outliner, which now displays "live" thumbnails of slides next to the outlined text. As you make changes to the text, the thumbnails are instantly updated, saving you from switching views to see how your changes look.

Harvard 4.0: A Runner-Up

Harvard 4.0 doesn't offer as many new or unique capabilities as the latest Freelance, but it does provide most of the easy-to-use features that won Harvard Graphics 3.0 a Best Buy in our last presentation software roundup ("Multimedia Is the Message," August). The biggest improvement is better overall performance as a 32-bit program.

Harvard 4.0's smorgasbord of new features is worthwhile, too. Among the most impressive: new Quick Presentation templates that include tips on how to use these canned presentations most effectively; an improved Advisor System, which lets you check for design problems and prompts you on how to fix them; and a handful of new editing tools, such as an eyedropper tool for quickly copying and pasting attributes from one object to another. Like Freelance, Harvard also has new screen-show tricks, including an animation player that makes it easy to add action to your presentations with several included clips.

Other new utilities include Harvard Montage Lite, a more versatile image browser that replaces the Symbol Library Manager, and Quick View (similar to Win 95's Quick View), which lets you see Harvard 4.0 files without launching the program. On the downside, Harvard 4.0 comes with the same 16-bit version of Harvard F/X—a tool for creating text and graphic effects—that was included in its predecessor. Even on my 90-MHz Pentium PC, I found F/X painfully slow for common tasks like creating embossed text.

The Envelope Please...

While both Freelance 96 and Harvard 4.0 have bolstered their screen-show prowess, neither package yet matches the spiffy multimedia production capabilities of Gold Disk's Astound or Macromedia's Action for Windows 3.1. In the future, we'll scrutinize other new presentation packages for Windows 95. But for now, Freelance Graphics 96 gets our vote as the most improved package. Harvard is as solid as ever, but it'll need to match the innovative features in Freelance (and PowerPoint) if it wants to keep winning Best Buy awards.

—Richard Jantz

JEFFREY PELO

Bug Watch: Pentium Board Snafu

Intel Zappa and Windows 95

▶ **Bug:** Intel's "Zappa" Pentium system boards (based on the Triton chip set) with AMI BIOS revision 1 can give Windows 95 a conniption. Booting the OS may trigger 'Static Device Resource Conflict' or 'System Board Resource Conflict' error messages. Although pressing <Esc> allows you to continue booting, the error messages reappear every time you boot.

▶ **Fix:** Download revision 3 (or later) of the AMI flash BIOS, along with installation and BIOS backup utilities, from the Intel support BBS (503/264-7999 or 916/356-3600). The BBS requires you to enter the system board's serial number, which can be found on a sticker on the motherboard.

Otherwise, you can try Microid Research's $15 shareware MR BIOS flash BIOS upgrade for the Zappa system board and get a few extra features that the AMI BIOS lacks. As we went to press, MR BIOS version 3.14 and related installation utilities were available from a World Wide Web page at http://198.215.126.12/mrbios/mrbios.html, and as mr_zappa.zip in the General Hardware library of the PC Hardware Forum on CompuServe (go pchw).

—Scott Spanbauer

Found a hardware or software bug? Call us at 415/978-3253, or post your report on PC World Online. We'll try to dig up a fix.

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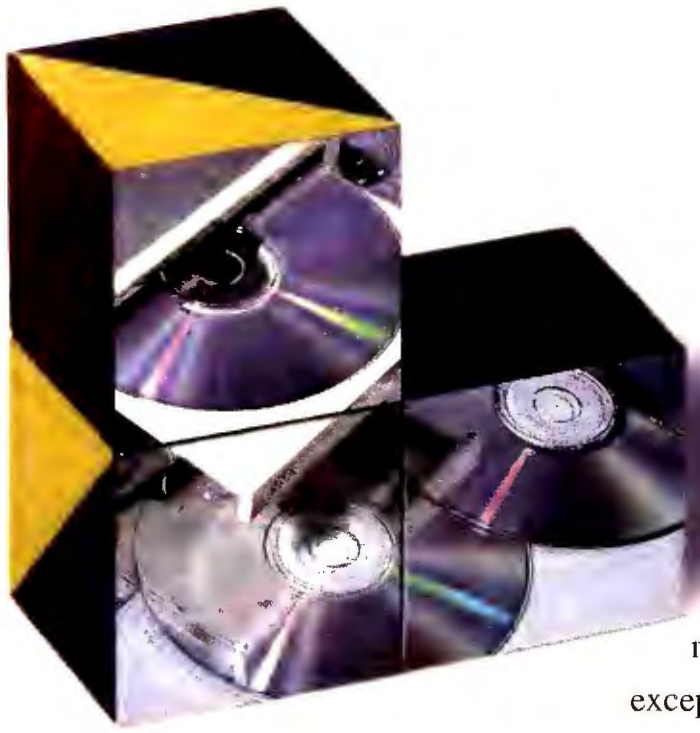

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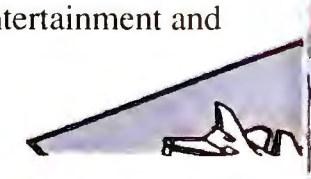

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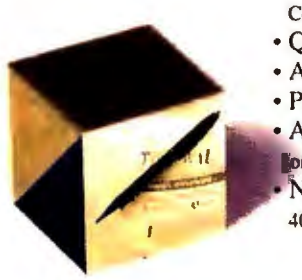

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- 1280MB 10ms EIDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- ATI MACH 64 PCI w/ 2MB DRAM
  (MPEG Playback w/Full Screen & Motion Video)
- 15" MAG Flat-Screen 1280x1024 Monitor
- 28,800 Baud V.34 Fax/Modem
- Toshiba 4X EIDE CD-ROM Drive (190ms)
- 16-Bit Stereo Sound Card
- Altec Lansing ACS-5 Speakers
- 11-Bay Mid-Tower Case
- 104-Key keyboard & Microsoft Mouse
- Microsoft Windows95
- Professional Software Bundle (preinstalled)

QP5/75 SM.....$2199
QP5/90 SM.....$2299
QP5/120 SM.....$2399
QP5/133 SM.....$2549

QP5/120 SM-1 $2749

- Intel 120MHz Pentium processor
- 16MB RAM, 256KB write-back Cache
- 1.6GB 9ms EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- ATI MACH 64 PCI w/ 2MB DRAM
  (MPEG Playback w/Full Screen & Motion Video)
- 17".26dp MAG 1280x1024 Monitor
- 28,800 Baud V.34 Fax/Modem
- Toshiba 4X EIDE CD-ROM Drive (190ms)
- Ensoniq 16-Bit Wavetable Sound Card
- Altec Lansing ACS-5 Speakers
- 11-Bay Mid-Tower Case
- 104-Key keyboard & Microsoft Mouse
- Microsoft Windows95
- Professional Software Bundle (preinstalled)

QP5/100 SM-1.....$2699
QP5/133 SM-1.....$2899

QP5/133 SM-2 $3099

- Intel 133MHz Pentium processor
- **16MB EDO Performance-Enhanced Memory**
- **256KB Pipelined Burst Cache**
- 1.6GB 9ms EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- STB PowerGraph 64 Video w/**2MB EDO DRAM**
  (MPEG Playback w/Full Screen & Motion Video)
- 17" .26dp MAG 1280x1024 Monitor
- 28,800 Baud V.34 Fax/Modem
- **6X EIDE CD-ROM Drive**
- Ensoniq 16-Bit Wavetable Sound Card
- Altec Lansing ACS-31 Speakers w/subwoofer
- 11-Bay Mid-Tower Case
- 104-Key keyboard & Microsoft Mouse
- Microsoft Windows95
- Professional Software Bundle (preinstalled)
- **Upgrade to 2.0GB EIDE Hard Drive and ATI MACH 64 PCI w/2MB VRAM for $150 more.**

QP5/100 SM-2.....$2899
QP5/120 SM-2.....$2949

Upgrade Specials

"Options Available with System Purchase"

- Conner tape backup units:
  850MB Add $169
  1.7GB Add $199
- Panasonic KX-6100 Laser Printer (6 ppm, 600 dpi class print quality, Windows*95 compatible) Add $369
- Microsoft Natural Keyboard Add $59.
- Ensoniq 16-Bit Wavetable Sound Card and Altec Lansing ACS-31 speakers w/subwoofer Add $99. (upgrade from systems with 16-Bit sound card)
- Call to upgrade to 16MB EDO Memory and 256KB Pipelined Burst Cache.
- Call to upgrade to STB PowerGraph 64 Video w/2MB EDO DRAM

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New Products

Edited by Laurianne McLaughlin and Randy Ross

Hardware 71 | Software 80 | CD-ROMs 102

IBM and Gateway Ride Second Wave of Portable Multimedia

Not long ago, any notebook that sported a CD-ROM drive was a novelty—and a high-price one at that. But with the arrival of new multimedia notebooks, including systems from IBM and Gateway 2000, you have a variety of portable multimedia options.

As usual, IBM's new top-of-the-line ThinkPad notes pretty much define the state of the art in high-end–notebook design. Built around a 90-MHz Pentium CPU, IBM's ThinkPad 760CD is among the first portables to use a roomy 12.1-inch active-matrix color screen and a quad-speed CD-ROM drive—two features that make it a natural for multimedia presentations. It also has 16-bit wavetable stereo sound, thanks to an IBM Mwave chip that doubles as a built-in 14.4-kbps modem.

The 760CD sports several other multimedia functions that are still rare even in desktops, including the ability to display full-screen, full-motion MPEG-2 video clips with a clarity that rivals that of broadcast TV. It also has a video-out jack for routing its display to a video monitor or a VCR, and a video-in jack for capturing and digitizing video images.

The system's innovations aren't restricted to multimedia, either. When you open up the notebook, its keyboard tilts upward slightly, like a desktop's, with similar ergonomics. Lift up the keyboard, and you get access to the hard disk, CD-ROM drive, and battery pack—all of which you can easily remove and replace with components that better fit your needs. For example, you can replace the CD-ROM drive with an additional hard disk, a second battery, or even a cellular telephone module.

The ThinkPad 760CD weighs 7.4 pounds and comes with 8MB of RAM and a whopping 1.2GB hard drive; IBM expects it to sell for a street price of about $7000. The company is also offering the ThinkPad 760C, a slightly thinner model that lacks the 760CD's CD-ROM drive and MPEG-2 video chip, for an expected street price in the $6000 range. The 760C is also available in a 120-MHz Pentium version—the fastest ThinkPad model—for around $7000.

GATEWAY'S SOLO MULTIMEDIA NOTEBOOK puts Pentium-based portable multimedia within the reach of economy-minded buyers.

IBM ThinkPad 760CD

Extra-large screen, quad-speed CD-ROM drive, and MPEG-2 video.
IBM
800/426-2968
Street price: Starts at $7000 with 8MB of RAM and 1.2GB hard drive

Gateway 2000 Solo Multimedia Notebook

Moderate-price multimedia Pentium with Windows 95–specific keyboard.
Gateway 2000
800/846-2000, 605/232-2000
Street price: Starts at $3699 with 75-MHz CPU, 8MB of RAM, 340MB hard disk, and double-speed CD-ROM drive
Reader service no. 789

Gateway Goes Solo

If the new ThinkPads' premium prices put them out of your reach, take a look at Gateway 2000's new Solo Multimedia Notebook. The Solo doesn't attempt to compete with the ThinkPads' cutting-edge features, but it does provide Pentium-powered multimedia capabilities beginning at a reasonable $3699 for the cheapest CD-ROM–equipped model, which weighs 5.9 pounds.

Just because the Solo is aimed at cost-conscious buyers doesn't mean it's a feature-poor notebook. All configurations include either a 75-MHz or a 90-MHz Pentium processor, 256K of secondary cache to boost performance, and 16-bit stereo sound. Each model has either a 10.2-inch VGA or a 10.4-inch super-VGA active-matrix color screen, making them suitable for delivering presentations.

While the ThinkPads offer IBM's acclaimed keyboard-mounted pointing device as a mouse substitute, the Solo uses a touch-sensitive panel located below the keyboard. The Solo also has two keys specifically for Windows 95. One key operates Windows 95's on-screen Start button, which lets you open documents and run programs; the other key brings up context-sensitive menus and is equivalent in function to the right mouse button.

The Solo lacks the pick-and-choose modularity of the new ThinkPads. Still, popping out its double-speed CD-ROM drive and replacing it with the included internal floppy disk module takes seconds—that's important because unlike the ThinkPad 760CD, the Solo doesn't include an external floppy drive.

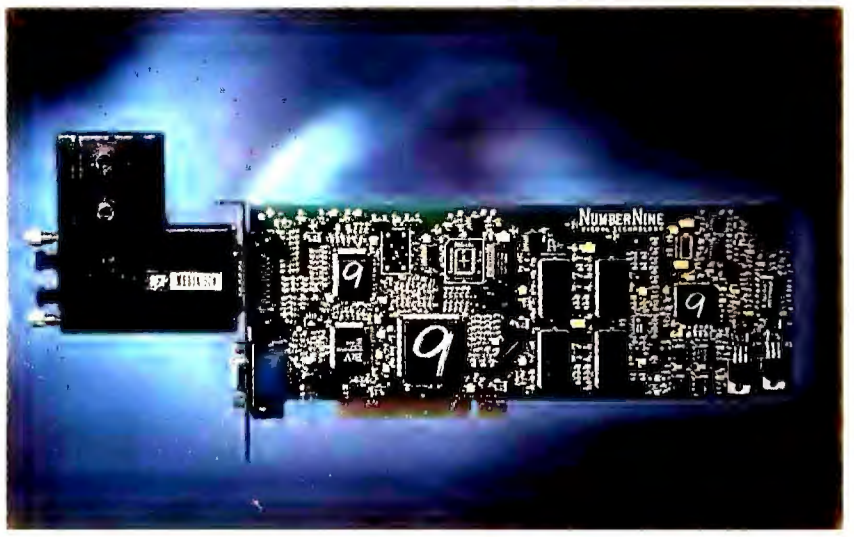
—Harry McCracken

Number Nine's New Add-In Board Packs Multimedia Features

How much multimedia can fit on one add-in board? Ask the people at Number Nine, and they'll tell you, "Lots." The company's 9FX Media574 is the first of what will be a wave of new boards based on Brooktree's innovative BtV MediaStream chip set, which combines several multimedia functions.

The 9FX Media574 is a graphics board, a full-motion video accelerator, a video capture card, and a 16-bit sound board with wave-table synthesis. The wave-table synthesis and MPEG playback are performed in software, but with today's faster CPUs, it's hard to tell the difference between the 9FX Media574's performance and that of hardware-based wave-table and MPEG products. The Number Nine board also supports blue-screen chroma-keying, the process that TV news stations use to superimpose the weather forecaster over a map of the United States. It's a neat feature for instructional presentations or walk-throughs of a building's layout, for example, because you can overlay a video of a "tour guide" on the graphic image (as long as the video was shot against the proper backdrop, such as a blue screen).

The Media574 is a good buy. If you're thinking of upgrading your sound or video card, consider this: The 9FX Media574, with 1MB of fast VRAM, has a street price of $349, which is far less than the total cost of separate video, wave-table, and capture cards. (A video card alone can cost $350.) Not only does this board save you cash, it also saves you the hassle of dealing with multiple cards, configurations, and cable clutter inside your computer. And using multiple cards can make it difficult to upgrade memory, CPUs, or other components and devices; the all-in-one Media574 eliminates these complications. However, the card does require a special adapter that juts out the back of your system. The adapter and various cables hook into the unit and can take up desk space.



THE 9FX Media574 handles a variety of audio and video input/output devices, but it takes 2 inches of space on the back of the machine.

—Brad Grimes

9FX Media574

Multifunction board supports MPEG playback, wave-table synthesis, and video capture.
Number Nine
800/438-6463
Street price: $349
Reader service no. 790

Microtek's PageWiz: Smart Price, Great Features

Microtek's PageWiz, the latest in a new class of monochrome scanners designed to help you get paper off your desk and into your PC, provides decent scanning capability at a low price. Like its personal scanner competitors, the PageWiz is very light (only about 2.5 pounds), takes up almost no desk space, and has snazzy Windows 3.1–based software that lets you send scanned documents directly to a printer, to a fax-modem, or to another PC as e-mail.

The PageWiz is bundled with the OmniPage OCR software package, which allows you to edit your scanned document before filing it or sending it out. An optional $49 document feeder holds ten sheets of paper. (Many competing products require you to feed sheets in one at a time.) The PageWiz scans in resolutions up to 300 dpi and offers gray scaling in 16 shades for importing photos. With a street price of $199, the PageWiz is one of the least expensive products in its class.

In my tests, documents that I scanned with the unit were not as sharp as the originals but were readable, both on screen and on paper. In addition, the PageWiz was very easy to set up (it plugs into your PC's parallel port), and the software installation was quick and simple. You might encounter problems, however, if your system has only one parallel port or if you're connected to a network. If your lone parallel port is being monopolized by a printer, you'll have to plug the printer into the back of the scanner. This arrangement produced a bidirectional communications error when I tried it with a Hewlett-Packard 660C ink jet printer. Microtek claims that the PageWiz should support bidirectional communications; the issue had not been resolved at press time.

Still, the PageWiz offers enough features to satisfy many users—and at $199, the price is tough to beat.

—Tracey Capen

PageWiz

Low-price personal scanner offers lots of features.
Microtek Labs Inc.
800/654-4160,
310/297-5000
Street price: $199
Reader service no. 791

"MOST BANG FOR THE BUCK."

(BUT DON'T TAKE OUR WORD FOR IT!)

PC WORLD BEST BUY

JUNE 1995 BYTE
BEST OVERALL
V.34 EXTERNAL
MODEM

ProClass 288 LCD V.34

New Estimated Street Price: $359

PC WORLD June 1995
BEST BUY

- "the best combination of price, performance, features, and support"... way ahead of the pack."
- "best overall value in a V.34 modem."
- "the clear Best Buy in this roundup."

BYTE/NSTL LAB REPORT June 1995
BEST OVERALL

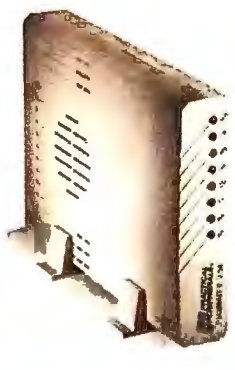
- "top honors in almost every aspect of our benchmarks."

EDITORS' HOME OFFICE COMPUTING PICK

COMPUTERWORLD V.32/V.32bis V.42/V.42bis MODEMS US BRAND PREFERENCE 1994 BEST PRICE/PERFORMANCE

ProClass 288 MT V.34

New Estimated Street Price: $289



Practical Class 288 Mt II V.34

New Estimated Street Price: $199

HOME OFFICE COMPUTING Jan. 1995
EDITORS PICK AWARD

- "represents the cutting edge of today's telecommunications technology...and better priced."

PC MAGAZINE March 14,1995

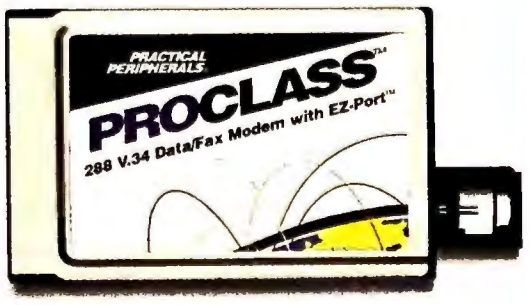
- "it's performance out distances even much more expensive modems."
- "by far a top performer overall."
- "best - performing modem."

COMPUTERWORLD PC/FAX MODEMS US BRAND PREFERENCE BEST PRICE/PERFORMANCE

JUNE 1995 BYTE
BEST OVERALL
V.34 PC CARD
MODEM

PCWEEK LABS ANALYST'S CHOICE DEC. 26, 1994

Mobile FIRST CLASS



ProClass 288 EZ-Port™

New Estimated Street Price: $289

PC WEEK April 3, 1995
ANALYST CHOICE

- "provided the most efficient built-in power management."
- "best combination of price and performance."

BYTE/NSTL LAB REPORT June 1995
BEST OVERALL

- "the modem ran extremely well, finishing first in our PC Card fax testing."

When it comes to value, industry editors and buyers think Practical. Our latest line of high-speed modems has been capturing all the awards, making Practical an incredible value. And with 7 day technical support and a lifetime limited warranty,* you will be very satisfied. For more information on the complete line of Practical modems, call PRACTIFAX at 800-225-4774 and select Document #3010, or call 800-964-2937, Ext. 600 for a dealer referral.

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*Five year warranty on PCMCIA modems.

Circle 191 on reader service card

Windows 95 Keyboards to Mice: Take a Hike

Windows 3.1 has doomed touch typists to a life full of mouse clicking and wasted time. And Windows 95 would have sealed their fates, because it exploits both mouse buttons. But now touch typists can rejoice: Two new Windows 95–specific keyboards add keys to handle many mouse-driven commands.

NMB Technologies' RT-6600WIN, street priced at $49.95, is a standard keyboard except that the <Space> bar has been shortened to accommodate the Windows 95 keys. Two Windows Logo keys sit on each side of the <Space> bar, and an Application key is on the right. The Logo keys open the Start menu, which can then be navigated with the arrow keys. The Application key simulates the right mouse button; in most apps it brings up context-sensitive pop-up menus. The Logo key combinations offer preset macro commands as well. For example, you press <Windows>-E to bring up Explorer. (These commands are identical on both keyboards.) The NMB's keys offer light to medium resistance without feeling spongy.

The Windows 95–specific keys are in the same location on the Microsoft Natural Keyboard. This model costs about $40 more than NMB's, but it includes ergonomic touches such as split keypads that are rotated out from the middle to encourage a straight wrist position. It takes some getting used to. However, the keypad pressure seemed just right—firm but not resistant.

WITH THE THREE EXTRA BOTTOM-ROW KEYS on NMB's Windows 95–compatible keyboard, touch typists will rarely need the mouse.

Choosing a keyboard is a very personal endeavor. If ergonomics are important, consider the Microsoft Natural Keyboard. I preferred the RT-6600WIN, because I'm used to a standard keyboard design.

–Michael S. Lasky

NMB RT-6600WIN

Windows 95 keyboard with standard layout.
NMB Technologies Inc.
800/662-8321,
818/341-3355
Street price: $49.95
Reader service no. 792

Microsoft Natural Keyboard

Ergonomic Win 95 keyboard.
Microsoft Corp.
800/426-9400
Street price: $89
Reader service no. 793

Storage to Go With PowerMO

If you want unlimited disk space or removable storage for archiving data or exchanging large files, here's a new option: the Olympus PowerMO 230 external magneto-optical drive. The PowerMO 230 boasts low media cost and high performance, which approaches that of removable magnetic drives.

The PowerMO 230 measures 5.7 by 3.5 by 8.2 inches and includes a 16-bit SCSI adapter, a cable, and one 230MB MO cartridge. The PowerMO can read, write, and format ISO-certified 3½-inch 230MB and 128MB cartridges from other MO drives.

The PowerMO 230's $689 street price stacks up favorably against the $695 street price of the slower 230MB Pinnacle Micro Tahoe MO drive. But compared with street prices for removable magnetic drives—such as the $200 Iomega Zip 100MB drive or the $240 SyQuest EZ135 135MB drive—the PowerMO's price looks less attractive, unless you frequently need that extra 100MB to 130MB per cartridge. (For higher capacities, 5¼-inch, 650MB phase-change rewritable drives start at less than $1000, and 1.3GB MO drives start at around $1750.)

But if you need the space, there's another story in terms of media cost. One compact and durable 3½-inch, 230MB MO cartridge retails for $20 to $25, or 9 cents to 11 cents per megabyte—compared with a 135MB SyQuest EZ135 cartridge's 15 cents and a 100MB Iomega Zip cartridge's 20 cents. The more media you use, the sooner the PowerMO 230 will pay off.

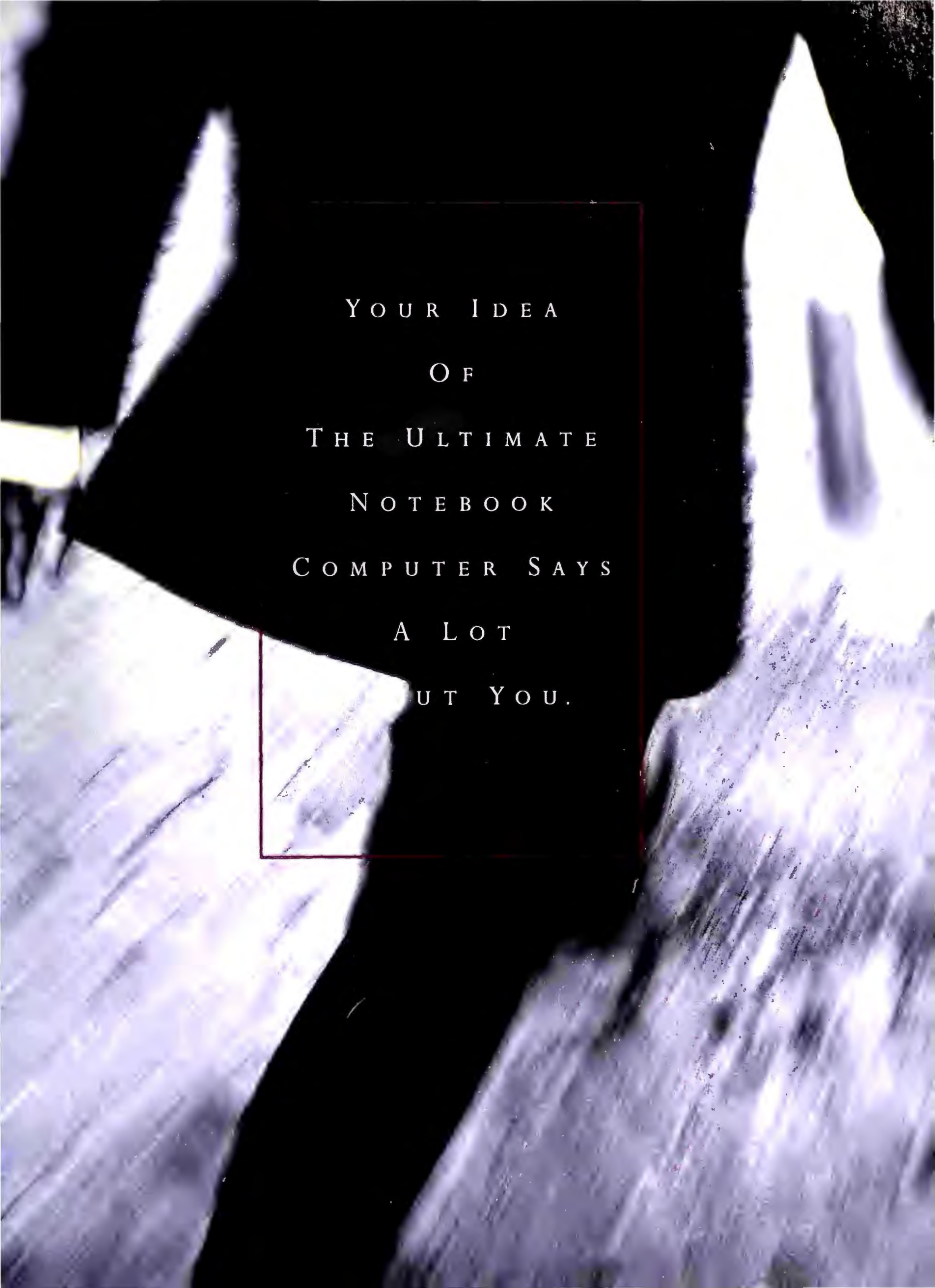
The performance of the PowerMO 230—which sports a large 1MB cache and a fast 4500 rotations per minute—approaches that of a magnetic cartridge drive. In our data transfer test, for example, the PowerMO ran 36 percent faster than the Pinnacle Micro Tahoe MO drive we tested last year, and was just 11 percent slower than the slowest magnetic cartridge drive.

If you need 100MB to 200MB of storage, the Olympus PowerMO 230, with its durable, cheap 230MB cartridges, is worth a look.

–Shane Rau

Olympus PowerMO 230

Rewritable 3½-inch drive is among the fastest.
Olympus Image Systems, Inc.
800/347-4027
Street price: $689
Reader service no. 794


Your Idea
Of
The Ultimate
Notebook
Computer Says
A Lot
ut You.

It Could Say You're A

collector nomad hotshot workhorse

You still have the invitation to your 7th birthday party (and you know where it is).

The thought of a second 1.35-GB hard drive isn't astounding – it's necessary.

Or a

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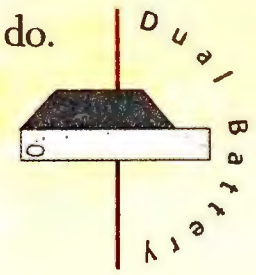
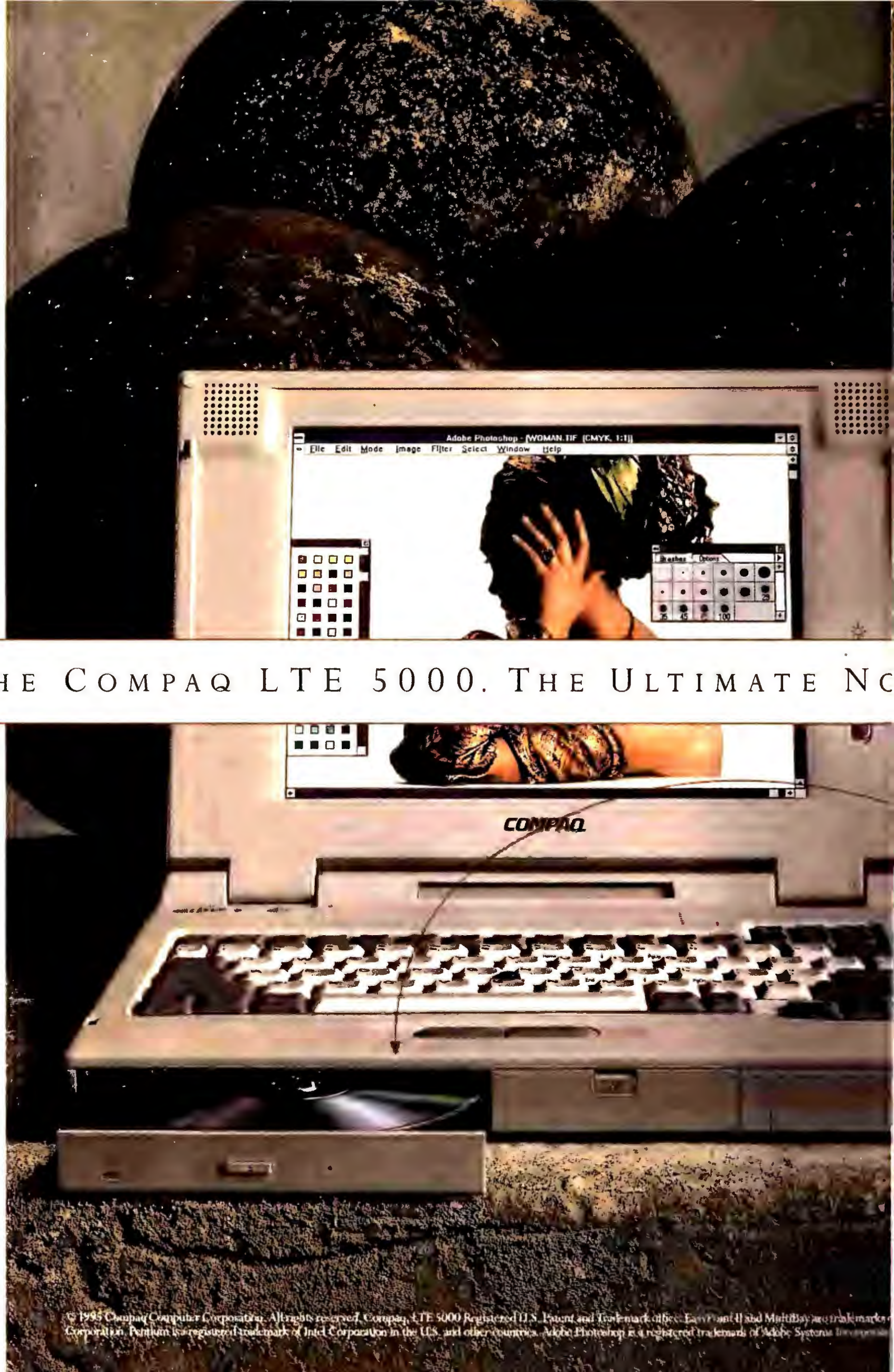
On red-eye flights,
you're the only one with
the overhead light on.

You demand a computer
that only needs to
recharge when you do.



Circle 61 on reader service card



THE COMPAQ LTE 5000. THE ULTIMATE NO

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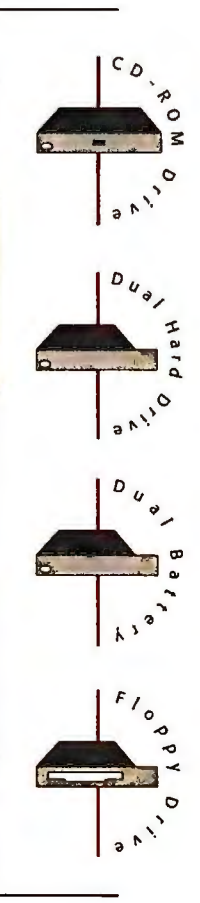
COMPAQ

collector
nomad
workhorse
hotshot

You know exactly who you are. Well, at this exact minute. But the way things go, this probably changes several times a day. Which is precisely why we created the LTE 5000.® A Pentium® powered notebook featuring interchangeable devices, giving it the ability to change as quickly as you do. We started with features any self-respecting notebook user demands: a Pentium processor, a full-sized keyboard (complete with the EasyPoint II™ pointing device), an 11.3- or 10.4-inch 800 x 600 LCD screen and two PCMCIA slots. Then we added memory expandable to 72 megabytes, 16-bit stereo sound and speakers, and optional MPEG video. But we left the cool part — the interchangeable part — up to you. The LTE 5000 is completely modular. So you can mix and match capabilities at the drop of one of your many hats. For starters,

TEBOOK FOR WHOEVER YOU HAPPEN TO BE.

there's a removable hard drive (going up to a hefty 1.35 gigabytes). A long-lasting lithium ion battery. And the kicker is the unique front-loading MultiBay — because it can do everything else. Running the world's biggest database? Use the MultiBay for a *second* 1.35-gigabyte hard drive. Making a multimedia presentation? Plug in a CD-ROM drive. Need more juice for a long flight? Plug in a second battery. Need to share some files? Plug in a floppy drive. In fact, the MultiBay is so useful, we built an expansion base featuring two of them. So in the office, you can be fully connected with everything working at once. And when you pack up, just configure the LTE 5000 for what you'll need on the road. It all adds up to a refreshing combination of the most advanced technologies and highly evolved common sense. Call it the technological cure for multiple personalities. Interested? Call us at 1-800-345-1518 (select PaqFax option) or visit our Web site at www.compaq.com.

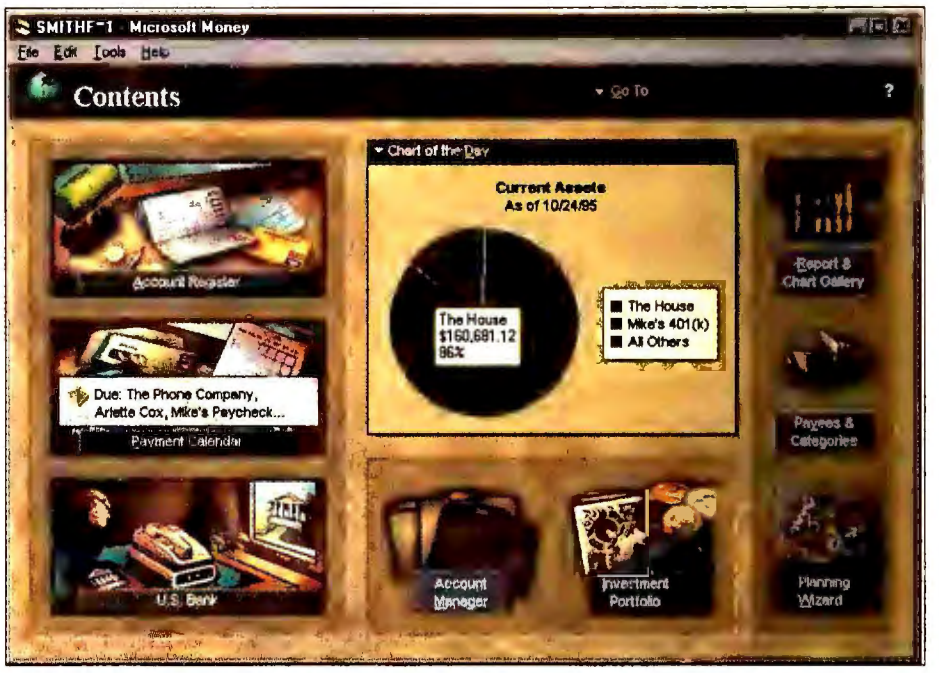


Circle 61 on reader service card

Manage Your Finances With Greater Ease and Less Cost

Personal finance software has been available for years, but it has suffered from key limitations. The programs required military-style discipline because you had to manually enter every transaction, and the cost of doing transactions online was steep. Things are changing: The latest versions of Microsoft Money and Intuit's Quicken go a long way toward the goal of easy-to-use, inexpensive personal financial management.

Money for Windows 95 (a program that only runs under Windows 95) and Quicken Deluxe (a Windows 3.1 application that runs under Win 95) facilitate entering transactions by forging online alliances with large banks throughout the U.S. At press time, Microsoft had hooked up with 20 banks; Intuit with 19. The process works like this: First, you establish an account with one of the participating banks. Then, instead of having to manually enter your cleared checks, account balances, or credit card payments, you connect directly to the participating bank through Money or Quicken Deluxe, using a toll-free number. All transactions are automatically posted to your software. (You'll still need to enter cash transactions manually.)



FRIENDLY FACE: Money for Windows 95 is a good choice for home PC owners who don't currently use personal finance software.

Both products have improved electronic-payment features. Paying your bills online has always been one of the biggest draws of PC-based financial management, but it's been occasionally unreliable (bills weren't always paid on time) and expensive as well. Intuit has set up a new company—Intuit Services Corp.—that will handle all electronic payments, which were previously handled by a third party. Intuit guarantees that bills will be paid on time. The new online bill-paying service wasn't available for testing at press time, but the fact that Microsoft Money is also using the Intuit Services Corp. payment service should increase confidence in its potential reliability.

The real news, though, is the lower cost of transactions: Some will be free; all will be accessible through toll-free calls; and online bill paying is expected to cost less per check than the cost of a first-class stamp. That's been a long-unfulfilled promise, but it looks like it's approaching reality. Prices for Quicken's former third-party service started at about $10/month and went up from there. Although Intuit Services Corp.'s exact prices weren't available at press time, Intuit estimated that $5.95 per month would cover up to 20 online checks, working out to as little as 30 cents per check.

For the Average User

Money for Windows 95 is a completely new product that bears no resemblance to its prior incarnation. Although it tracks investments, it's really not designed for those who spend a great deal of time watching the market. Money is particularly adept at generating charts and reports of your financial situation, and it makes heavy use of Windows 95's object-oriented features. For example, pointing to a chart point pops up a display of details; click the right mouse button and you'll see a list of links to related data. And you can't beat the price: It's free via the Microsoft Network and the World Wide Web until October 31 (it will be $34.95 after that).

Quicken Deluxe features a redesigned interface that takes the drudgery out of common tasks and includes features for serious investors. Investor Insight lets you track your portfolio automatically using online sources, such as Dow Jones News Service and Standard & Poor's Company Reports. Again, pricing for these services wasn't available at press time, but it's expected to be low. The Mutual Fund Finder lets you enter a variety of criteria for finding the right fund.

Both Quicken Deluxe and Microsoft Money take lots of the pain out of computerizing your finances, but they still make some demands on your time and require at least a modicum of organization.

–Stan Miastkowski

Microsoft Money for Windows 95

Easy-to-use personal finance and online banking software.
Microsoft
800/426-9400, 206/882-8080
List price: Free until 10/31/95 from Microsoft's World Wide Web page or the Microsoft Network, $9.95 via mail (call 800/508-8458 for info); $34.95 after 10/31
Reader service no. 751

Quicken Deluxe for Windows

Personal finance manager adds investment research and advice.
Intuit
800/816-8025
List price: $59.99

The IBM PC 300
comes with a
Pentium processor,
256 KB L2 cache,
ZIF sockets,
8 MB (exp to 128 MB),
4 SIMM slots.

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If you dig all that technical stuff, great. But if it just looks like Martian code to you, call IBM PC Direct. And we'll be more than happy to translate it into clear, plain English.

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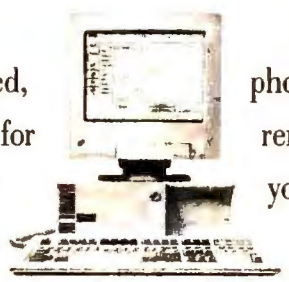

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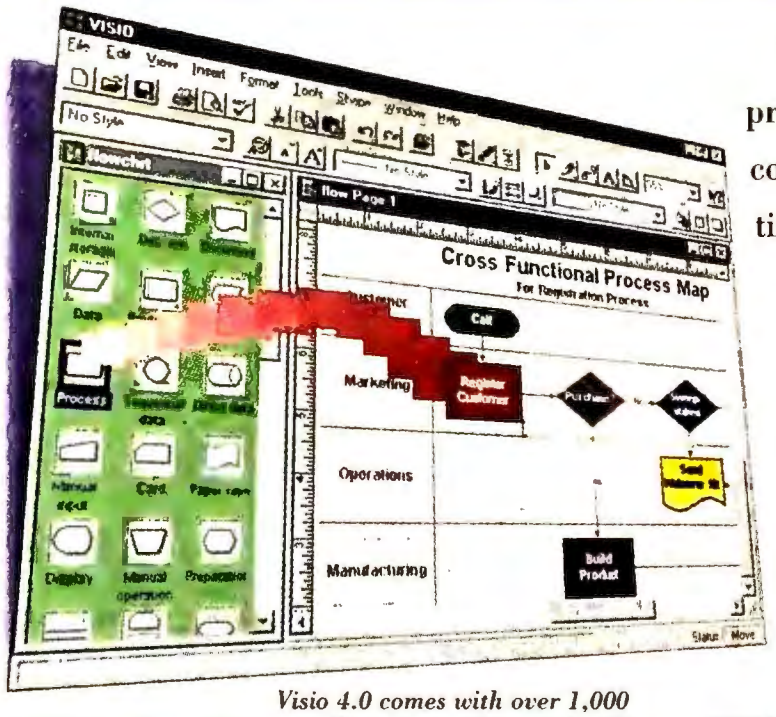

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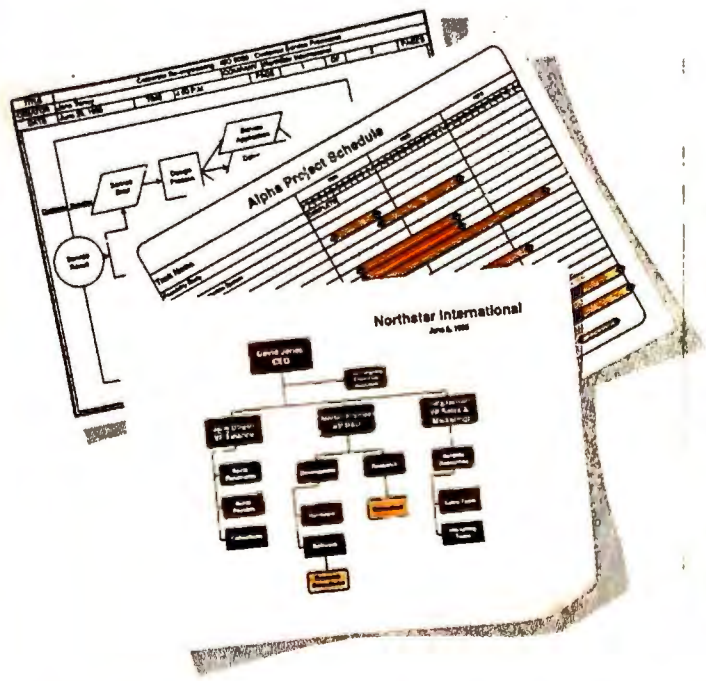

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Visio supports the new Microsoft Office Binder, offers a user interface option for each of the three suites, and supports Lotus Notes/FX. It's no wonder corporations are standardizing on it.

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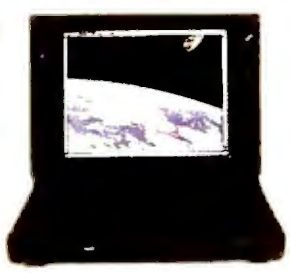

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Let Windows 3.1 Programs Use Long File Names

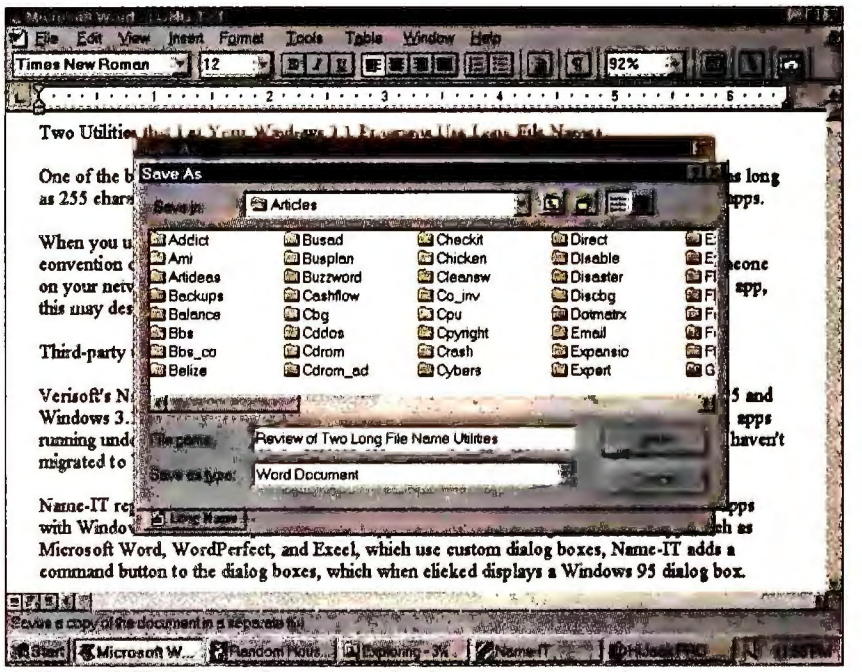
One of the nice things about Windows 95 is that you can use file names as long as 255 characters. The problem is that you can only do this with Windows 95 applications. If you use a Windows 3.1 app under Windows 95, you're still stuck with the old DOS convention of eight characters plus a three-character extension.

Vertisoft's Name-It for Windows 95 and View Software's Long File Names for Windows 95 and Windows 3.1 are two small programs that both let you use long file names with your Windows 3.1 apps running under Windows 95. And Long File Names lets you do this even if you're still using Windows 3.1.

Name-It replaces the File Open, Save As, and similar dialog boxes of your Windows 3.1 apps with the Windows 95 versions, provided those apps use standard dialog boxes. With apps such as Excel and WordPerfect, which use custom dialog boxes, Name-It adds a command button to the dialog boxes that displays a Windows 95 dialog box when clicked.

Unlike Name-It, Long File Names builds a proprietary database. This takes up a little disk space, but it provides a backup of file name information, and it lets you use long file names even if you're not running Windows 95.

—Reid Goldsborough



USE LONG FILE NAMES WITH OLD APPS. Name-It offers Win 95–like Save As dialog boxes for Windows 3.1 apps running in the new OS .

Name-It for Windows 95

Adds support for long file names to Windows 3.1 apps running under Windows 95.
Vertisoft
800/466-5875,
415/956-5999
Street price: $30
Reader service no. 752

Long File Names for Windows 95 and Windows 3.1

Lets your Windows 3.1 apps use long file names, under either Windows 3.1 or Windows 95.
View Software, Inc.
415/856-8439
Street price: $30
Reader service no. 753

World of Web Tools Widens

Two new authoring tools for the World Wide Web offer significant improvements in power and ease of use, but fail to completely untangle the knotty issues faced by Web designers. SoftQuad's HoTMetaL Pro 2.0 is a major upgrade to the de facto standard in this category. InContext Spider, a unique newcomer, offers one of the easiest ways to create basic pages.

HoTMetaL's drawback has been that any change to the HTML "standard"—which lately has been changing like the wind—renders the program unusable. Version 2.0 attempts to fix this by supporting all proposed new standards documented so far. This still leaves out the most popular extensions—those of Netscape Communications—because they are not yet completely documented. The result is an HTML editor that works with about 98 percent of the features you might want to use. Future changes will be supported through filters offered free from SoftQuad's Web site. An icon command bar makes HoTMetaL friendlier, but it's still tricky for beginners.

InContext Spider attempts to simplify the authoring process by hiding HTML behind a standard word-processing interface. What's unique is that Spider makes creating a Home page as easy as browsing the Web. If you see a link or an image you like on someone else's Home page, Spider lets you grab it and place it on your own. This may sound like plagiarism, but it is common practice. At press time, items such as icons, buttons, bars, and lines are not copyrighted: Borrowing them may be fine. Obtaining permission to use them is better. But if you use someone else's large, unique graphics without permission, you risk violating copyright laws.

—Joe Abernathy

HoTMetaL Pro 2.0

Commercial World Wide Web page tool gets a valuable update but is still hard to use.
SoftQuad
800/387-2777,
416/239-4801
List price: $195
Reader service no. 754

InContext Spider

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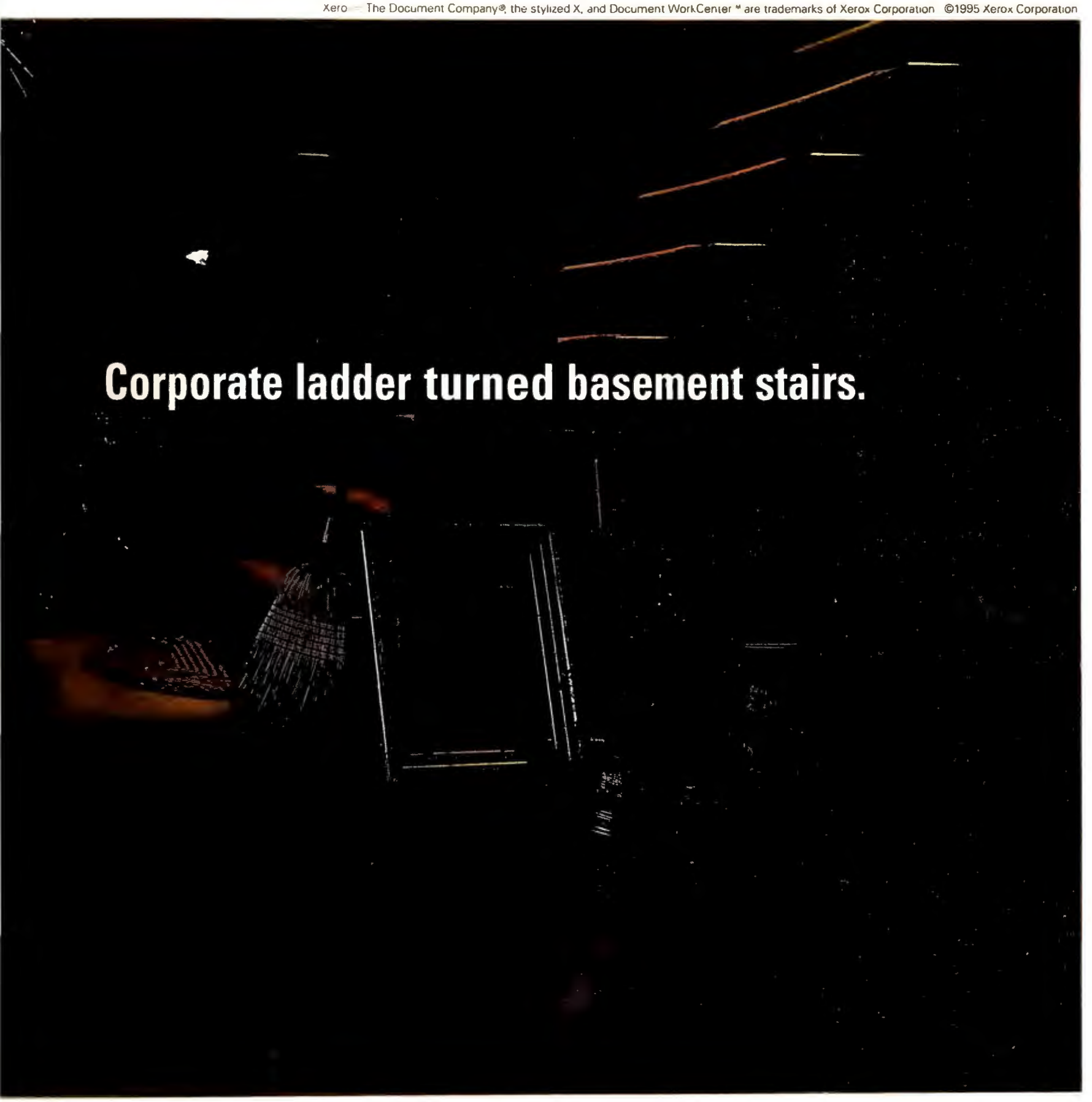

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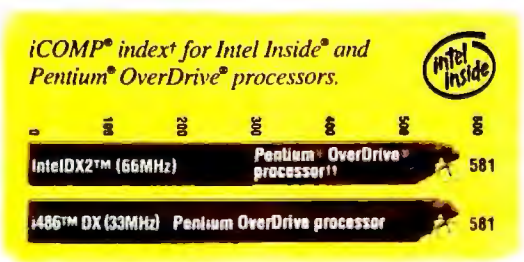

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No-Sweat Presentations With Visual Brainstorming

If you make presentations from time to time, grappling with a feature-laden presentation package can be intimidating and frustrating. That need not be so any more, thanks to Software Publishing's ASAP for Windows, a Windows 3.1 program that runs under Windows 95.

What sets ASAP apart from other packages is its street price ($99) and two features designed to help the graphically challenged. The first, "Intelligent Formatting," makes it easy to modify images without ruining them. If you add words to a line, for example, the program changes the font size to make the text fit on a line, then modifies the rest of the elements on the slide—type sizes, spacing and so forth—to maintain its esthetics.

The second feature is visual brainstorming—a set of layout tools in the program's preview mode that lets you visually associate text on your slide. For example, you can show one idea flowing to another or organize the ideas into a pyramid as a way to illustrate one idea building on another. All this can be done by simply clicking an icon or dragging the tool to text on the screen.

On the downside, the program's simplicity limits your creativity. For example, there are only 13 layout templates from which to form the base of your design. These layouts can't be modified, and you can't create your own.

You can, however, create hundreds of different slides with one layout by using the other tools that are included with the program.

Still, at this price, anyone short on cash or the time to learn a full-blown presentation graphics package, like Lotus Freelance or Microsoft's PowerPoint, will appreciate ASAP.

—John P. Mello Jr.

ASAP for Windows

Presentation software for the graphically challenged.
Software Publishing Corp.
408/986-8000
Street price: $99
Reader service no. 756

ASAP INCLUDES A NUMBER OF BACKGROUND PALETTES. Here a logo is overlaid on a stream bed background.

Suitest Graphics Programs for Windows 95

Hoping to latch onto the coattails of Microsoft Office for Windows 95, Micrografx has introduced a suite of graphics programs that take advantage of features of the Office 95 interface.

Judging from the late beta I looked at, this is the graphics suite to beat.

ABC Graphics Suite consists of four applications that are solid in their own right, plus a huge library of clip art (30,000 images) and a respectable collection of fonts (250).

This suite includes the following: the drawing program Micrografx Designer (supporting more than 50 file formats), the flow chart package ABC FlowCharter (sporting a new automated data analyzer), the image editor Picture Publisher (now including the 32-bit Kodak color management system), as well as the new clip art manager ABC Media Manager.

Providing further evidence that version numbers are meaningless these days, all four programs carry the version number 6.0.

You don't need Microsoft Office to use ABC, but if you have it, you'll be able to take advantage of a number of usability features that I considered pretty slick. ABC's included apps support the new Office Binder technology, which lets you easily collect documents created by different programs into one location, or binder

Installing ABC also places icons on the Office shortcut bar, which provides one-click access to each of the included programs, and it places an icon for ABC Media Manager on the toolbars of Word and Excel for drag-and-drop access to clip art images. Installation requires up to 80MB of disk space.

ABC Graphics Suite for Windows 95

Drawing, image editing, and flow charting, under a Microsoft Office 95 interface.
Micrografx
800/653-2610, 214/234-1769
Street price: $299 (upgrade $149.95)
Reader service no. 757

A competitor, CorelDraw 6 has more fonts (1,000), a presentations program, and 3-D modeling and animation, but it lacks ABC Graphics Suite's tight Office integration and sophisticated diagramming. Moreover, at $695, CorelDraw 6 is more expensive if you don't need all those extra tools and programs.

—Reid Goldsborough

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- 10 video clips and 75 sound clips
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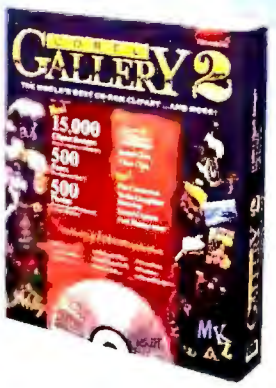
- Includes a full-color reference guide



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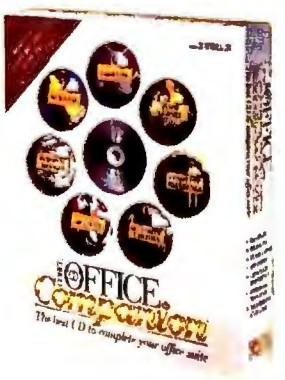

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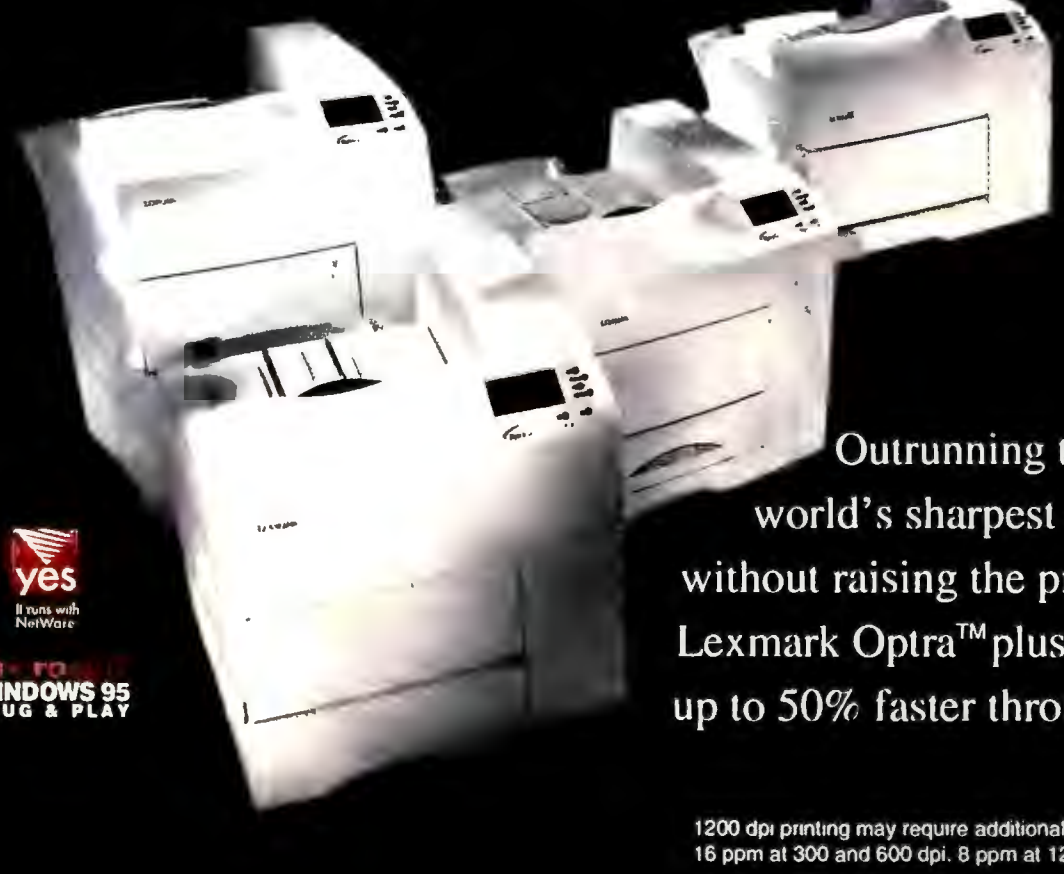

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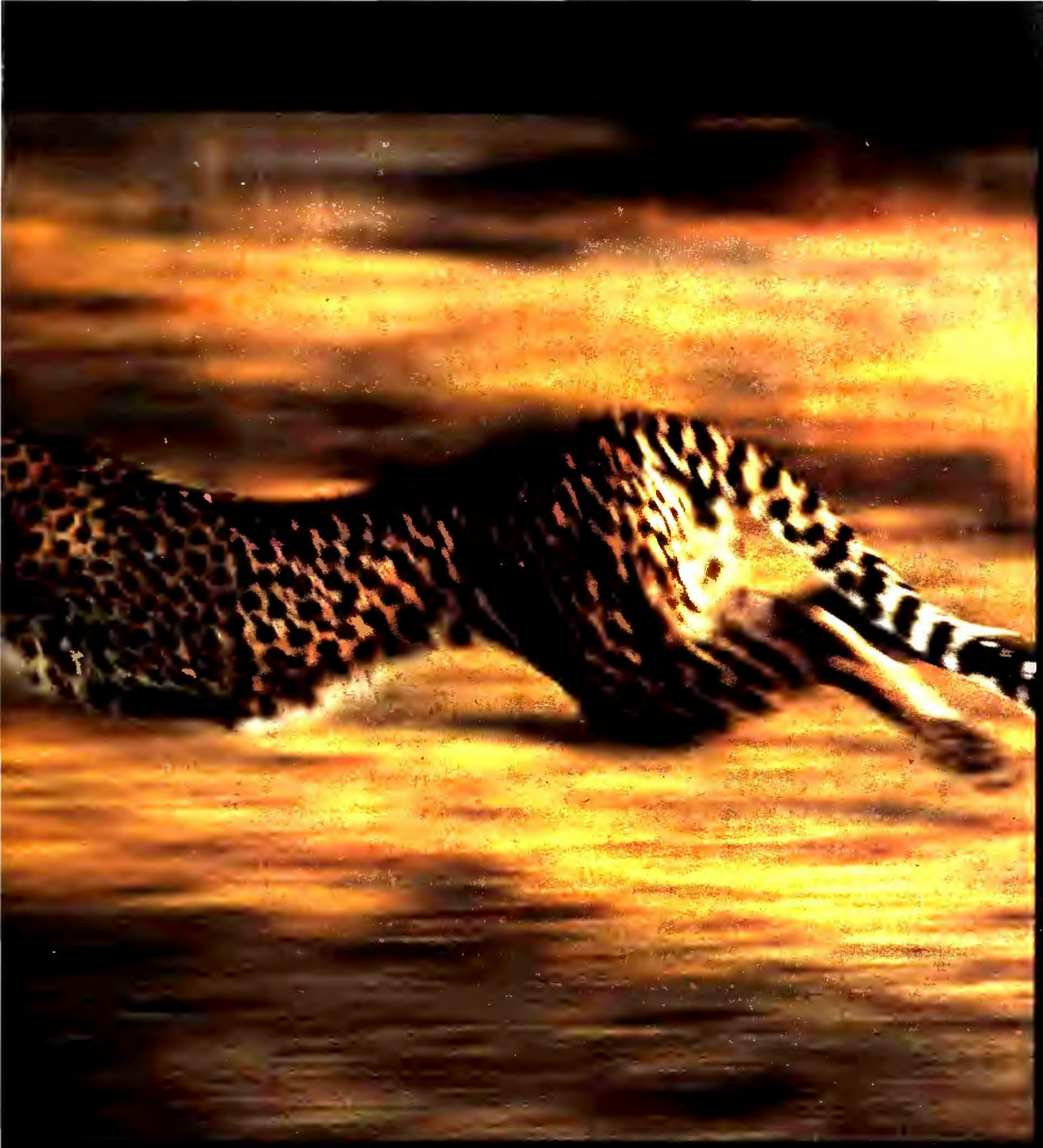

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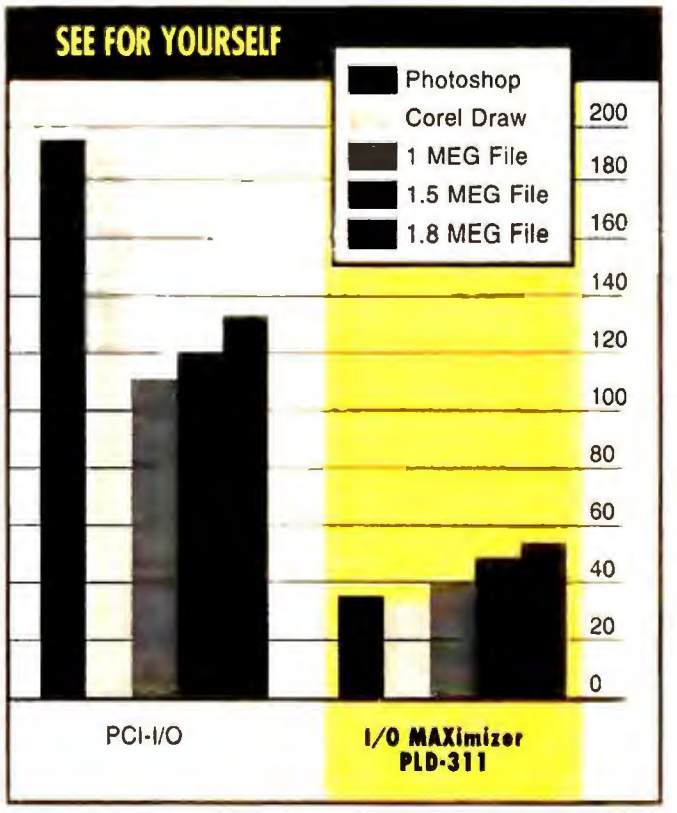

** Overall performance scores (measured in seconds) based on Pentium™-90 system, 16MB RAM, on board PCI-I/O port and I/O MAXimizer for Printing PLD-311 with 4MB, printed on an HP 4P+.*

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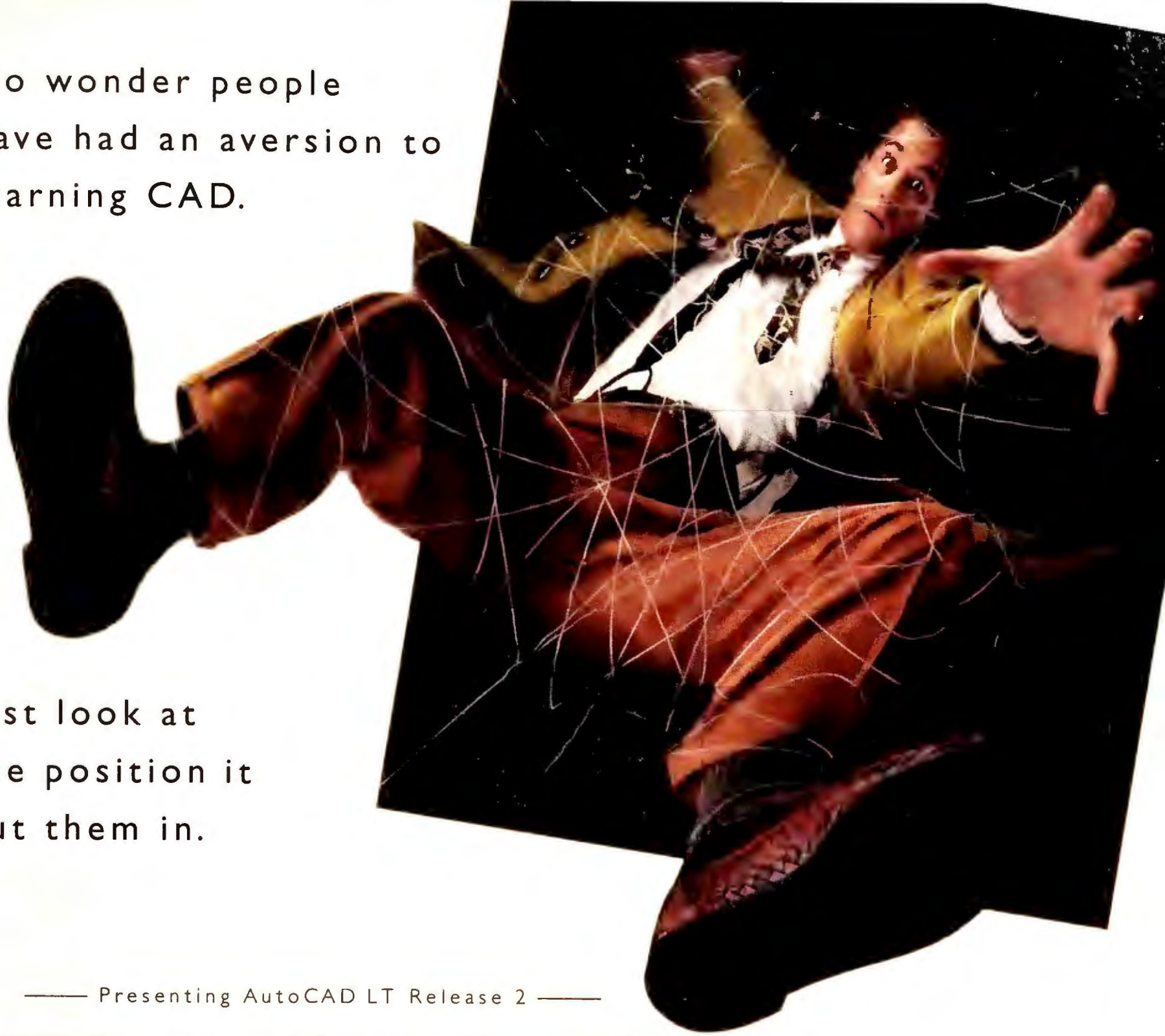
No wonder people have had an aversion to learning CAD.



Just look at the position it put them in.

— Presenting AutoCAD LT Release 2 —

Here you are caught between wanting to use CAD to help you work faster and not wanting to learn it because it could slow you down. After all, your clients won't be sitting still waiting for you to get up to speed. What's the answer? Software from the leader in CAD that teaches you on-line and speeds your work – new AutoCAD LT™ Release 2. Whether you're new to CAD, upgrading, or switching CAD packages, you'll find that AutoCAD LT is easy to learn and easy to use. Fast too, especially when you add one of the new $99.00 AutoCAD LT architectural, mechanical or electrical pre-drawn symbols packages. So why get hung up wondering how quickly you can learn CAD. Buy AutoCAD LT and see.

Orientation:
Use this self-paced overview to speed your transition from paper to CAD.

Tutorials:
On-line exercises guide you through the specific commands needed to draw in AutoCAD LT.

Cue Cards:
Call up step-by-step help on the screen while you draw.

Windows® 95:
AutoCAD LT runs on Windows 95 and Windows 3.1.

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Come see us at Autodesk University, October 29-November 2

Programming Ease and Power for Windows 95

Microsoft's Visual Basic 1.0's visual, event-oriented programming environment revolutionized Windows development. Up through version 3.0, Visual Basic allowed even inexperienced programmers to create useful Windows 3.*x* software, quickly becoming the darling of enterprise and shareware developers alike. Visual Basic 4.0 now offers developers those same tools for Windows 95 and Windows NT, and its applications easily qualify for the coveted Windows 95 logo. While version 4.0 runs only in Windows 95 or NT, you can use it to develop apps for all versions of Windows.

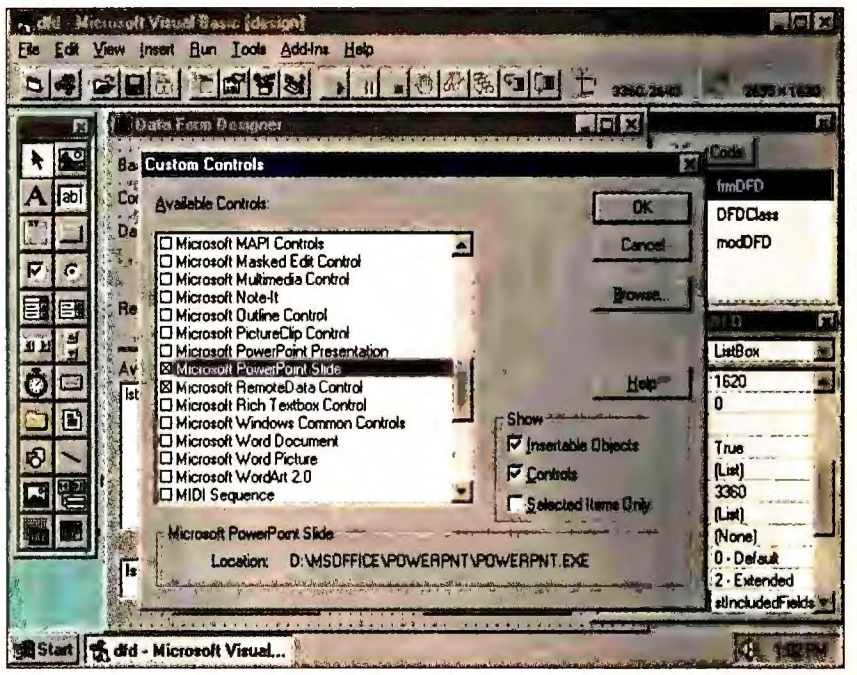
Visual Basic 4.0 makes it easy to create OLE 2.0–compliant programs and modules, adds Visual Basic for Applications compatibility, and offers conditional compiling capabilities to let developers use a single code base for all Windows versions.

Improved printer support now includes graphics printing, while new 32-bit controls, such as the Rich Text Format edit control, take advantage of 32-bit features in both Windows 95 and NT. Database developers get major enhancements, like 32-bit report generation and the Jet 3.0 database query engine. The Enterprise edition's SourceSafe 4.0 tools offer excellent team development version control.

But there's a catch for developers who distribute online: Unlike Borland's Delphi, Visual Basic is not a true compiler, so programs must include more than 1.5MB of run-time files, even if compressed, for even the simplest application.

Visual Basic 4.0 comes in three editions: Standard, Professional and Enterprise.

—George Campbell



BEYOND BASICS: VISUAL BASIC 4.0 brings easy visual programming into the 32-bit world of Windows 95 and NT.

Microsoft Visual Basic 4.0

Visual programming moves into the 32-bit world, but huge run-time files may limit its usefulness.
Microsoft
800/426-9400
List price: $99 Standard, $499 Professional, $999 Enterprise
Reader service no. 758

Project Management That's Easy to Manage

Project management software has just become more manageable. Two packages popular with novice users have added features that make them friendlier and more powerful.

The biggest feature of Microsoft Project 95 is that it's designed to integrate with Windows 95 and the new Microsoft Office 95 applications suite. That's important, since Project previously had a user interface all its own.

The redesign also makes Project more useful and accessible. Wizards help you set up common tasks, and a feature known as Intelligent User Assistance lets you query the software with tough questions in plain English ("How do I...").

Project also has links to both Microsoft Schedule+ and Microsoft Exchange, a feature that promises to let data move between applications in ways that may redefine the desktop.

Kidasa Software's Milestones, Etc. 4.5 also emphasizes ease of use, but does so with a feature set and design philosophy that targets small business owners and managers. It is also compatible with Windows 95 and Windows NT.

Those in a small office or home office environment will appreciate the templates built into Milestones; these templates interact with the drag-and-drop feature to generate a completed project plan within half an hour. Version 4.5 also offers SmartColumns, which performs the most likely action on the information you select, such as outline generation and the like. Milestones is adequate for generating simple Gantt-style timelines, and for help in developing scheduling, planning, and tracking charts.

—Joe Abernathy

Milestones, Etc. 4.5

Fast, relatively accessible project management program gets sleek upgrade and adds support for Windows 95 and Windows NT.
Kidasa Software, Inc.
512/328-0167, 800/765-0167
List price: $199
Reader service no. 759

Microsoft Project 95

New ease-of-use features appeal to a wider group of business users.
Microsoft
800/426-9400, 206/882-8080
List price: $469, upgrade from previous version $79, upgrade from competing product $149
Reader service no. 760

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Automotive Designer
Easily programmable buttons convert time-wasting stuff like double clicks, draglock and repetitive menu selections into speedy single clicks.
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THE FIRST SOFTWARE THAT HARNESSES ALPHA WAVES TO FAX DIRECTLY INTO SOMEONE'S BRAIN.

(THAT'S IN THE PIPELINE. MEANWHILE, YOU WON'T FIND A FAX PROGRAM MORE ADVANCED THAN NEW DELRINA WINFAX PRO 7.0 FOR WINDOWS 95.)

Alas, Delrina developers still haven't figured out how to fax into someone's brain after 11 P.M. (when rates are lower) without waking him or her up. Fortunately, their latest release – new Delrina WinFax™ PRO 7.0 – is as easy and powerful as one would expect from the best-selling, most award-winning fax software in the world. It fully exploits new Windows® 95's 32-bit multi-tasking, multi-threading talents for true background faxing, greater speed and more. But it doesn't stop there. With the new TalkWorks™ telephony option and your voice modem, WinFax PRO 7.0 turns your computer into an integrated in-box for faxes, e-mail and voice mail. It even takes phone messages, distinguishes between fax and voice calls, has fax on demand and identifies callers before you pick up. And there's more. Built-in compression cuts fax transmission time (and phone bills) by up to one-third. It now supports gray-scale faxing, integrates with Microsoft® Exchange, and includes OCR, 101 ready-to-use fax cover sheets and tools to design your own. You can even get WinFax PRO as part of new Delrina CommSuite™ 95, the complete, affordable, integrated communications software solution for Windows 95. All of which should suffice until the new alpha wave faxing program is ready. (Hmm. Perhaps if we *partition* your brain so that one half can receive faxes while the other remains undisturbed...)

Designed for Microsoft® Windows®95

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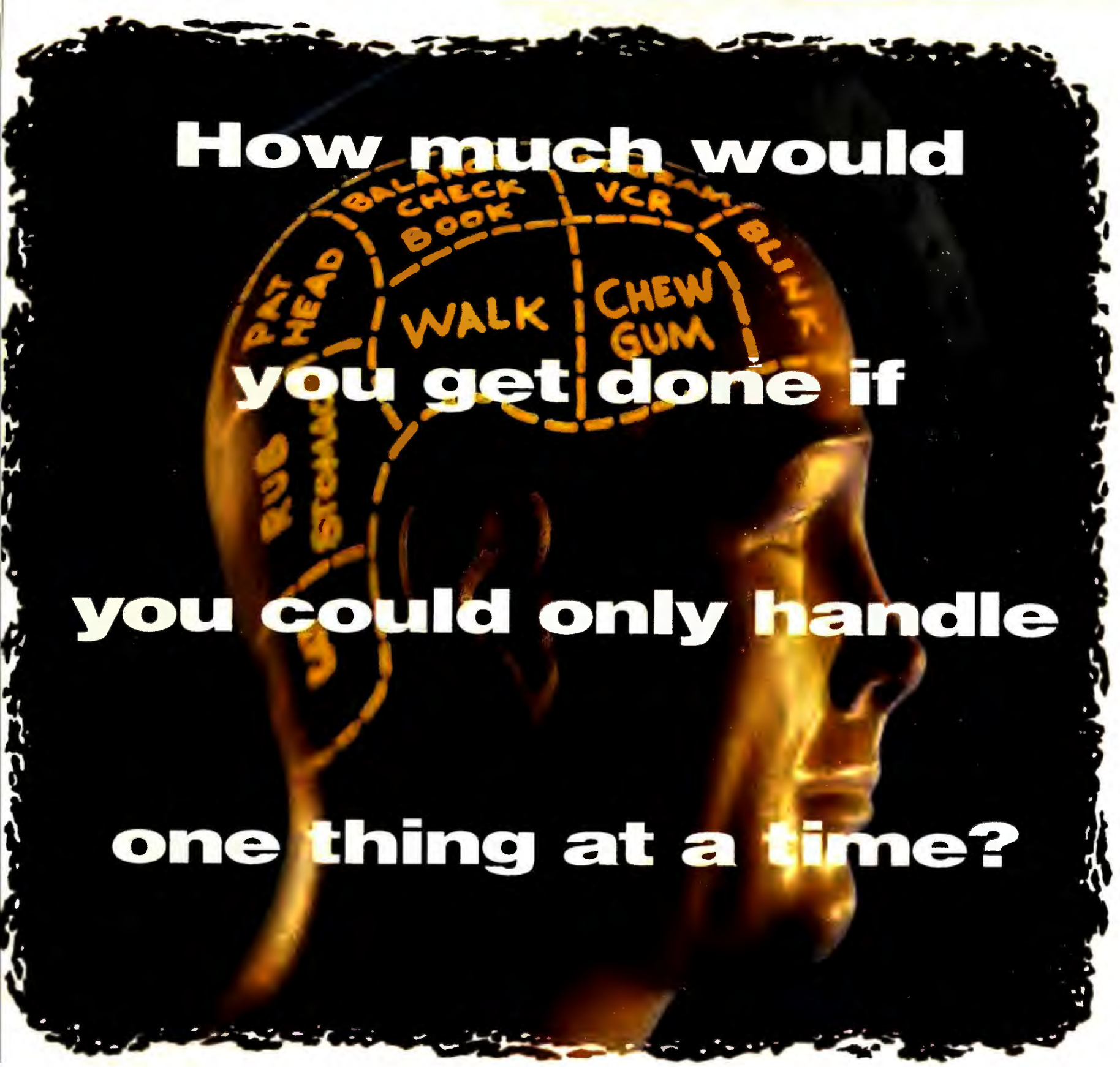
How much would you get done if you could only handle one thing at a time?



Without a SCSI connection, true multitasking isn't possible.

In theory, if your PC is working on several things at once, productivity should skyrocket. And that's what OS/2® Warp, Windows® 95 and Windows NT™ can do. But add peripherals to the equation. Soon you'll find that an operating system alone won't let you do things like run a CD-ROM program and download Internet files at the same time.

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Boca's Voyager Movie Player Turns Your PC Into A Movie Theater

Now you can experience full-screen, full-motion video with the new Voyager Movie Player™ integrated multimedia video graphics card from Boca Research. You get the smooth, crisp, high speed performance demanded by today's sophisticated CAD, animation, game and 3-D graphics applications.

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5-year warranty - You might not expect so many features at such an affordable price, but Voyager Movie Player even includes a five-year limited warranty and free technical support. It's like getting free popcorn and a soft drink at the movies. So enjoy the show!

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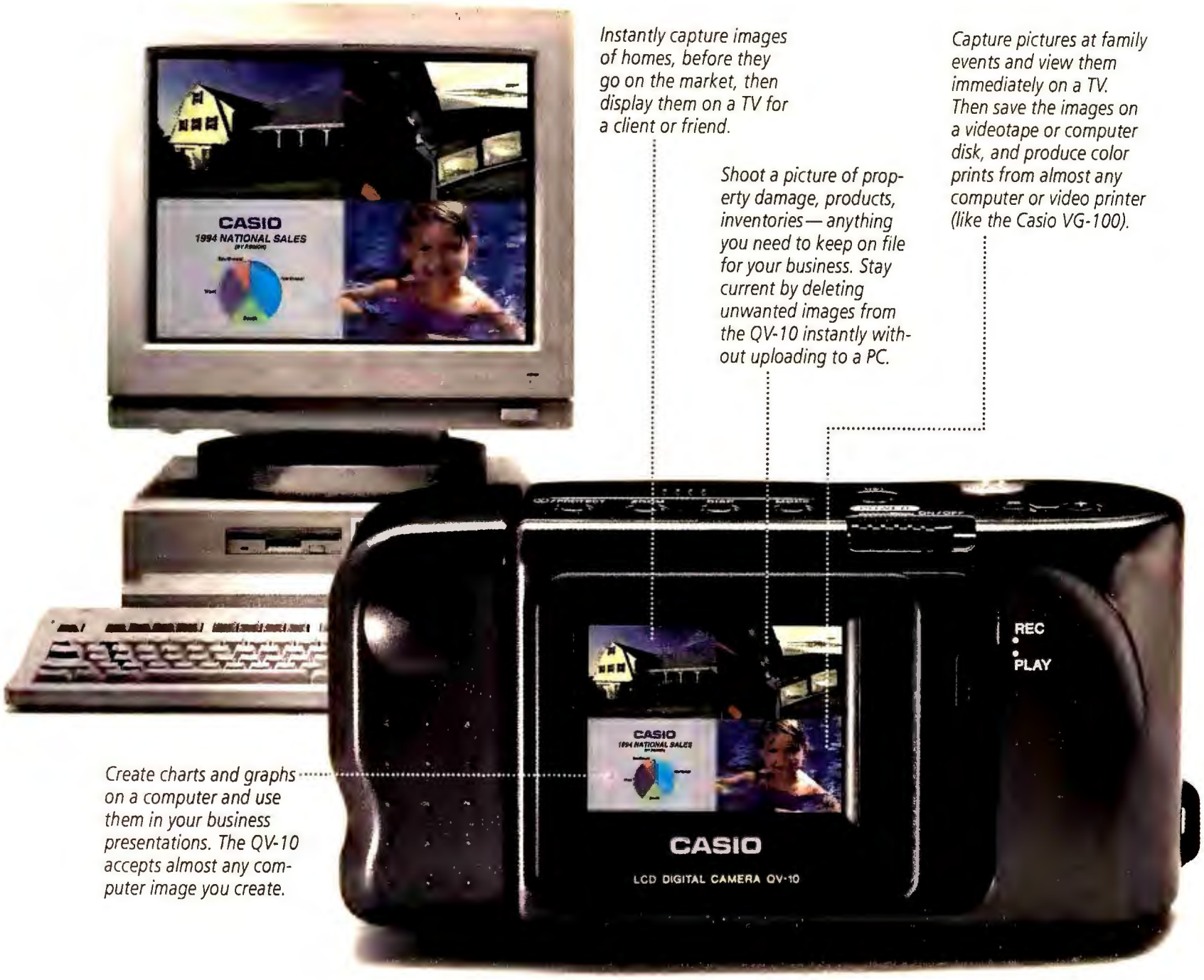
If a picture is worth a thousand words consider this a dissertation.

Instantly capture images of homes, before they go on the market, then display them on a TV for a client or friend.

Shoot a picture of property damage, products, inventories — anything you need to keep on file for your business. Stay current by deleting unwanted images from the QV-10 instantly without uploading to a PC.

Capture pictures at family events and view them immediately on a TV. Then save the images on a videotape or computer disk, and produce color prints from almost any computer or video printer (like the Casio VG-100).

Create charts and graphs on a computer and use them in your business presentations. The QV-10 accepts almost any computer image you create.



The QV-10 gives you enough memory for 96 digital images. With built-in LCD color screen. Plus video and computer outputs. More uses — for business and pleasure — than you can count.

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Learn the How-To's of Windows 95 Without Risking Your Data

If you feel queasy at the thought of risking your precious data while learning Windows 95, here's some relief: EasyTutor Learn Windows 95.

This multimedia CD-ROM teaches step-by-step lessons on the new OS, from maximizing a window to using dial-up networking. The disc stands out from some other tutorials that we've seen because it runs under Windows 3.1 *or* Windows 95—so you can evaluate and learn about the new operating system before installing it.

EasyTutor's how-to sections (Getting Around, Power Users, and more) offer narrated demonstrations of Windows 95. You practice hands-on using a mock interface that looks and operates like the real thing. But because it's a mock-up, you can't damage your files—or your blood pressure. EasyTutor also explains the concepts behind the new operating system. So I learned not only that the Start button replaces Program Manager but also that it's helpful to think of Windows 95's approach to organizing work as a filing cabinet. The disc's main drawback is its steep $40 asking price. And some experienced PC users won't need this much help. Still, if you suffer from acute upgrade-itis, this product could be your remedy.

–Shane Mooney

EasyTutor Learn Windows 95

Tutorial runs on Windows 3.1 as well as on the new OS.
CRT Multimedia Ltd.
714/642-3246
Street price: $40
Reader service no. 732

LEARN WINDOWS 95: Using a red arrow to point out features, EasyTutor provides audio narration and text-based lessons.

A New Way to Search the Web

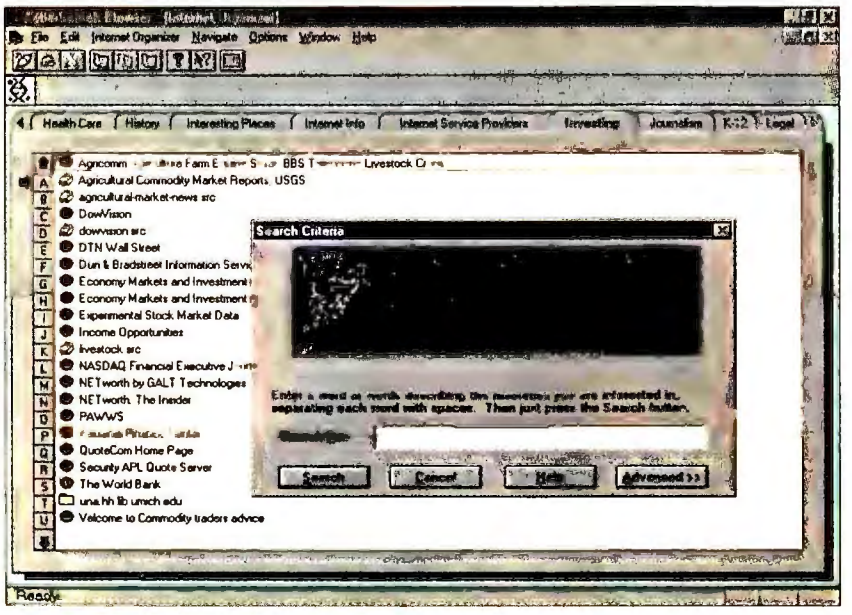
SuperHighway Access CyberSearch makes it easy to get what you need from the World Wide Web. This CD-ROM package provides an Internet start-up kit, a Web browser capable of multiple simultaneous searches, and a version of the most comprehensive Internet catalog—Lycos, licensed from Carnegie Mellon University. Any Web browser lets you search Lycos online, but then you're paying for the time. But with this CD-ROM, you can search offline using descriptions of a half million Web sites.

CyberSearch lets you use multiple keywords to help pinpoint information you need. When the search is complete, you get a list of the ten best Web site matches, with a brief description of each site and a score indicating how closely each meets your criteria.

You can visit the sites immediately or save the URLs to the included Internet organizer. This tabbed organizer comes packed with sites grouped by category—businesses, museums, and so on. CyberSearch works on its own (a free trial period for Internet access is included) or with your existing Internet access provider.

Content on the Web always changes, so Frontier intends to keep you current by publishing bimonthly issues of CyberSearch until January 1996, with monthly issues thereafter.

–Peter Loshin



SUPER SEARCHER: Search offline through the Lycos catalog of Web sites and get a Web browser and an Internet start-up kit.

SuperHighway Access CyberSearch

Web-search CD-ROM
Includes browser.
Frontier Technologies Corp.
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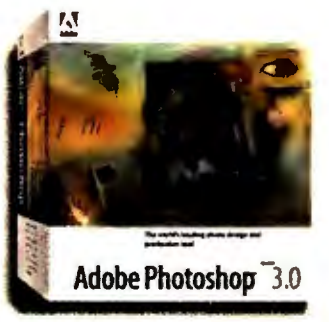
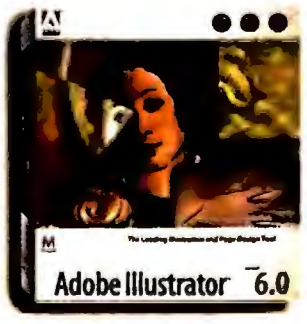
Designers, illustrators, photographers and production professionals each have their own vision. Their own way of doing things. Knowing this, Adobe™ created tools to extend creative options without interfering with the ways people



IF YOU CAN *dream* IT, YOU CAN *do* IT.™

work. This is the philosophy behind the collection of Adobe software that virtually defines the world of creative design, including electronic illustration, image manipulation, page layout and much more. In this family, the possibilities are endless.



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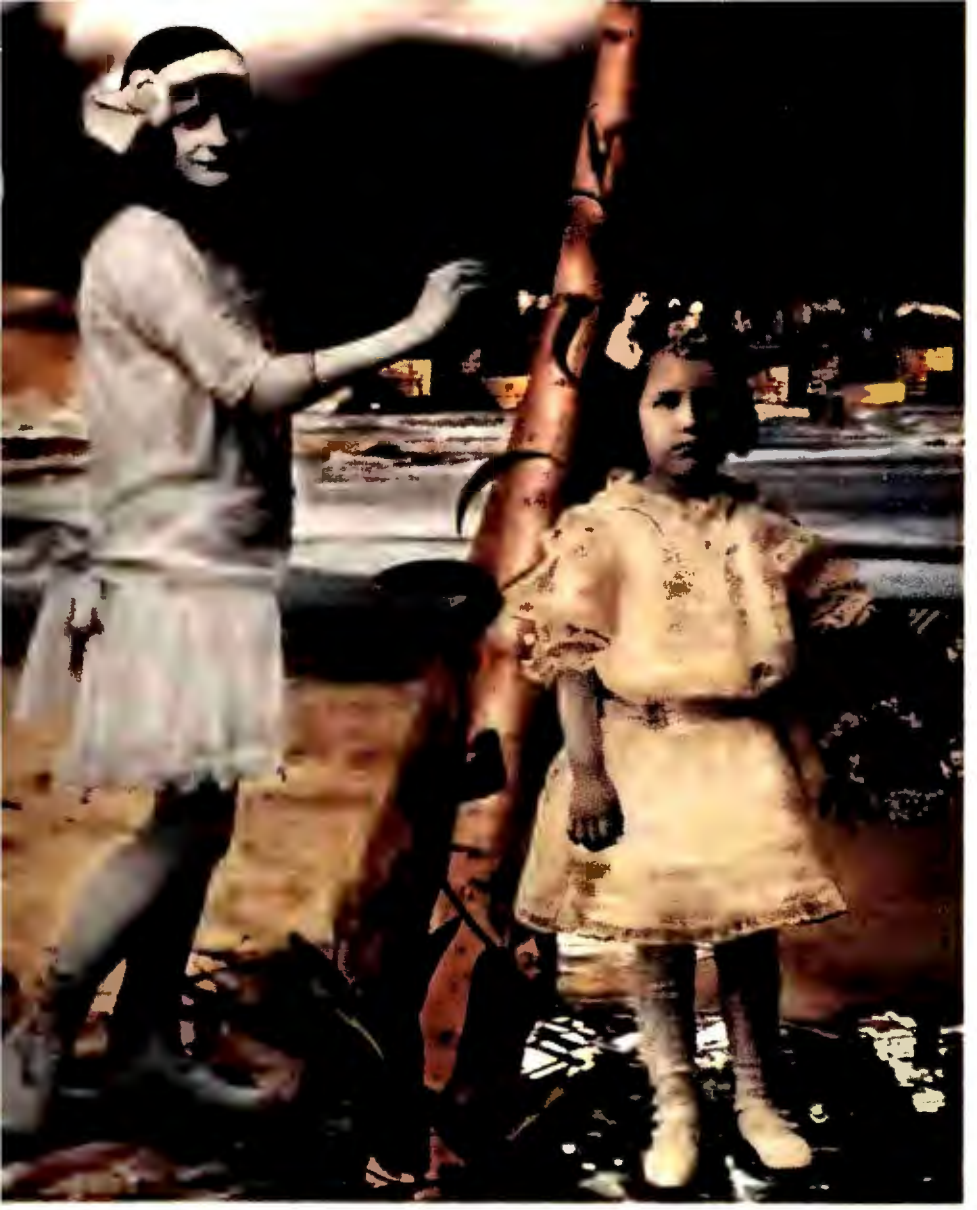

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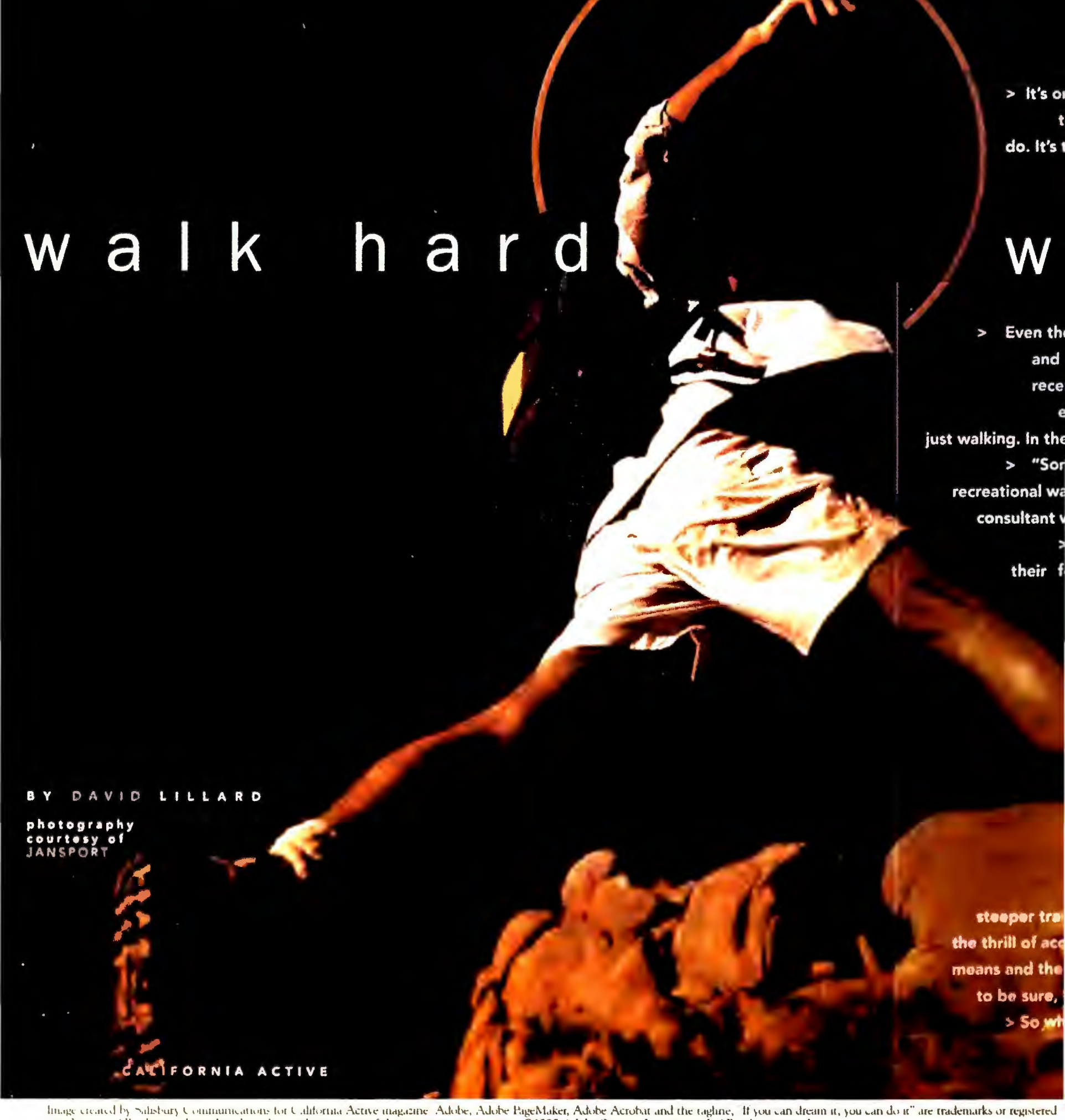
MIKE SALISBURY



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on PageMaker 6.0.

Mike Salisbury uses Adobe™ PageMaker™ to create designs so powerful they've become part of our collective consciousness. Layouts for Rolling Stone magazine, posters for Jurassic Park and Aliens, and Michael Jackson album covers bear his imprint. Now there's a radically new Adobe PageMaker 6.0 upgrade. "The interface is so natural, it never interferes with my ideas", says Salisbury, "and this new version is really over the top. I'm getting dead-on color from start to finish because it's locked into Kodak's Precision Color Management System." Hot new features include multiple master pages to streamline the creation of different page designs in a single publication; grouping and ungrouping to combine elements into a single movable, editable unit; integrated automatic trapping for color publications; and full compatibility with Adobe Acrobat™ and HTML so any document can be sent anywhere electronically. Adobe PageMaker 6.0 is here, so even if you're not creating professional design, this is the tool to give you professional looking results. Call 1-800-521-1976, Ext. L1672 for more information or visit our web site at http://www.adobe.com/.

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SPECIAL REPORT The Practical Guide to Business Software

How to Succeed with Software

Business software can spark the growth of small companies, but it can also burn up time and money. Here's how to use the technology wisely.

By Bronwyn Fryer

Illustrations by Sandra Dionisi

Lori Abramson, CEO of her own bookkeeping, accounting and tax-preparation firm in Wahiawa, Hawaii, has become an accounting superwoman: She's able to turn around tall tax returns in a single day. "It used to take me three to four weeks to prepare a complicated return," notes Abramson, who calls her two-person firm Bookkeeping at Your Service. "Now I can get one done in a few hours. And I no longer have to ask clients to file extensions because I don't get their returns finished on time."

A Joint Project by the Editors of Working Woman and PC World

Abramson, whose 350-client business has been growing at the rate of 30% in annual revenues since its founding in 1988, credits a tax-compliance program called ProSystem *fx* with helping to revolutionize her operation. She runs the $2,200 program, available on CD-ROM from the Chicago business publisher CCH (800-45-PROFX), on one of two PCs installed in her office, and estimates that it has saved her at least 50% in labor formerly devoted to digging up hard-to-find tax forms.

Specialized CD-ROM programs like ProSystem *fx* are just one choice in the proliferating array of software for the personal computer. A 1994 survey conducted by Roper Starch Worldwide estimated that 82% of American companies with revenues of $5 million to $99 million use desktop computers. And Microsoft figures that fully 27% of its business-applications software is being bought by companies that employ 100 or fewer workers; about one-third of these small businesses are owned by women.

What all this means, of course, is that more and more small businesses are attempting to use various desktop software applications—word processors, spreadsheets, accounting software, databases, schedulers, project-management packages and more—to help manage their operations. Indeed, the issue for most small companies today is not *whether* to use PC technology but how to use it wisely.

The problem is that sophisticated technology demands sophisticated use, and most small businesses are too busy trying to meet deadlines, sell products and keep clients happy to do the necessary research. How can small companies use PC software to serve their customers better and avoid a tech-support quagmire?

The Software Sand Trap

Because most small businesses lack the computer-support resources available to large companies, employees must figure out how to evaluate products, train and assist users and upgrade systems on their own. Experts cite a litany of mistakes that small companies frequently make.

Perhaps the most common error is assuming that a software program will "fix" a given problem, such as automating a manual task, without understanding the real needs of the business. "Most people buy shrink-wrapped software like they're buying a box of breakfast cereal," says Salli Rasberry, a Freestone, Calif.–based business consultant and the author of *Running a One-Person Business*. "They just load it and expect it to work, without spending the time beforehand to figure out what they really want the software to do."

Abramson says that she learned the hard way to assess the fit between her needs and the software's capabilities. "I'd wanted a simple database program that would let me send fliers and letters out to prospects," she recalls. She bought a very sophisticated, $500 database package. "I didn't bother to take a training class, and I didn't want to take the time to read the manual. So I ended up spending three days trying to work with a program that was far too complex for what I needed. I wasted a lot of time and money." Ultimately, Abramson

How the Cookie Crunches

Katie Patterson, who owns a Cookie Bouquet franchise in Irving, Tex., has to produce a lot more than cookies to earn her daily bread. She also has to do some serious number crunching. Before she installed a complete point-of-sale system, Patterson did all her calculations manually. "I used to spend several hours at night working with pencils and calculators," she says.

Founded in 1983 by Gwen Willhite in Dallas, Cookie Bouquet sells "bouquets" of cookies. It began selling franchises in 1987, now has over 110 outlets (in most states, they're called Cookies by Design), and ranks right behind Mrs. Fields. Patterson's franchise, with gross sales of $175,000 annually, employs three full-time workers and is growing at 20% a year.

In the past, Patterson found it daunting to estimate supplies for peak times, such as Valentine's Day. "I'd have to add up the inventory and sales receipts from the previous year," explains Patterson. "It was too busy to do that, so I simply didn't. The result was that I spent three to four times the amount I needed."

Today, a software and hardware package called SellWise from CAP Automation (800-826-5009) handles sales, tracks customers, produces reports, controls inventory and reads bar codes for Patterson. The $1,495 package, which Cookie Bouquet purchased for franchisees, works on a modem-equipped Compudyne 386 PC that also runs Microsoft Windows and allows managers to capture all sales, inventory and customer information instantly.

Patterson's PC also runs a $499 credit-card-verification software package, ICVerify (510-553-7500), as well as State of the Art's $995 accounting program, BusinessWorks (800-854-3415). Automatic links between SellWise, ICVerify and BusinessWorks allow Patterson to tabulate all credit card charges and other sales data and enter them in a general ledger. "The system is saving me at least 75% in labor and time on tasks like the closeout, direct mail and accounting," she says. **—Bronwyn Fryer**

DANNY TURNER (LEFT), LINNY MORRIS CUNNINGHAM (RIGHT)

Accounting whiz Lori Abramson can offer her clients one-day tax-form turnaround, thanks to a software package called ProSystem *fx*.

purchased a simple $99 database program, Alpha Four from Alpha Software (800-451-1018, ext. 117), and has been "very pleased" with the results. Other packages, such as the $20 MyDatabase from MySoftware Company, also offer straightforward database capabilities. (Prices given throughout are estimated store prices except where marked "retail.")

Tooling Around

There's another way small businesses can be sucked in: Employees excited by technology can become entranced by it and allow the tool to become the manager. "Technology puts you in touch with more information, but if you're not judicious, you can find yourself on information overload," says Ronni Marshak, vice president of the Patricia Seybold Group, a Boston-based computer-industry analysis firm. "For example, we use Lotus Notes here to store more than 50 internal research databases. I used to tap into 10 of those 50; now I only use four regularly. I had to make some clear decisions about what role the technology would play in my work life."

Because training frequently gets short shrift, employees can find themselves spending hours or days spinning their wheels. "You can't afford to be playing around with technology when you're a small company," says Barry Gilbane, a principal at Insight Consulting, a Boston-based computer-consulting firm. "Every minute you're not productive is revenue down the drain."

Small companies also often fail to think ahead. "People will argue that they don't have the money to pay for an expert to install a network or set up a database," says Marshak. "But if the job is done in a half-assed way, it ends up costing twice the time, labor and money in the long run." The best way to find a good consultant is through recommendations from acquaintances; alternatively, try a local user group or a national vendor for recommendations (see "Let's Make a Deal," below). The cost can range from $80 to $150 per hour.

Taking Control

On the other hand, companies that invest in adequate training, support and products can profit handsomely. For example, GroupTix, a 10-person firm that assists theaters in selling tickets to schools and other groups in New England, is growing by 60% a year, thanks in part to intelligent use of software. Sally Monroe, president of GroupTix, says that her company's use of off-the-shelf products—such as CompuWorks Publisher, a $25 desktop-publishing program from WizardWorks Group (612-559-5140), QuickBooks, a $100 bookkeeping program from Intuit (800-816-8026) and Access, a $339 (retail) database program from Microsoft (800-426-9400)—has allowed her to streamline projects that would have been "nightmares." "We used to have all our clients listed on note cards kept in metal boxes," she recalls. "Now we have everything available at the touch of a button."

Monroe says that although learning to use QuickBooks was simple, she felt it was critical to hire an expert to set up her company's database. Through the local PC user group, Monroe located an "excellent" consultant who bartered the work for theater tickets. "We sat down and gave him the categories we needed and what we wanted to do," she recalls. "He showed us what we were doing right and doing wrong; within three hours we had planned an easy-to-use system."

Let's Make a Deal

Some tips for building your software library without depleting your bank account:

- **Perk Up.** Most new computers come equipped with bundled software, from basic applications to flashy CD-ROM titles. If you're going to a local store, don't be shy about haggling with the vendor to throw in a few extra perks.
- **Get Competitive.** If you're upgrading from a competitor's product, most vendors will give you an upgrade for next to nothing. For example, an old copy of WordPerfect for DOS might qualify you for a substantial discount on Word 6.0 for Windows.
- **Mail Away.** You can get discounted packages from mail-order software companies. To order catalogs from two major dealers, call PC Connection (800-800-5555) or Computer Discount Warehouse (800-804-4239).
- **Try It Out.** Many vendors offer so-called "shareware" programs on a try-before-you-buy basis: You can pick up most shareware packages for just $10 to $40—and freeware programs come free. The best way to pick these up is through on-line services such as CompuServe (where the key word **ibmff** takes you to the PC File Finder database of available programs) and America Online (where the key word **quickfind** allows you to search for software by release date and type). For a few dollars a disk, you can also order programs preselected for quality by calling Public Software Access (800-242-4774). Or buy a CD-ROM shareware collection from a local computer store. Also, check out the Freeware Hall of Fame on PCWorld Online (800-827-6364).
- **Buy Antiques.** You can buy an old version of software that may perfectly suit your needs. A classic example: Corel 3, a sophisticated graphics program, costs about $99, as opposed to $500 for the more powerful Corel 5.
- **Be Friendly.** By joining a software-user group, which generally meets monthly for a minimal fee, you can test out new products and often acquire software at rock-bottom prices. (To locate a user group in your area, call the Association of PC User Groups Hotline: 914-876-6678.) —**Leslie Crawford**

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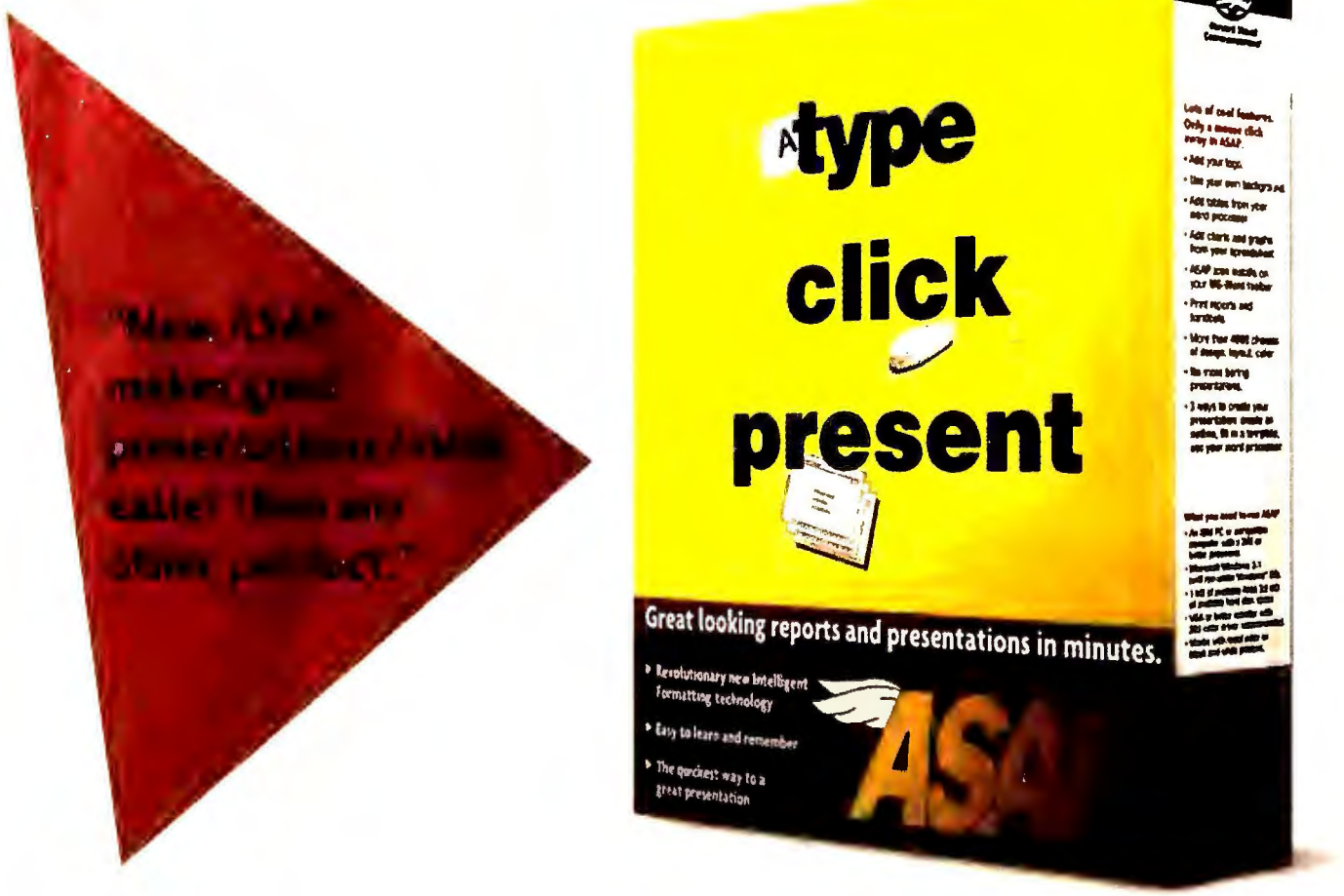

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Keeping Up

Monroe adds that automation has been key in managing her rapid expansion—one of the biggest challenges for small businesses. Susan Peterson, president of Susan Peterson Productions, a 20-employee firm based in Washington, D.C., that teaches corporate executives how to do interviews with the press, says her thriving operation usually runs "right on the edge of chaos." But this year, Peterson set out to develop a control system to monitor some 8,000 contacts. Through a $100 personal-information management program called Ecco Professional from NetManage (800-457-4243) installed on the firm's network of 12 PCs, Peterson Productions has been able to log in, follow up and report on all prospect inquiries. "We know what time a prospect calls, what they want, what was sent to them and what follow-up was done," notes Peterson. "We can figure out the return on our proposals, or find out why people don't go with us. It's unbelievably effective."

Other firms have found that project-management software provides the critical element of control. Strategic Resources of Falls Church, Va., a 15-employee firm specializing in engineering, software development and management consulting, uses the $469 (retail) Microsoft Project to track assignments, including a 300-page technical document they developed for the IRS. "We know when the first and final drafts are due, and who's working on what," says president and CEO Rose McElrath-Slade.

The On-Line Connection

If there's one software category that's rapidly becoming more important than any other, it's anything related to communications—electronic mail, fax-modem software, on-line services and such—that helps employees connect to each other and the information superhighway. "An Internet address is critical," says author Rasberry. "It gives you flexibility and lets you maximize your time."

By installing either a peer-to-peer or a local area network (see "When to Think Network"), even the smallest companies can become more productive. Rasberry, for example, shares her personal agenda with her partner through the $249 (retail) Apple Remote Access Personal Server, a program for Macintosh computers. "We can access each other's to-do lists and calendars, and we can get files off each other's machines," she notes. "It lets us turn around on a dime."

Likewise, employees who work off-site with a modem-equipped laptop can tap into files on their computers as easily as if they were physically in the office. Employees at Peterson Productions, for example, use a $129 communications package called pcAnywhere from Symantec (800-441-7234) to access files on their desktop computers while they're on the road. The company also communicates regularly with its clients through a variety of commercial on-line services, such as Prodigy and CompuServe.

Of course, tapping into an on-line service can mean doing more work. Nevertheless, the fact remains that business in the 1990s must often run faster and faster just to stay in place, like Alice and the Red Queen in *Through the Looking-Glass.* Smaller companies will frequently have to run twice as fast—and be twice as smart in the use of technology—as those with big budgets and dedicated computer-support departments.

PC World *contributing editor Bronwyn Fryer writes frequently for* Working Woman.

Hail to Higher Tech

In the get-it-done-yesterday world of high technology, Blanc & Otus, a public-relations firm in San Francisco, relies on higher tech to stay ahead of the curve. "You don't want to wait around for new technology," says company CEO Simone Otus, "because in the meantime you're losing productivity."

Since Blanc & Otus represents software and networking companies, the need to use technology wisely was clear at the company's inception 10 years ago. The firm started with just a couple of computers, used primarily for word processing. Today Blanc & Otus is growing at the rate of nearly 40% per year, with $3.6 million in revenues last year, and all 45 of the firm's predominantly female employees use Mac and IBM-compatible computers to communicate with customers and the press, access client databases and do research.

Leasing computers instead of buying them, which costs about $1,000 a year for a basic setup, gives Blanc & Otus the option of purchasing the equipment at the end of the agreement, requires no down payment and lets the company write off the payments.

For these communicators, e-mail is crucial. Internally, the firm runs QuickMail, a $2,350 network program from CE Software (800-523-7638). To ensure full access to the outside world, the company has accounts on all the major on-line services, including America Online, Prodigy and CompuServe, and has Internet addresses for all its employees. Blanc & Otus is even in the process of setting up a World Wide Web page—a cyberspace "home base"—on the Internet to post information about clients and recruit new customers.

The company recently hired a full-time manager of information systems to plan future technology. There are already four laptops available for communal use, and more to come. Though the ability to take work everywhere makes it harder to leave it behind, Otus feels liberated: "If I'm tired of the office, I finish up work in my living room."—**Christina Wood**

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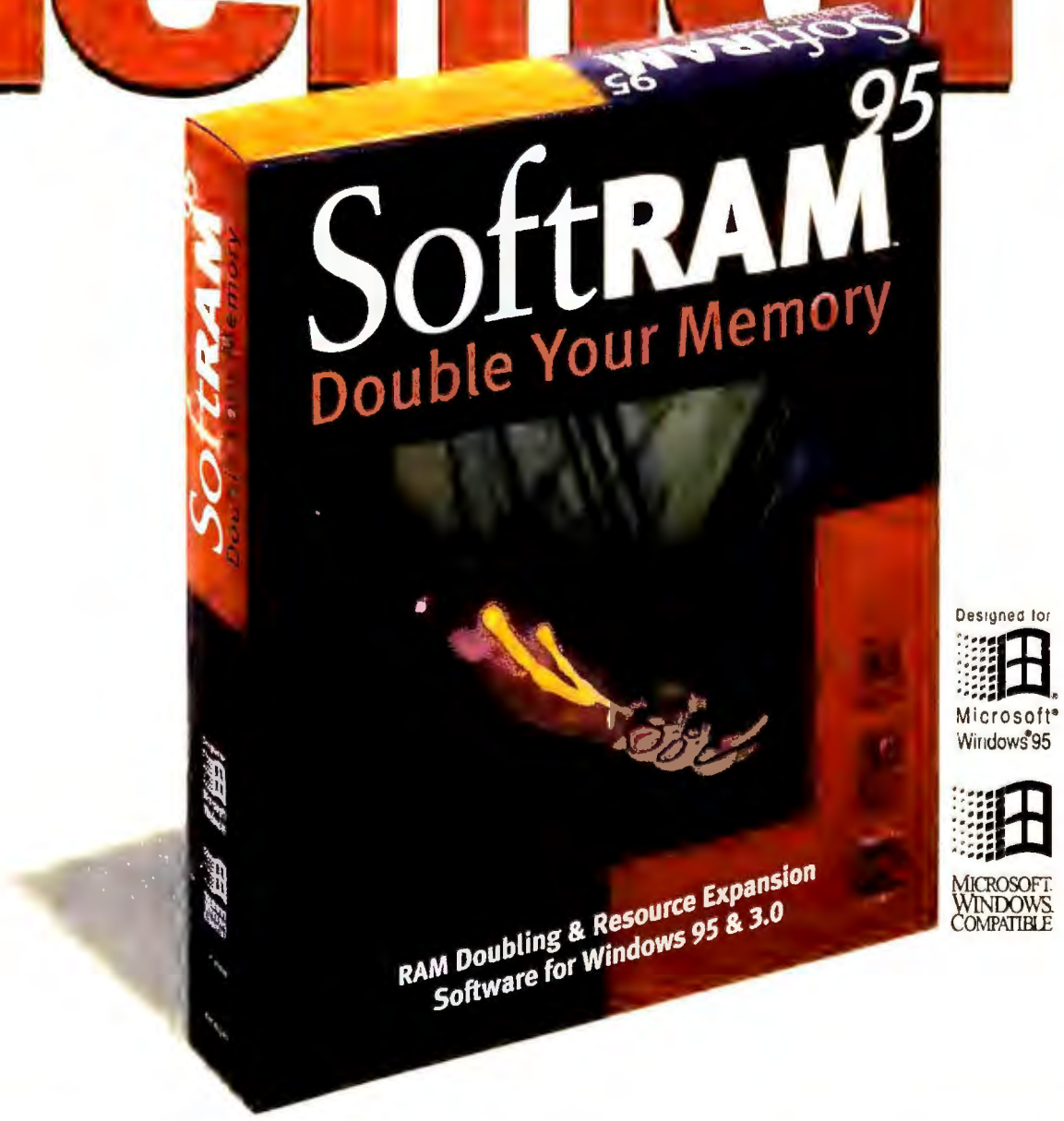

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Perfect Picks

The secret to small-company success may be as close as your keyboard. These software packages can help you manage and expand your business.

35 Smart Choices

IF YOU OWN OR RUN A SMALL BUSINESS, you face the daunting task of making every minute and dollar count. One of the most important calls you'll need to make is deciding which software applications to buy.

You probably already have a word processor to write memos, reports and correspondence, as well as a spreadsheet program to manage your budget and do "what if" forecasting. But what *other* software can reduce labor and increase efficiency? In fact, there are hundreds of specialized software products that could be just the ticket for managing projects, keeping your client contact list, sending faxes and e-mail messages or doing other tasks. And if you're looking for relevant business news and market-research data, there are on-line services that can help you find whatever you're after.

Before you start cruising the software shelves, however, take a long, hard look at

the needs of your business. What do you produce? Whom do you sell to? Then determine what you want the software to achieve, how much time you have to invest in training and what you can afford to spend. With a little forethought, your software choices will pay off in profits and productivity. (The prices given below are estimated store prices except where noted.)

Project Managers

Completing a complex project thoroughly and on time requires more than commitment to the task. It takes a meticulous organizational system. Project-management software helps you create a practical timeline and document what's being done, who's doing it, what resources are required and how much it's all costing. If your program works on a local area network, it can keep everyone involved in the project posted about deadlines and tasks.

Sophisticated project managers used by large companies to coordinate vast manufacturing projects can cost several thousand dollars, but small businesses can find excellent project managers for less than $700. *Microsoft Project* ($469; 800-426-9400) is one of the best choices. Its Cue Cards supply ready-made templates, while built-in tutorials called Wizards assist new users. One Wizard even suggests various courses of action to take if your original project schedule looks questionable. Alternatively, Symantec's $695 *Timeline* (800-441-7234) offers Wizard-like "guidelines" that work with project information and a "dependency walker" that lets you easily identify any trouble spots along the project route. —*Kathy Yakal*

Fax/Communications Software

No one likes to wrestle with jammed fax machines or curled paper. Fax software programs like Delrina Technology's $90 *WinFaxPro* (800-268-6082) and Global Village Communications' $99 *FaxWorks Pro* (800-FAXWORKS) not only save you from the fax-machine headache, but also make automatic corrections to faxes. You can send faxes to other computers as well as receive them on your PC. Even if your budget is tight, you can buy inexpensive software with built-in fax-back capabilities (to send faxes automatically to customers) and voice mail. For example, ZyXEL (714-693-0808) sells modems, priced between $349 and $749, that come with fax, voice mail and fax-back software.

If your PC has a modem, you can use communications software to stay in touch with clients, suppliers, prospects and the world at large. Basic programs, like Datastorm's $119 *ProComm* (800-315-3282) and Attachmate's $179 *CrossTalk* (800-426-6283), help you connect to product-support bulletin boards and other modem-equipped computers. Communications programs also let you write "scripts" that will send and receive e-mail at times you designate. A few

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Wrap It Up, I'll Take It

If there's anything Wendy Sardinsky hates more than wasting paper, it's wasting time. "Time is everything," says Sardinsky, founder and president of Rewrap, a Philadelphia wholesaler of paper, gift wrap and stationery fashioned from recycled materials.

In the spirit of the Body Shop and Ben & Jerry's, Sardinsky dreamed of working for a company that was environmentally and socially conscious. A former marketing and sales manager with the Franklin Mint and Swatch, Sardinsky began in 1992 by loading her car with wrapping-paper samples produced at a local factory and testing her wares with local retailers. Today, Rewrap has evolved into a national corporation with seven-figure revenue projections, over 100 independent sales representatives and several hundred clients.

"As an owner of a small company with great growth potential, I have to choose carefully how to use limited resources," says Sardinsky. Since 1992, that has meant purchasing a laptop, a new fax, a laser printer, a copier and the best software her company could afford. Step One: ditching her archaic DOS applications for Windows. Based on recommendations from fellow entrepreneurs, she bought the $599 (retail) Microsoft Office Professional (800-426-9400), a software "suite" that includes a word processor (Word for Windows), a spreadsheet (Excel), a presentation package (PowerPoint) and a database (Access).

Word alone has made a big difference in her work. "It's incredible what you can do with a basic program like Word," says Sardinsky. "I produced our direct-mail package in-house."

For bookkeeping, Sardinsky's entrepreneur friends suggested Intuit's $100 QuickBooks software, with its built-in payroll program. And for organizing Rewrap's ever-growing database of clients, she relies on the $200 ACT! from Symantec (800-441-7234), a popular Windows-based contact manager. "ACT! helps me keep meticulous notes on all the national sales accounts," says Sardinsky. "It's like having a personal secretary, one who makes me more self-sufficient and saves me time. And time translates into money."

Sardinsky hasn't yet mastered all the products. "I'm at the tip of the iceberg," she says. "I've been learning Excel, which is great for running our company's numbers, but I haven't yet learned how to use PowerPoint or Access. I look forward to seeing how these can help my business. The challenge is finding the time to learn them." **—Leslie Crawford**

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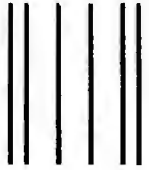

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products, such as Delrina Technology's $179 *Suite 2.1* and ProComm's $179 *Plus 2.0 for Windows*, make things even easier by combining fax and communications software in one package. —*K.Y.*

Contact Managers

If the secret of getting ahead is who you know, then a good contact-management program can help you stay there. Contact managers track people, messages and meetings, manage your calendar, organize random notes and show what tasks need to be done. Leading contact managers include Symantec's *Act! for Windows 2.0* ($280; 800-441-7234), Modatech's $249 *Maximizer for Windows 3.0* (800-804-6299) and Jensen-Jones's $295 *Commence 3.0* (800-688-7080).

A powerful new feature in all of these programs is Caller ID support, which finds and displays a customer's contact record before you pick up the call. Whether you're a high-tech firm or a small retail business, this sort of preparation will help win clients. For example, a catering company can impress customers by "remembering" them, and their preferences, instantly. Check carefully before you purchase, however: Packages such as Commence and Maximizer work only with certain hardware. For a great time-saver, use a fax modem and fax software with your contact manager to automatic-fax a whole group of contacts at specified intervals. —*Laurianne McLaughlin*

When to Think Network

Just about any business with two or more computer users at the same site is a candidate for a network, which allows you to share files with your co-workers without swapping disks, or to use the same printer without taking turns. With a network, too, you can use e-mail to communicate with your co-workers, whether they're three desks away or 2,500 miles away in a satellite office.

There are two types of networks. A **peer-to-peer** network requires that one computer in the group pull double duty, as a personal system and as the brains of the network. Peer-to-peer networks are the cheaper and less complex solution for small work groups (under 25 people). The leading peer-to-peer networks are Artisoft's $119-per-user LANtastic (800-233-5564), Microsoft's $149-per-user Windows for Workgroups (800-426-9400) and Novell's $99-per-user Personal Netware (800-NETWARE). Though they don't require baby-sitting by a technician, peer-to-peer networks can cause problems when co-workers try to access files directly from the double-duty hard drive—slowing that system down as they do. Plus, they provide only minimal security.

In a **server-based** situation, a dedicated computer serves the needs of the network—including acting as central storage for shared files and applications. Companies of five or more people can use server-based solutions such as Novell Netware. This type of network is pricier (Netware starts at $1,095 for five users and requires a full-time network administrator to manage it), but it offers better security and more growing room.

Whichever network you choose, make sure it works with applications you already have. And if you're worried about installation, rest easy: Your vendor can refer you to a value-added reseller (VAR) to help install the network in your office. **—Melissa Riofrio**

Accounting Software

Accounting and bookkeeping software has come a long way from plain old bean counting. The top-selling small-business program—*QuickBooks* by Intuit ($100; 800-816-8026)—can handle simple inventory management and produce reports on both a cash and an accrual basis, so you can run reports for the IRS as well as the bank. When it comes time to fill in your Schedule C next year, you might appreciate this flexibility.

Other best-selling programs are the $199 *MYOB for Windows* by Best!Ware (201-586-2200), the $150 *DacEasy for Windows* (214-248-0305) and the $169 *Peachtree Accounting* (800-228-0068). MYOB is a snap to set up and features a very simple push-button interface. DacEasy's accounting package also comes with contact-management capabilities. Peachtree publishes both *First Accounting*, for companies with simple accounting needs, and *Accounting for Windows*, with inventory management and payroll. —*Theresa W. Carey*

Business-Management Software

Whether you're writing a business plan, launching a new product or service or setting goals for your employees, you might find it handy to have an MBA around—an MBA in a box, that is. This class of software is specifically designed to help business managers with some of the more difficult aspects of management—writing business plans, finding the right market for a product or service and dealing with employees.

If you want to find out where the potholes in your business lie, for instance, the $495 *Business Insight Software* from Business Resource Software (800-423-1228) will guide you through a battery of detailed questions. The same company also offers the $130 *PlanWrite*, a self-contained program that helps you put together a basic business plan; you can even work according to a ready-made template that you access from other programs, such as a word processor or spreadsheet.

The $395 *ManagePro* and $129 *Review Writer*, both from Avantos Performance Systems (510-654-4600), will help you set performance goals for your staff and evaluate employees for annual reviews, and will assist you in solving human-resources problems. If you're polishing the crystal ball for sales predictions, let the $595 *Forecast Pro for Windows* by Business Forecast Systems (617-484-5050) put its Expert Mode to work

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When it comes to brainstorming product ideas and names, you might have some fun using the $199 *IdeaFisher for Windows* by IdeaFisher Systems (800-289-4332) or the $495 *NamePro* by The Namestormers (214-350-6214). IdeaFisher might just supply you with the perfect advertising slogan or campaign, while NamePro's database of over 30,000 words and phrases will help you create a unique name for your product or service. *—T.W.C.*

On-Line Services

If you need business information in a hurry, head to an on-line service. You can use it to gather news, share information, get advice and find new resources. The business resources on *CompuServe* (800-848-8199), for example, are rich and varied. For $9.95 per month, CompuServe offers business directories, demographic surveys and trademark and market-research information. Type **go patent**, for example, to access a database of national and international patents. For market research, try **go iqbusiness** for entrée to Iquest's management and marketing research. To target a specific market, type **go supersite** for a gander at U.S. demographic statistics.

Another trove of useful business and financial news is *Dow Jones News/Retrieval* (800-522-3567). This service offers on-line versions of more than 1,800 regional and national publications, including the *Wall Street Journal* and *Business Week*, and gives you stock and mutual-fund information through company trackers Dun & Bradstreet and Standard & Poor's. *—Arden Hoffman*

Suites vs. Stand-Alones vs. Integrated Software

Let's say you need a word processor, a spreadsheet and a program for making presentations. Do you (a) buy three separate software packages from three different companies, at approximately $300 a pop; (b) buy an "application suite" from one company containing all three applications for roughly $500; or (c) buy a single integrated package with built-in word-processing, spreadsheet and presentation capabilities for around $130?

If you automatically answered C, think again. The right choice shouldn't be based on price alone, as it depends on your individual needs, how your business works and how it will grow.

Option A: *Individual Packages.* Individual packages are the most expensive way to go but offer the greatest flexibility. If you already know you want Lotus's AmiPro for word processing, Software Publishing's Harvard Graphics for presentations and Microsoft's Excel for spreadsheeting, you may want to buy them all. That way, you get your favorite applications, and they'll work together because they all run under Windows (though transferring data back and forth between them can prove nettlesome).

Option B: *Software Suites.* Basically, suites are giant value packs that generally include a word processor, a spreadsheet, a database, presentation graphics and, sometimes, a personal information manager (PIM). These full-featured packages combine three or more programs for little more than the retail price of any single program. For example, you can expect to pay around $450 for a given suite, compared with separate applications that cost around $300 each.

In Lotus's SmartSuite 3.1 for Windows ($399), you get AmiPro, 1-2-3, Approach, Freelance Graphics and Organizer. Microsoft Office for Windows ($499) includes best-sellers Word and Excel and presentation package PowerPoint. Microsoft Office Professional for Windows ($599) adds Access, a database. Novell Perfect Office 3.0 for Windows ($659) jams in WordPerfect, spreadsheet QuattroPro, WordPerfect Presentations, InfoCentral (PIM) and Envoy (a tool for "portable documents"), plus e-mail and scheduling software. The professional version adds Paradox, a database program.

Software suites offer other benefits. You can share data between applications more easily. And because you buy the package from only one vendor, a suite saves you the time and hassle of getting service and support from several parties.

Before springing for a software suite, however, make sure your hard drive can accommodate these hefty packages (which can eat up more than 100 megabytes of disk space). You may also need a fair share of patience to learn how to use these software leviathans effectively.

Option C: *Integrated Packages.* Think of an integrated software package as a "suite lite"—a baby version that includes a simple word processor, a spreadsheet and a database.

Integrated packages like Claris Works 4.0 ($99) and Microsoft Works for Windows 95 ($54.95) lack the power and sophistication of their full-grown siblings, but a modified package is far less expensive than a suite and may be ideal if your needs are basic: writing letters, memos and newsletters, or creating fliers, mailing-labels and budgets. And packages don't eat up all your hard-drive space, and they're easy to use. If your business outgrows an integrated-software package, you can always upgrade to the full-blown suite by the same vendor. This saves you from having to learn a whole new medley of applications. **—Leslie Crawford**

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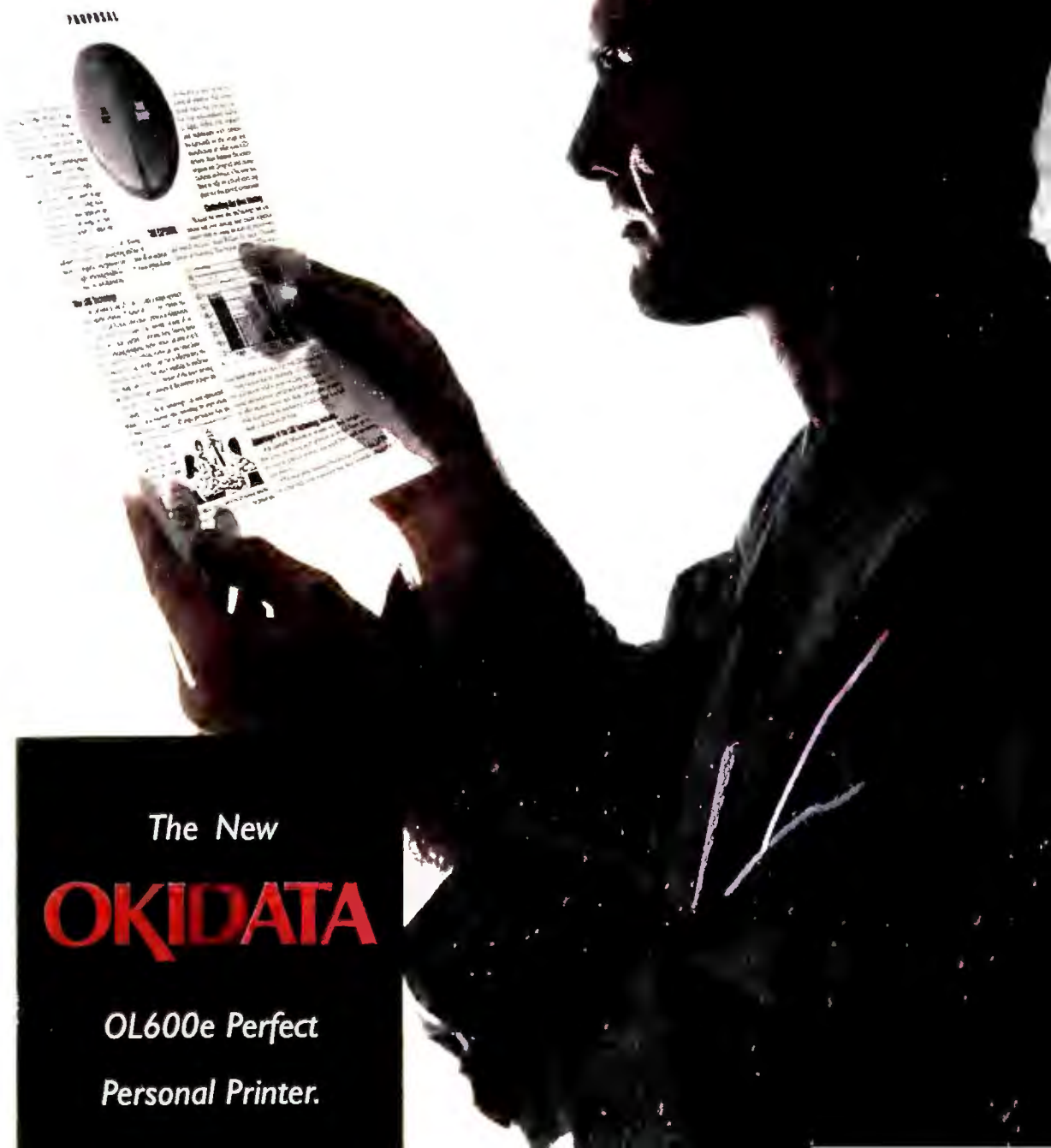

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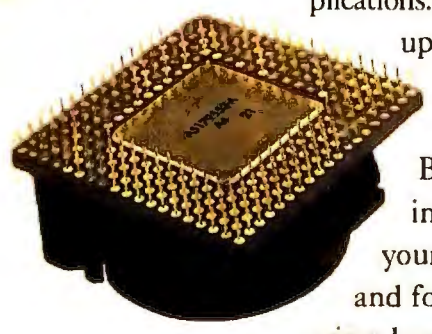
BEST Upgrades FOR YOUR 486

It's a Pentium world, but in most cases you *can* bring yesterday's 486 up to speed. Here's how—and when—to invest your upgrade dollars.

BY ERIC KNORR



BILL MAYER

TIRED OF COMPUTING in molasses? Outraged by the idea of needing a new system when it seems like you just bought the one you're using? Then upgrading—swapping a few key components for some newer, faster ones—could save you from blowing a gasket.

But where to start? Depending on the age of your current hardware, a new graphics adapter may boost some multimedia and other graphics-intensive applications. A new hard disk should speed up database apps and the loading of big files (see "Peripherals and Performance"). But only a CPU upgrade can increase the performance of your system across the board—and for remarkably little money, as prices have dropped dramatically,. Best of all, a CPU transplant is the easiest upgrade ever invented: Just turn off your machine, open it up, remove the old chip, maybe move a jumper or two, and install the new chip.

To determine the best place to invest your upgrade dollar, we collected 15 CPUs, plugged each of them into a Compaq Prolinea 486, and then ran the system through our standard systems test suite. When we finally emerged from the lab, three things were clear:

- If you have a 486DX or 486SX system, you're in luck—just swap in a low-cost DX4 upgrade CPU to nearly double your performance.
- If you want to upgrade a 486DX2 or DX4, your best option is to swap in a new Pentium motherboard (see the sidebar "The Mother of All Upgrades")—or buy a new system.
- Unless you're lucky, a Pentium OverDrive won't give you enough bang for your upgrade buck.

What about upgrading a 386? Don't bother. Sure, you can swap in a new CPU—plenty of 386-to-486 upgrade chips are available. But no matter how fast the CPU, the 386's memory architecture will still slow you down. So if

you are determined to hang on to to that old 386, you should upgrade the whole motherboard. Even then, you may have to add a new hard disk and graphics card, in which case you'll probably violate the first law of upgrading: Never pay as much for an upgrade as you would for a new system with similar performance.

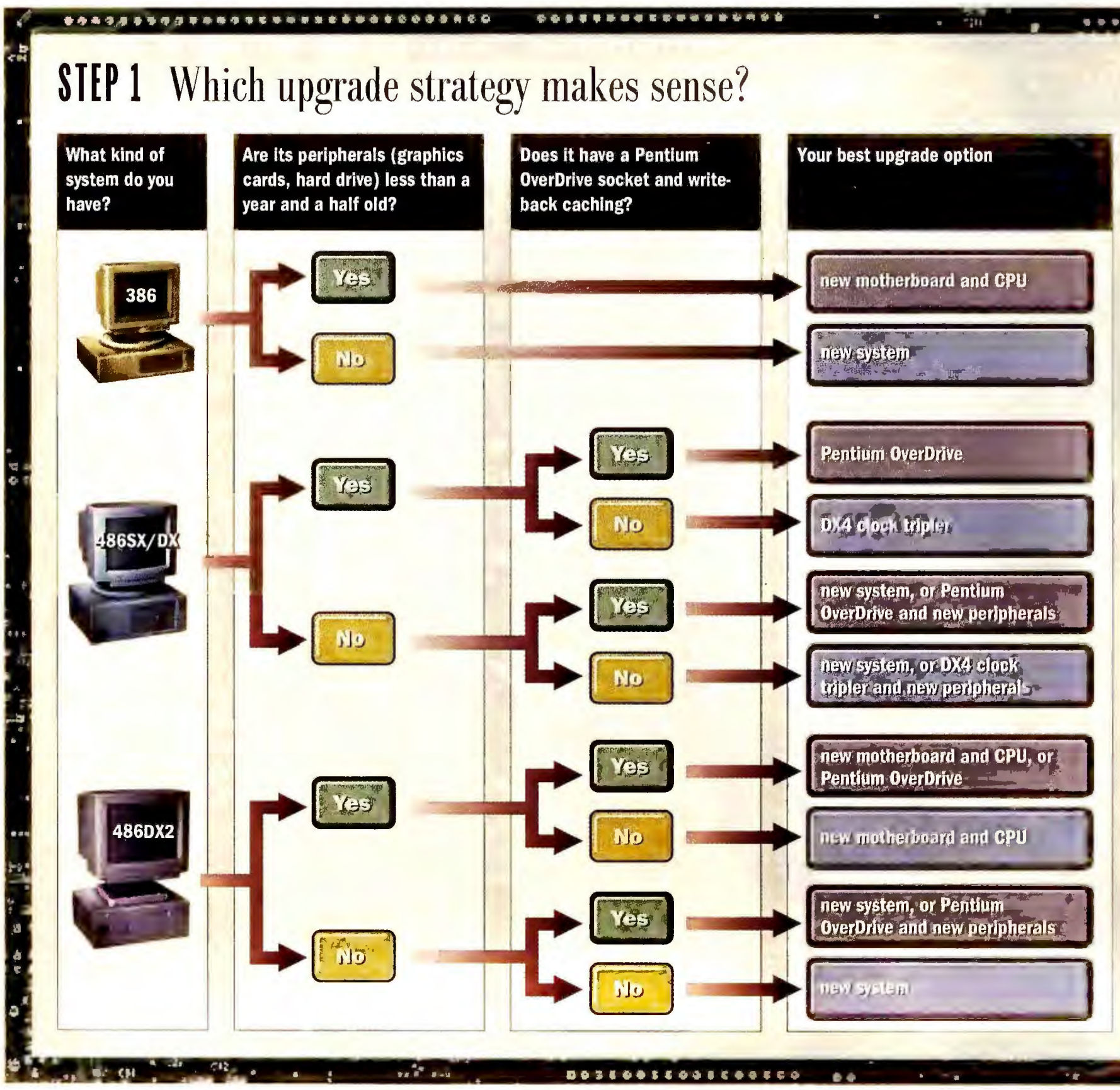
New Engines for 486 Machines

Systems with 486 processors, on the other hand, are ripe for a CPU swap, and you have plenty of CPU upgrade products to choose from. They fall into two broad categories: 486 clock multipliers and Pentium OverDrives.

The *486 clock multipliers* are CPUs that run at some multiple of the motherboard's *clock crystal* speed (the clock crystal sets the processing pace for your computer). Most clock multipliers are either *doublers* or *triplers;* AMD is the first and so far the only manufacturer to come out with a clock *quadrupler*. Doublers and triplers are available in two forms: one for 25-MHz motherboards and one for 33-MHz motherboards (thus far, AMD's quadrupler is available only at 25 MHz). For example, Intel's DX4-75 OverDrive is a clock tripler for 25-MHz systems—which means it runs internally at three times the speed of the motherboard, or 75 MHz. You can put a clock multiplier into virtually any 486SX and 486DX system.

To complicate your choices even more, clock multipliers are available from two sources. You can buy them as retail upgrade chips (from Intel, Evergreen, and Kingston) at your local computer store. Or you can buy them on the

STEP 1 Which upgrade strategy makes sense?



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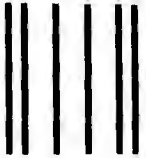

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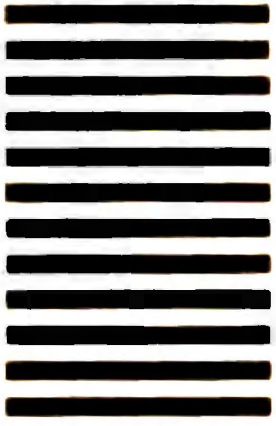

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"gray market": The back pages of *PC World* and other magazines are full of advertisements hawking chips from companies such as Intel and AMD at amazingly low prices. These chips aren't official upgrade products, however. They are CPUs originally intended for use in new PCs and have somehow wound up for sale to end users without the express consent of the manufacturers. Inside, they're virtually identical to the retail products sold specifically for upgrading.

Like triplers and doublers, *Pentium OverDrives* also multiply the PC's clock. And like those other chips, Pentium OverDrives come in 25-MHz and 33-MHz versions. But that's where the similarities end. Unlike the 486 clock multipliers, which are still 486s, Pentium OverDrives are architecturally related to the Pentium CPU. And instead of doubling or tripling the system clock speed, Pentium OverDrives multiply it by 2½ times, so they run at 63 MHz and 83 MHz, respectively. Most SX2, DX2, and DX4 systems have sockets for the Pentium OverDrive, but only some SXs and DXs do.

We chose the Compaq Prolinea as our test system because it's one of the few 486 PCs that accommodates the Pentium OverDrive in addition to standard doublers and triplers. And because it has a switchable system clock, the Prolinea can pull double duty as a 486SX-25 and a 486DX-33, the two most common 486 motherboard configurations. We saw only one problem with using the Prolinea for our tests: Because it's only a year old, its hard disk and graphics subsystems are relatively speedy, which means the peripherals won't slow down a new

STEP 2 Which upgrade CPU, if any, is right for you?

Yes · No · Maybe

If you own a 25-MHz 486	Recommended	Street price	Requires voltage regulator	Overall performance improvement versus base 486SX/DX (percent)	Overall performance improvement versus base 486DX2 (percent)	Reader service number
Intel DX4-75 OverDrive	Yes	$150	no	88	24	761
Intel Pentium OverDrive 63 MHz[1]	Maybe	$250	no	126	49	762
Intel Pentium OverDrive 63 MHz[2]	No	$250	no	94	28	763
Evergreen REV TO 486DX/4	No	$249	no	81	19	764
Kingston TurboChip	No	$149	no	71	13	765
Intel DX2-50 OverDrive	No	$120	no	52	n/a	766
If you own a 33-MHz 486						
Intel DX4-100 OverDrive	Yes	$200	no	69	20	767
Intel Pentium OverDrive 83 MHz[1]	Maybe	$275	no	99	42	768
AMD DX4-100 (gray market)	Maybe	$135[3]	yes	57	12	
Cyrix DX2-66 (gray market)	Maybe	$100	no	33	n/a	
Intel Pentium OverDrive 83 MHz[2]	No	$275	no	73	23	771
Intel DX4-100 (gray market)	No	$175	yes	69	20	
Kingston TurboChip	No	$179	no	56	12	773
Evergreen REV TO 486DX/3	No	$199	no	56	11	774
AMD DX2-66 (gray market)	No	$135[3]	yes	40	n/a	
Intel DX2-66 OverDrive	No	$140	no	40	n/a	776
Texas Instruments 486DX2-66 (gray market)	No	$135[3]	yes	33	n/a	

n/a = not applicable

[1] With write-back caching enabled.

[2] With write-through caching enabled.

[3] Includes $35 for voltage regulator.

For more information about all products in this table, circle reader service no. 910.

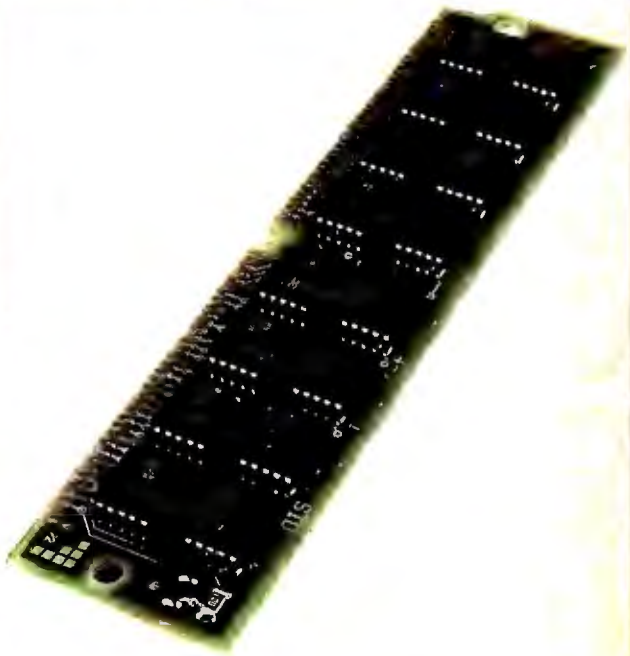
CPU. Consequently, your results could be less impressive, especially if your hard disk or graphics card is anything more than a year and a half old.

Clock Triplers: The Upgrade to Beat

If you have a 25-MHz or 33-MHz 486DX or 486SX system, it's hard to surpass the value of a clock-tripling DX4 upgrade. With prices for these triplers starting at around $150, there's little reason to putt-putt along with an original, low-speed 486—or to mess with slower DX2 clock doublers. (Keep in mind, however, that these are estimated discount street prices. CompUSA and many other retail chains tend to sell at list—so shop carefully.)

Three vendors are currently hawking clock-tripling upgrade products for 486s. First, there's Intel itself, with its DX4 OverDrive. Then there are Kingston and Evergreen; both sell upgrade packages (which include the CPU and sup-

PERIPHERALS AND PERFORMANCE



yes, the CPU has the biggest effect on your overall system performance. But if you plant a new CPU in a machine with too little memory, an aging hard disk, or an antiquated graphics card, your new DX4-100 may act more like a DX2-66—or worse. Of course, upgrading these components means sinking even more money in an old system instead of investing in a new one that has a warranty. But if you can't afford a new computer, here's where to start when shopping for peripherals upgrades.

How Much Memory Is Enough?

At this point, all Windows users should have a minimum of 8MB of RAM. When, if ever, do you need to upgrade to 16MB?

If you're running one or two applications at the same time under Windows 3.1 or Windows for Workgroups, 8MB is plenty. Sure, upgrading to 16MB helps performance—our latest tests show boosts in the 5 to 15 percent range when running a single application. But by the time you read this we expect the extra 8MB to cost you upwards of $350, and 5 to 15 percent better performance isn't enough bang for that many bucks. What about stability? As far as we can tell, Windows 3.*x* crashes just as frequently with 16MB of RAM as with 8MB. The only time you really need 16MB under Windows 3.*x* is if you regularly load four or five apps in the background or work with large files like graphics or multimegabyte spreadsheets. We found, for example, that Picture Publisher running alone was almost 40 percent faster with 16MB than with 8MB.

If you're upgrading to Windows 95, you'll want 16MB of RAM no matter what. In our Windows 95 performance tests, we found that applications ran faster with 16MB than with 8MB. After the RAM upgrade, however, 32-bit apps improved only slightly more than their 16-bit counterparts: Excel 95 was 29 percent faster with 16MB; Excel 5.0 was 25 percent faster. As for multiple apps (see "Is Windows 95 Faster? Take 2...," *Top of the News*), when we timed Word 95 with cc:Mail, Excel, Paint, Picture Publisher, Sidekick, and WinFax already loaded, performance improved 22 percent with 16MB of RAM versus 8MB.

Most 486 and Pentium PCs have a secondary memory cache to maintain system performance when the CPU can't find what it needs in its own internal primary cache. You can upgrade the secondary

PERIPHERAL CONCERNS

- ☑ If you're sticking with Windows 3.x, 8MB of RAM will keep you going.
- ☑ If you've upgraded to Windows 95 or you plan to, you should upgrade to 16MB of RAM.
- ☑ If your hard drive is more than a year and a half old, buy a new one and get an EIDE controller to go with it.
- ☑ If your graphics board is more than a year and a half old, consider one of this month's Top 10 graphics boards.

port chips on one package) based on AMD's clock-tripling DX4. Evergreen also sells an upgrade product based on AMD's clock quadrupler, which runs at four times the speed of the motherboard's clock.

Of these, Intel's DX4 OverDrive is the best deal. At 25 MHz, the DX4-75 delivered an 88 percent speed boost over our base 486—still nowhere near a new Pentium—for a projected street price of about $150. The 33/100-MHz version, which should cost about $200 on the street by the time you read this, jacked up the speed of our base 486DX-33 by almost 70 percent, yielding performance on a par with a slow Pentium-60. If you have a 25-MHz 486, you may be eligible for the hottest upgrade of all: Check your PC's manual to see if you can switch your motherboard to run at 33 MHz. If so, you can shift up to the higher clock speed, install a 33/100-MHz DX4 OverDrive, and enjoy Pentium-level performance—a 129 percent improvement—for about 200 bucks.

The other retail triplers we looked at might cost a little less than Intel's, but they couldn't match the performance. The Kingston TurboChip (about $180 on the street) and the Evergreen REV TO 486DX/3 (around $200) boosted our 33-MHz test machine's scores by around 56 percent, compared with the OverDrive's 69 percent. We were also disappointed with Evergreen's REV TO 486DX/4 upgrade, which combines an AMD quadrupler with extra cache and supporting chips on a single module. At 25 MHz, it was slightly slower (7 percent) than Intel's DX4 OverDrive, yet it will probably cost $100 more on the street. It should be noted that the chip we tested was a preproduction model; Evergreen was not able to provide us with a final version (with an optimized cache) at press time.

Triplers make sense for 486DX or 486SX systems only. There's no reason to consider installing a DX4 in a DX2 system: For $135 to $249, you'll average a 13 to 24 percent speed increase. Will you notice? Barely.

Gray-Market Triplers: Deal or Boondoggle?

If the retail triplers are good deals, you'd think the "gray market" chips you see for sale in the back of the magazine would be even better. After all, they should deliver the same performance as their retail counterparts (a gray-market Intel DX4-100 should be just as fast as a retail Intel DX4-100 OverDrive) while costing less. To find out how good these chips are, we called Future Micro—a mail-order house with low prices—and obtained two 33/100-MHz gray-market triplers from Intel and AMD for testing.

As we expected, the gray-market Intel DX4 tied its retail OverDrive counterpart for speed. And, at about

cache in many systems these days—but how much cache is enough? In our experience, 128K does fine for a 486 system, while 256K does the job in a Pentium.

Hard Disks: The Hidden Speed Upgrade

You probably think you need to upgrade your hard drive only when you run out of disk space. In fact, a new drive can also give your system a huge speed boost.

Over the years, *PC World*'s tests have repeatedly demonstrated that there's relatively little difference in speed between hard disks with comparable specs (rotational speed and buffer size being the most significant). From year to year, however, hard disks keep getting faster and cheaper. Replace a four-year-old disk with a new drive and you could easily see more than a 50 percent boost in speed. The bottom line: You probably need the space anyway, so with the price of storage these days (you can find 1GB drives selling for about $300), there's no excuse for putting up with an old hard disk.

And don't forget the interface. Virtually all new drives use Enhanced-IDE technology, which can give you a boost of over 40 percent with disk-intensive apps. But unless your machine is less than a year and a half old, it probably doesn't have an EIDE interface. An EIDE interface card costs about $35—money well spent.

Accelerating Graphics

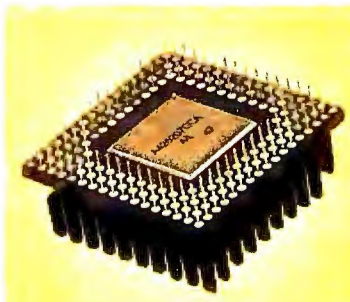
An aging graphics card can slow you down as much as a sputtering old hard disk. But so much depends on controller chips and drivers that the age of a graphics card can't tell you as much about its performance as a hard drive's age can about its own capabilities. Still, if your card is more than a year and a half old, any of the products in *PC World*'s monthly Top 10 graphics boards chart will likely outpace it.

Age isn't all that counts. You'll also get faster graphics if you switch from an ISA adapter to a PCI version. But there's a catch: You have to upgrade your motherboard to upgrade from ISA to PCI. If you're already planning to upgrade your old ISA motherboard to a PCI model, be sure you get a new PCI graphics card in the process. But you might consider saving the money from that double upgrade (between $700 and $1000, depending on whether you need to buy memory) and investing it in a new system.

$175, the gray-market chip should cost you $20 to $30 less. The gray-market AMD tripler is just a bit slower than the AMD-based Evergreen and Kingston upgrade products, but its price—as low as $100—is stunning.

But despite the gray-market alternatives' comparable performance and low prices, we can't fully endorse them for two reasons.

First, they require something called a *voltage regulator*. Why this ominous-sounding device? Because the 486 you're replacing ran at 5 volts, and the gray-market DX4s from AMD and Intel require 3.3 volts. Try plugging a 3v chip into a 5v socket, and you'll fry the chip. The voltage regulator, a small circuit card a bit larger than the chip itself, converts 5v to 3.3v. You plug the regulator into the socket and then plug the chip into the regulator. (The over-the-counter upgrade triplers from Kingston and Evergreen have voltage regulators built in.) While these regulators aren't hard to install, they cost about $35, which you need to factor into the overall value of most gray-market CPUs.



Intel DX4-100 OverDrive

Intel's DX4-100 OverDrive, which should cost about $200 on the street, jacked up the speed of our base 486DX-33 by almost 70 percent.

Second, there's the question of customer support. Chip manufacturers turn a blind eye to onesy-twosey reselling on the gray market. But because these chips aren't traveling though the regular retail channel, vendors are under no obligation to provide warranties or customer service to end users. Neither Intel nor AMD officially offer end-user support for their gray-market chips.

These reservations aside, we can give a qualified thumbs-up to the gray-market tripler from AMD for those unafraid of voltage regulators and the absence of a customer support safety net. True, the gray-market and retail DX4s from Intel are faster, but even with the added cost of a voltage regulator, the AMD option should cost $60 or $70 less than the retail Intel DX4 OverDrive. A gray-market DX4 plus a regulator not only costs more than the AMD chip—it probably costs more than the retail OverDrive upgrade does. (Note, however, that Future Micro tells us some customers have had trouble getting the AMD-plus-regulator combo to work in older machines. Which is why, as with any upgrade, you should insist that you get a money-back guarantee.)

Evergreen REV TO 486DX/4

We were let down by the REV TO 486DX/4 upgrade. It was slightly slower than Intel's DX4 OverDrive, yet it will probably cost $100 more on the street.

Clock Doublers: The Penny-Wise Solution?

And what about clock doublers? Forget 'em. Like the triplers, clock doublers come in retail and gray-market versions. On the retail side, we looked at the 25- and 33-MHz DX2 OverDrives from Intel. We also looked at three 33-MHz gray-market doublers from AMD, Cyrix, and Texas Instruments. We were none too impressed with any of them. (We also could have looked at any of the myriad retail products based on these same AMD and Texas Instruments CPUs. But these other chips would have performed the same as the CPUs they're based on and would have cost more—so we didn't test them.)

You can expect to find Intel DX2 OverDrives discounted to around $140 for the 33/66-MHz model and about $20 less for the 25/50-MHz version (compared with $200 and $150, respectively, for the company's DX4 OverDrives). Gray-market doublers from AMD and Texas Instruments go for around $100, but they require the pesky voltage regulator and come with no tech support.

And even at these low prices, DX2s don't make much sense, because the performance boost you get isn't that great. The Intel and AMD 33/66-MHz doublers each netted a 40 percent performance increase over a 486DX-33, while the 25/50-MHz chips posted 52 percent speed improvements. (Compare these numbers with the 80 to 90 percent boost you'll get from a DX4.) The Cyrix and Texas Instruments DX2s increased system speed by about 33 percent in our 33-MHz system.

If there's a deal here, it's the Cyrix DX2-66. This chip should cost less than $100, and because it's a 5v chip, it doesn't require a voltage regulator. You may not see a huge improvement in performance with a Cyrix doubler—but then, at this price, what do you expect?

Shake It Down Into OverDrive

If you own a 486SX2, 486DX2, or DX4 system—or the right 486SX or 486DX—you probably have a special 238-pin, 237-pin, or 235-pin socket designed to accommodate one of Intel's Pentium OverDrive chips (see this month's *Hardware Q&A* column for a look at common CPU sockets and the upgrades you can plug into them). Your system may even have been sold as "Pentium upgradable." But beware: As we've said before, Pentium OverDrives are rarely worth the $250 to $275 you'll pay for them (see the lead story in April's *Top of the News*).

Plug a Pentium OverDrive into a DX2-66, and you'll see a 23 percent increase in speed, though your PC will still be slightly slower than the average DX4-100. Plugging the 63-MHz version of that chip into a DX2-50 will get you a 28 percent boost—but your system

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won't get near DX4 performance. And remember: We started with an unusually speedy machine. In a DX4 system, the speedups are almost unnoticeable.

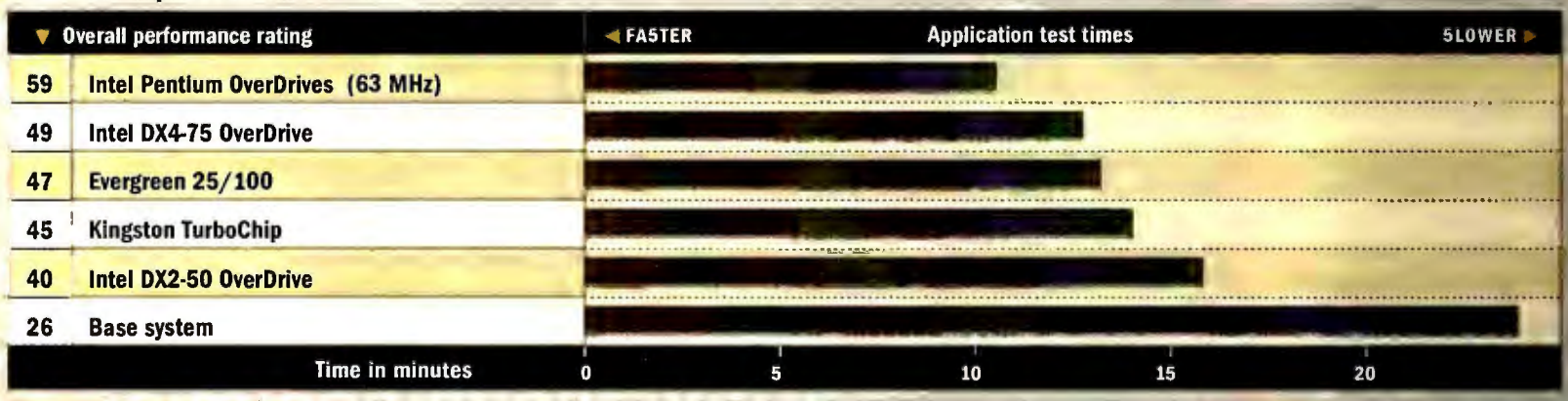
Why the poor showing? First, there's the difficulty of shoehorning the Pentium architecture, which is designed to use a 64-bit data bus, into a 32-bit system. Then there's the problem of the Pentium OverDrive's memory cache. True, this cache is extra large—at 32K, it's twice the size of the ordinary Pentium's. But for the chip to perform optimally, your system must support *write-back* caching. In a write-back cache, instead of the CPU writing data to memory external to the chip, the data is written to the cache itself—a much faster operation than "writing through" to slower external memory.

But as far as we can tell, only between 5 and 10 percent of systems that accommodate the Pentium OverDrive support write-back caching. And even if your system's manual points to a jumper on the motherboard that enables write-back mode, it may not work: In our initial tests of ten 486 PCs with the Pentium OverDrive socket, four that claimed to support write-back didn't (and three simply would not function with the Pentium OverDrive installed).

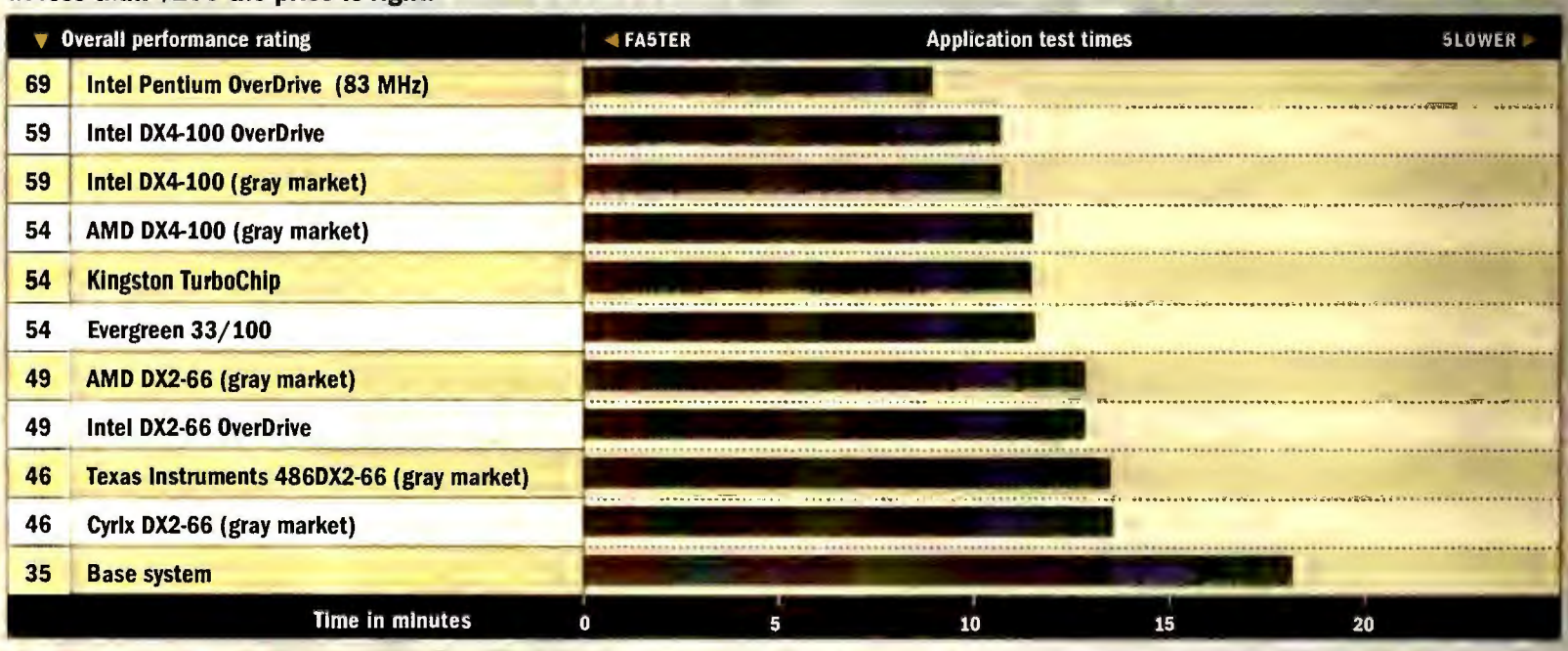
Fortunately, our Prolinea test system is one of those PCs in which write-back caching actually works. While the Pentium OverDrive delivered a 23 percent boost to a DX2-66 with write-through caching, performance jumped 42 percent after we switched to write-back

TEST REPORT Pentium OverDrives Are Fastest

For a 25-MHz 486: A 63-MHz Pentium OverDrive finishes our suite of business applications in half the time it takes a 486SX-25, but clock triplers are still a better value.



For a 33-MHz 486: Clock triplers can speed up your system by more than half—not as much as an 83-MHz Pentium OverDrive, but at less than $200 the price is right.



Upgrades are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from seven tests.

Methodology
To test CPU and motherboard upgrades, we used the base systems as supplied by the vendor with the version of DOS supplied and the default Windows installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver. We loaded the test applications and files and the test automation software and scripts.

Word 2.0 for Windows
WordPerfect 6.0 for DOS
Excel 4.0
1-2-3 release 3.4 for DOS
Paradox 1.0 for Windows
Paradox 3.5 for DOS
Freelance 1.0 for Windows

See Top 20 Test Report for test description. Data based on tests designed and conducted by the PC World Test Center. **All rights reserved.**

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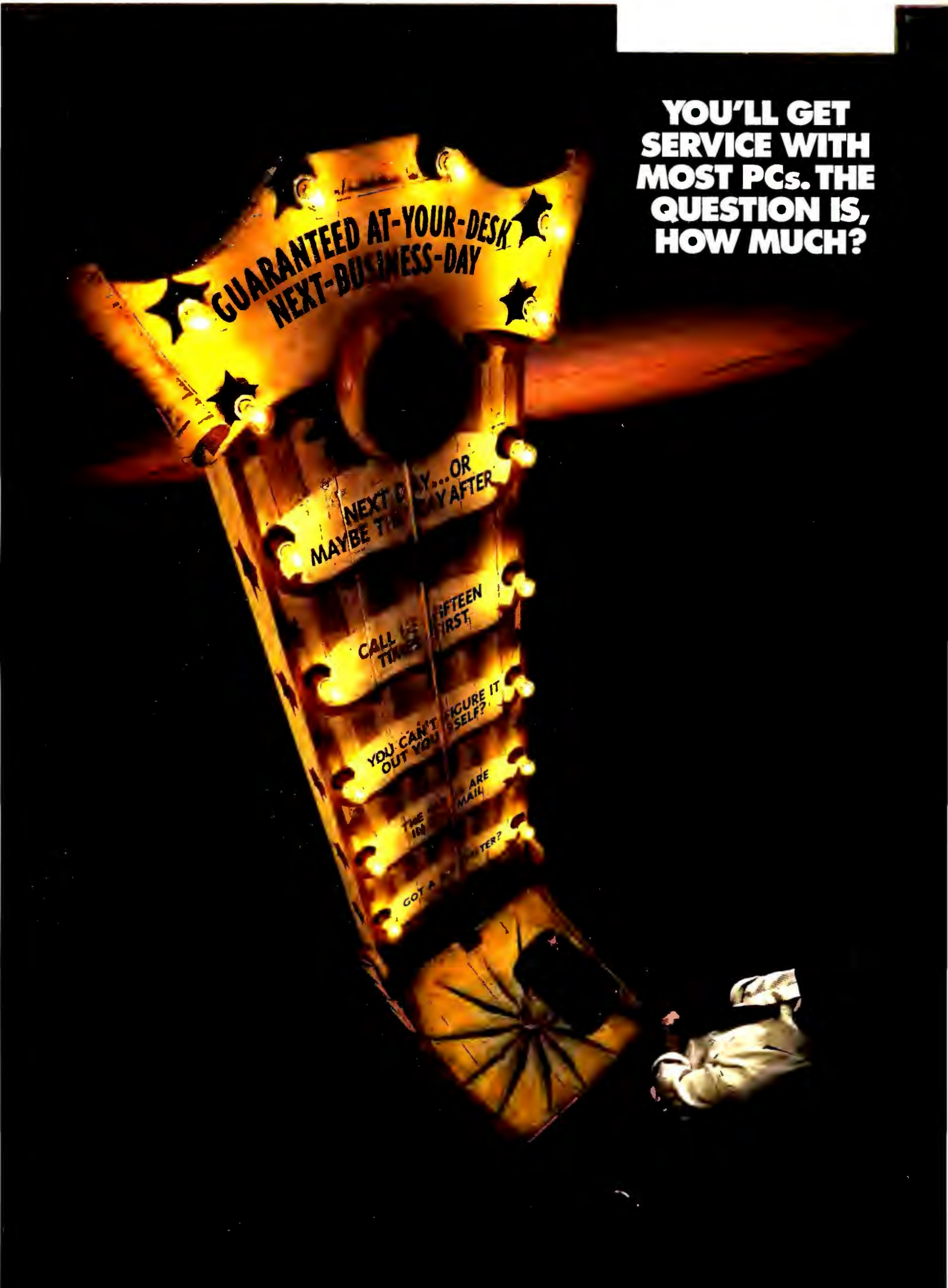

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Dell's featured computer artist is Max Seabaugh of San Francisco.

intel inside pentium PROCESSOR

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THE MOTHER OF ALL UPGRADES

If CPU upgrades don't make much sense for owners of ancient 386s and most modern 486SX2, 486DX2, and DX4 systems, what can they do to improve performance—short of buying a new PC? Consider upgrading the motherboard instead.

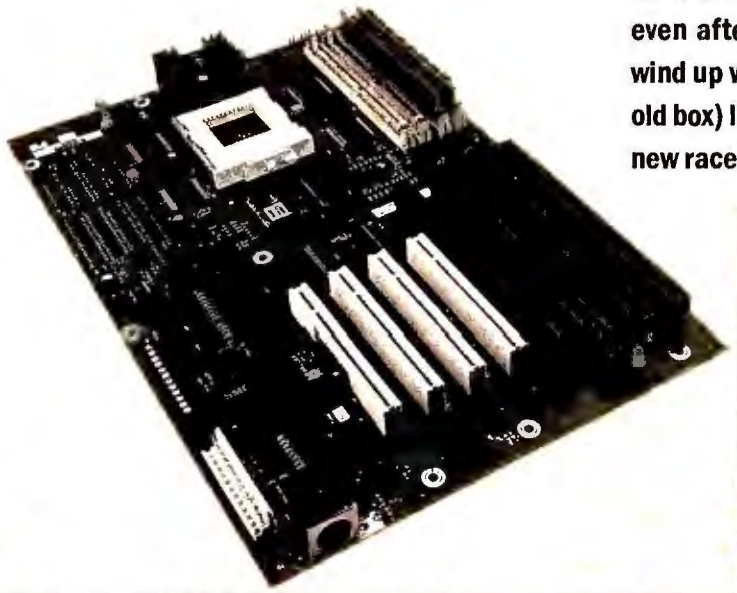
If you absolutely, positively don't want to forsake that 386 system for a new PC—or if that 486DX2 is feeling a little poky compared with your neighbor's Pentium—a new motherboard, designed from the ground up for an honest-to-goodness Pentium processor, could be the best way to bring some spring back into your step.

To suss out the motherboard option, we put two systems on the operating table: an AST Premium 386/33 (circa 1989) and a 486DX2-66V from Gateway 2000 (circa 1993). From the many motherboards now on the market, we chose one of the fastest for our experiment: the Micronics M54Hi, a PCI motherboard with a reasonable $300 street price, sans CPU. Into this board we plugged a 90-MHz Pentium chip. Assuming that the price of Pentium-90s comes down over the next several months, you should be able to put together this same combination for as little as $600. Note that Micronics sells neither CPUs nor memory; for these, you'll have to hit your favorite local dealer or the back pages of a computer magazine.

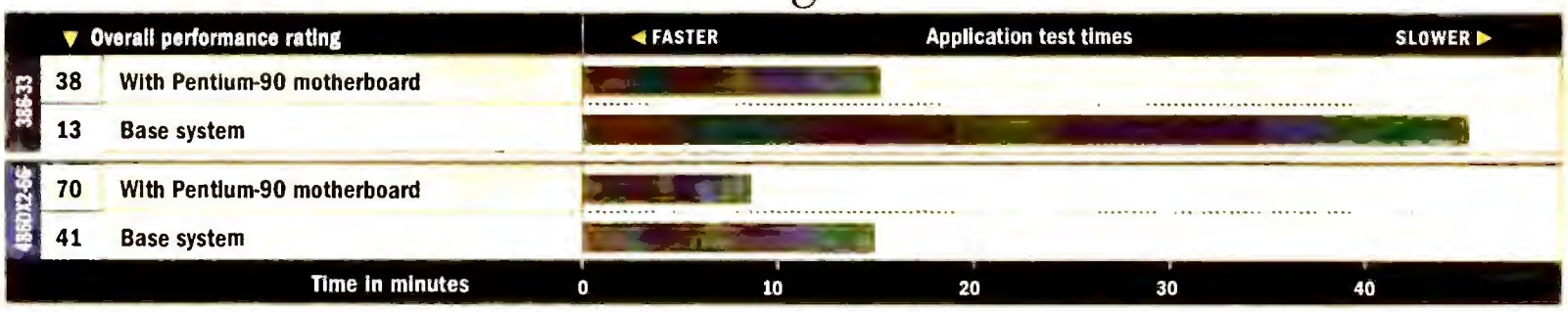
Do the Math

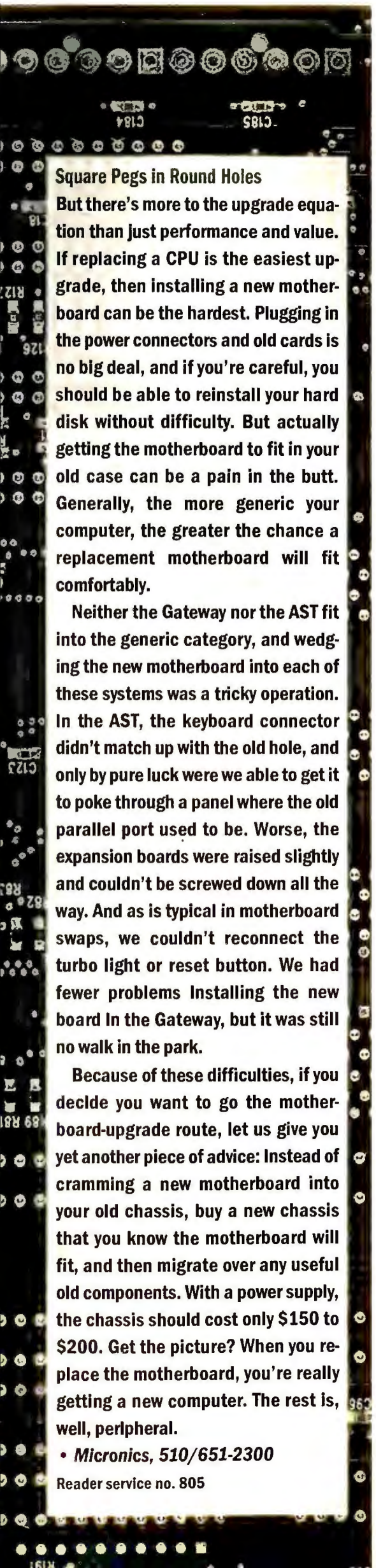
The golden rule of motherboard swaps is that you shouldn't bother unless your other components are fairly new. Otherwise, a sluggish hard disk and a slow graphics card will make all that work seem for naught. For example, installing the Pentium 90 motherboard in the Gateway DX2-66V—a system with up-to-date peripherals—improved performance some 73 percent, making it almost as fast as the average 75-MHz Pentium PC. We did have to add a new graphics card, because the Gateway came with a VL card, while the Micronics motherboard had only PCI slots. The same motherboard sped up our ancient 386 by a whopping 185 percent, but because of its laggard peripherals, it still wasn't as fast as your average 486DX2-66.

Sure, you could upgrade your hard drive and graphics card when you install the new motherboard, but you'd end up spending as much on the upgrade as you would on a new system. Do the math: A new 730MB hard disk costs a little over $200, and a fast graphics card costs a little less. You may also need to buy new RAM (none of our AST system's memory could be used), so add at least $300 for a minimal 8MB. Do you really want to live with that crummy old monitor? A decent 15-inch model sells for about $400. And to be safe, you'd better spend $100 to replace that aging power supply. Total cost: $1800, not much less than what you'd pay for a brand-new 90-MHz Pentium PC. And even after spending all that money, you'd wind up with just one system (the upgraded old box) instead of two (the old plug plus the new racehorse).



MOTHERBOARD UPGRADES Race-Car Engine in a Model-T Frame





Square Pegs in Round Holes

But there's more to the upgrade equation than just performance and value. If replacing a CPU is the easiest upgrade, then installing a new motherboard can be the hardest. Plugging in the power connectors and old cards is no big deal, and if you're careful, you should be able to reinstall your hard disk without difficulty. But actually getting the motherboard to fit in your old case can be a pain in the butt. Generally, the more generic your computer, the greater the chance a replacement motherboard will fit comfortably.

Neither the Gateway nor the AST fit into the generic category, and wedging the new motherboard into each of these systems was a tricky operation. In the AST, the keyboard connector didn't match up with the old hole, and only by pure luck were we able to get it to poke through a panel where the old parallel port used to be. Worse, the expansion boards were raised slightly and couldn't be screwed down all the way. And as is typical in motherboard swaps, we couldn't reconnect the turbo light or reset button. We had fewer problems installing the new board in the Gateway, but it was still no walk in the park.

Because of these difficulties, if you decide you want to go the motherboard-upgrade route, let us give you yet another piece of advice: Instead of cramming a new motherboard into your old chassis, buy a new chassis that you know the motherboard will fit, and then migrate over any useful old components. With a power supply, the chassis should cost only $150 to $200. Get the picture? When you replace the motherboard, you're really getting a new computer. The rest is, well, peripheral.

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mode—enough to make it almost as fast as the average Pentium-66. With a DX4, you'll see roughly a 20 percent gain with write-back caching enabled.

If you have one of those rare SX or DX systems with a Pentium OverDrive socket, your improvements will be even more dramatic. Even without write-back caching, our SX-25 leaped 94 percent with the OverDrive installed; with the cache, the speedup was 126 percent. At 33 MHz, scores jumped 99 and 73 percent with and without write-back mode.

But even with these dramatic improvements, you should wonder: Is it worth paying $250 to $275 for bottom-rung Pentium performance? If your DX or SX system does support write-back caching and has the right socket, a Pentium OverDrive is a good deal—you'll average twice your current performance. Otherwise, you should stick with a clock tripler. If you have a DX2 or DX4 and you need Pentium power, you might be better off replacing your 486 motherboard with one designed from the ground up to support a Pentium processor. We can think of one exception: If you work with CAD software or do serious financial or statistical work, it might be worth swapping a Pentium OverDrive into a DX2 system, because the Pentium's math coprocessor is so much faster.

Kingston TurboChip

The Kingston TurboChip boosted our test PC's scores by only around 56 percent, compared with the Intel OverDrive's 70 percent.

The Road to Future Upgrades

Though you have plenty of options when it comes to upgrade CPUs, more are coming. We'd hoped to see upgrade products based on Cyrix's new 5x86, the first "Pentium-class" CPU upgrade for the 486 socket, but none were available for testing at press time. Improve Technologies (which makes upgrade chips for 286 and 386 PCs) and Evergreen are promising upgrade products based on the new Cyrix chip. In coming months, check out *Top of the News* for the first benchmarks on the 5x86 and these products.

And yes, even Pentium owners can hope for upgrade CPUs. Intel plans to release upgrade chips for Pentium systems in 1996. It's too early for Intel to provide price or performance details yet, although the company projects its usual 30 to 70 percent speed boost over the base system. At this writing, Intel has no plans to offer upgrades based on its next generation P6 for any of the sockets in existing Pentium systems, though P6 upgrade sockets may appear by the time you read this.

For now, CPU upgrades make the most sense for owners of relatively up-to-date 486SX and 486DX systems. If your system is too old, its peripherals may drag down even the fastest new CPU. If your current CPU is too fast—a DX2 or DX4—the relative speedup isn't worth the price of the new chip. But if you own a DX or SX with a pretty fast hard disk and graphics card, a $200 CPU upgrade may be the right way to give your system a whole new lease on life.

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Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444). Testing conducted at the PC World Test Center by Ulrike Diehlmann.*

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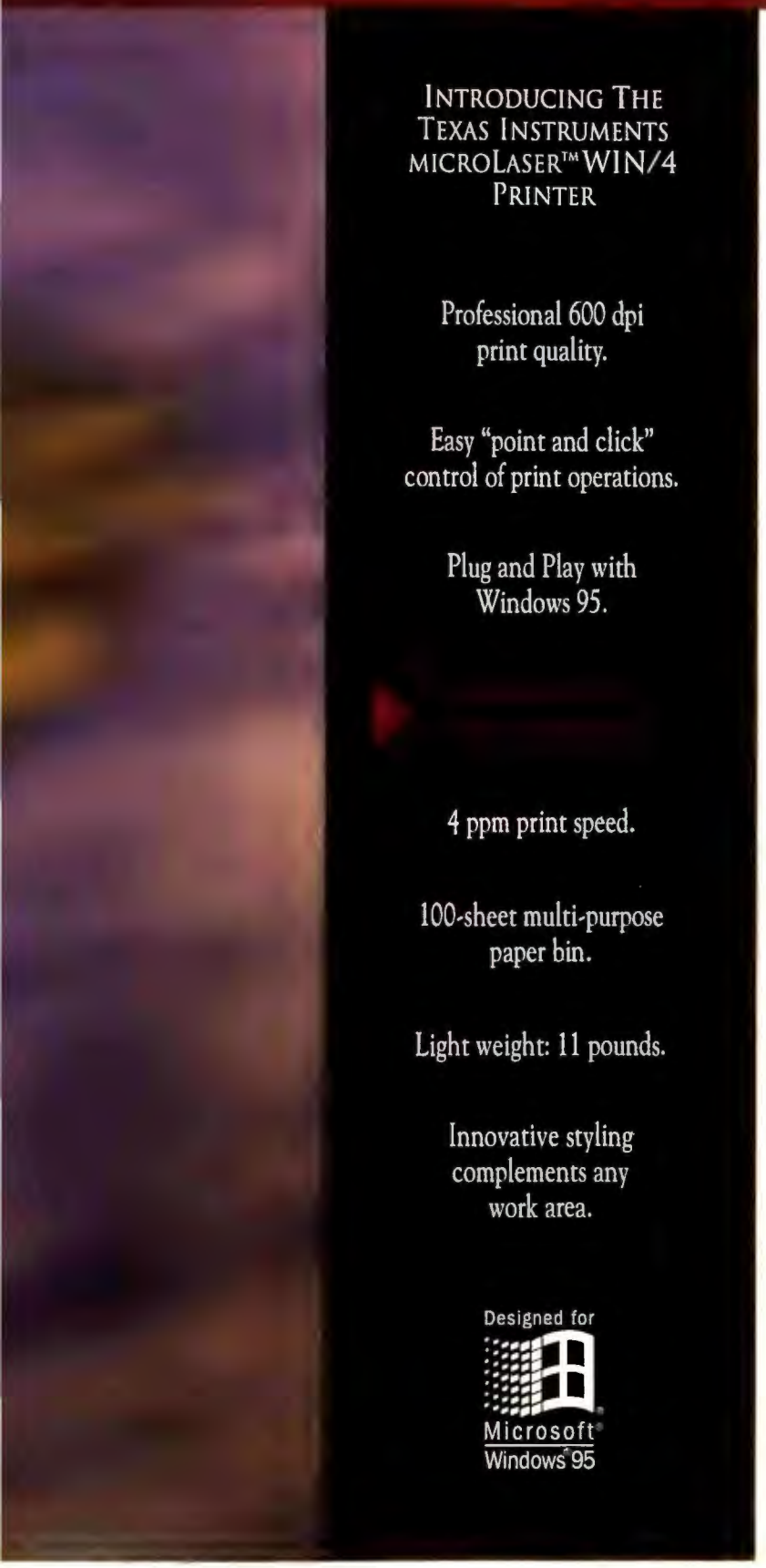

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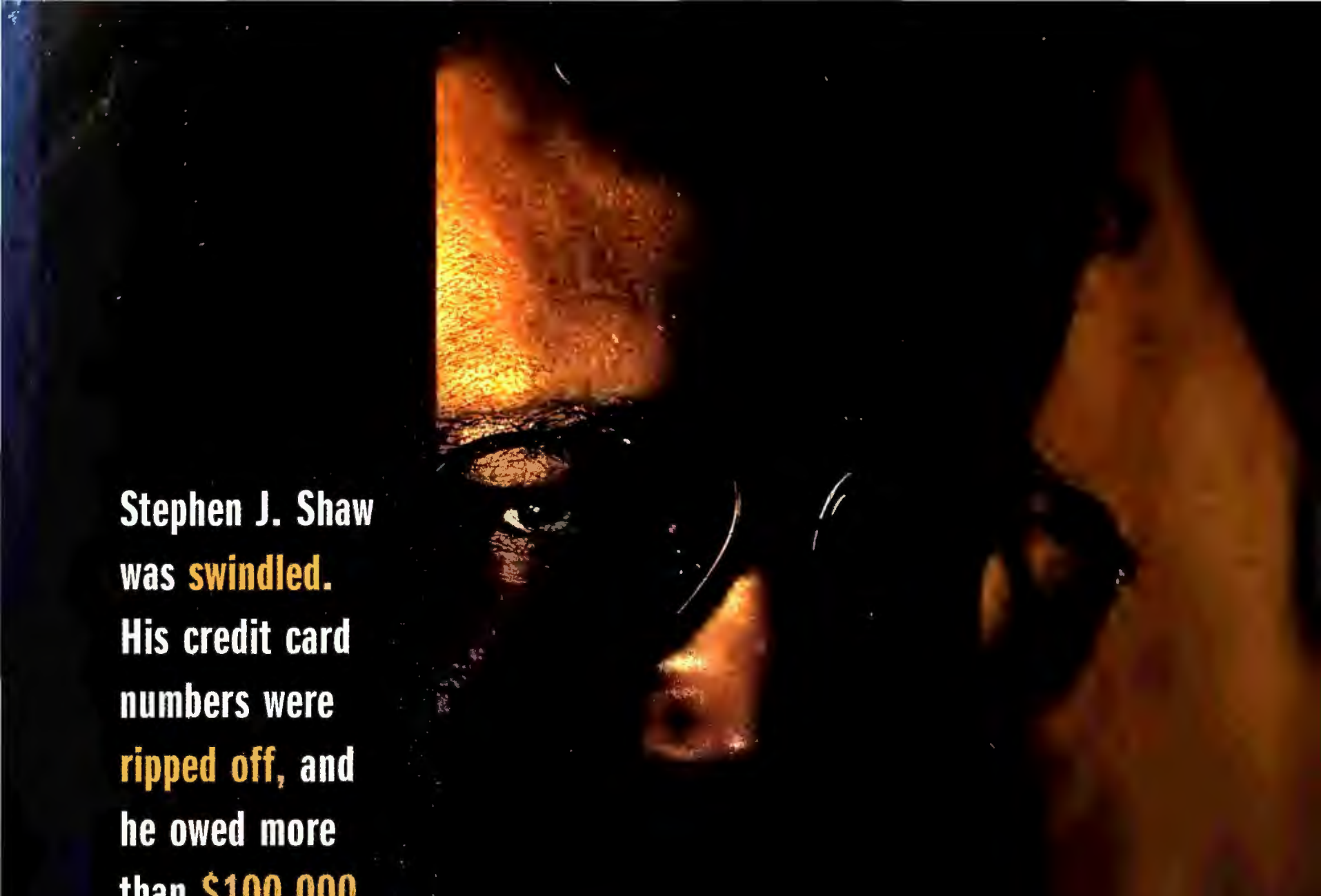


Stephen J. Shaw was swindled. His credit card numbers were ripped off, and he owed more than $100,000 to companies he'd never heard of. Privacy in the digital age? It barely exists.

INVASIONS

MANUELLO PAGANELLI

By Jeffrey Rothfeder

Three years ago Stephen J. Shaw found out what's in a name—and he's still paying dearly for the lesson. His ordeal began when Steven M. Shaw, who sold used cars in Orlando, Florida, tapped into a computer at the auto dealership where he worked to look up credit files on his namesakes around the country. Rifling through dozens of electronic reports, Shaw browsed for clean records—files on people with lots of credit available and no delinquent accounts. His plan was to pose as these people with pristine credit histories.

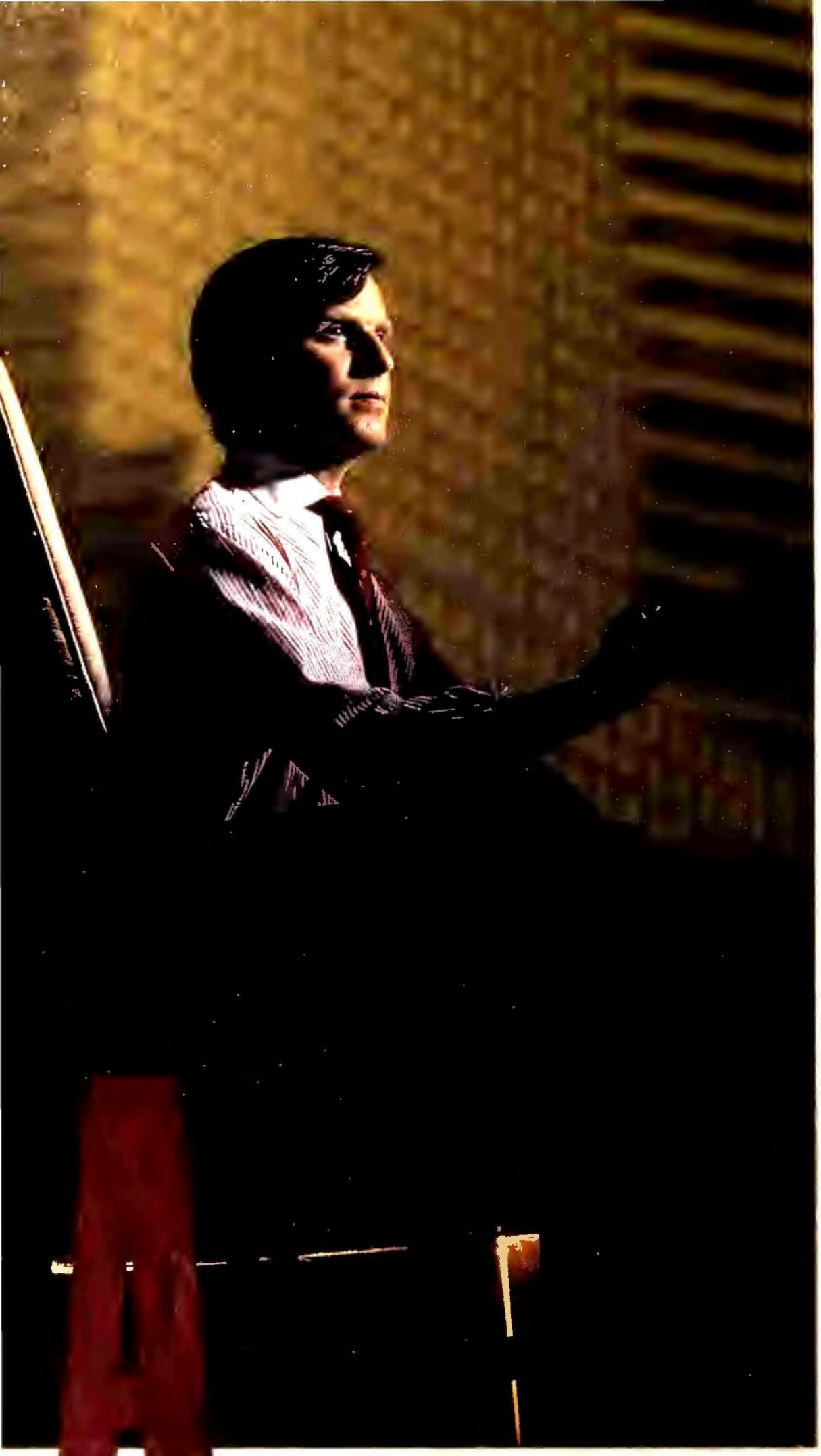
He obtained duplicates of his victims' credit cards, opened up accounts at retailers, and even took out car loans in these names—debts he never intended to repay. Then Shaw ran the credit checks again to make sure he wasn't pushing the capacity of his host accounts too far.

Because Stephen J. Shaw, now a 40-year-old Washington, D.C.–based freelance writer, paid his bills on time and wasn't overextended financially, he became one of Steven M.'s victims. Unfortunately, by the time Stephen J. learned he was being robbed—thanks to an eagle-eyed loan processor at a credit union—his address had been changed to Florida (where he'd never lived), and he owed more than $100,000 to companies he'd never heard of.

Eventually, Steven M. was convicted of bank and credit fraud and sentenced to 37 months in federal prison. Stephen J., in the meantime, has spent the last few years restitching his tattered financial files and publicizing his plight at congressional hearings and on talk shows such as *Geraldo,* hoping to warn others before it happens to them.

Shaw has become something of a poster child for victims of data shakedowns, but his case is far from unique. What he's going through illustrates a dispiriting truth about privacy in the information age: It barely exists.

OF PRIVACY



"Almost any transaction you enter into leaves some kind of trace."

—Joel Reidenberg, *associate professor at Fordham University law school*

What They Know

As more and more confidential records are posted on far-flung computer networks—and accessible to everyone from home computer owners to real estate agents, insurance brokers, employers, private investigators, car salespeople, and marketers—no data is safe from prying eyes. Medical files, financial and personnel records, Social Security numbers, and telephone call histories—as well as information about our lifestyle preferences, where we shop, and even what car we drive—are available quickly and cheaply.

Even worse, it's easy for errors to creep into databases, and it's extremely difficult to get them removed. The Federal Trade Commission receives more complaints about inaccuracies in credit reports than any other consumer issue. The problem is simple. For data collectors, there's no profit in satisfying the public's demand for accuracy, just in selling information. Which leaves consumers in a difficult spot: Information providers have no incentive to protect data—whether accurate or erroneous—from landing in the wrong hands, and individuals have little recourse if it does.

Not all the prying eyes belong to crooks like Steven M. Shaw, though. A lot of legitimate business gets done at the expense of your privacy.

Numerous marketing companies compile lists of Americans based on their tastes, purchasing choices, and financial condition, as well as on their age and physical characteristics. These companies can buy motor vehicle records from the states to get your address, your date of birth, your height and weight, and the type of car you drive. They can get change-of-address information from the U.S. Postal Service to determine who just moved and might be interested in furniture, carpets, and home equity loans. From credit bureaus, they can buy names of deadbeats (perfect for bankruptcy pitches). Supermarkets tell marketers what customers are buying based on information scanned in at the checkout counter. And with Caller ID systems, marketers can grab phone numbers of people who dial 800 and 900 numbers to identify who's in the market for a vacuum cleaner, an astrology magazine, or even pornography.

"Almost any transaction you enter into leaves some kind of trace," says Joel Rei-

LEFT, CHRISS WADE; RIGHT, MANUELLO PAGANELLI

denberg, an associate professor at Fordham University School of Law in Manhattan. This is true even if a person takes pains to cover their tracks. According to an investigation by the *Providence Journal Bulletin* in Rhode Island, for example, more than 50,000 telephone customers who paid to block their phone numbers from being read by Caller ID systems never got that protection. This came to light only when a woman staying at The Shelter, a hideout for battered women in Alabama, dialed a friend in New England. She was stunned when her friend mentioned that he could see her phone number on his Caller ID machine.

The New Big Brother

In many ways, each communications breakthrough is yet another powerful weapon that lets marketers read more clearly the behavior and likes of the U.S. consumer. Take the way that online services can make money from the intimate details they accumulate on their customers' personal tastes. According to an ad in *DM News*, a direct-marketing trade newspaper, CompuServe rents names of subscribers grouped by the operating systems they use and by "interest categories" representing their online activities. Marketers can target individuals interested in "stocks, graphics, games, hobbies, programming, publishing, multimedia, health and fitness—you name it," the ad states.

America Online offers a series of similar lists, while Prodigy will post ads to personal mailboxes based on a subscriber's interests and demographic profile.

Earlier this year, this activity caught the attention of Rep. Edward Markey (D-Mass.), chair of the House Subcommittee on Telecommunications and Finance. Markey has asked the online services to explain their policies to him and has threatened to introduce a bill protecting the privacy of online users. "Comprehensive privacy protections must become part of the electronic ethics of companies doing business on the information superhighway," says Markey.

Markey's intentions are good, but his colleagues aren't listening. "Privacy doesn't have any major organization with teams of lobbyists backing it," says Evan Hendricks, editor and publisher of *Privacy Times*, a newsletter based in Washington, D.C. On the other hand, plenty of special interests are lobbying against privacy legislation. Law enforcement and intelligence authorities, for instance, are set on ensuring that their ability to monitor computerized communications, as well as to tap phones, isn't limited. That position got a big boost last April with the bombing of the Alfred P. Murrah federal building in Oklahoma City. Following the arrest of alleged terrorist Timothy McVeigh, President Clinton submitted a bill to Congress that would, among other things, make it easier for federal authorities to check credit, hotel, and travel records and to use electronic surveillance and wiretaps more freely.

"Privacy doesn't have any major organization with teams of lobbyists backing it."
—Evan Hendricks, *editor and publisher of* Privacy Times

Credit bureaus and direct marketers warn that the economy will suffer if their ability to resell confidential data about consumers is constrained. As they see it, collecting and selling information has made possible instant mortgages, car loans, and credit at retail outlets. In addition, they say, hundreds of thousands of jobs are tied directly to the scramble to gather information about people and then market goods to them.

Given the prevailing sentiment, it's unlikely that the current Congress will pass any far-reaching privacy laws. But lawmakers have never had much appetite for protecting privacy. There's no federal legisla-

Espionage, Corporate Style

For Ivy James Lay, stealing 60,000 calling card numbers from an MCI switching station in North Carolina was about as easy as reading a ticker tape.

The former MCI maintenance worker used a small computerlike device to monitor calls as they surged through routing equipment and retrieve numbers that long-distance customers had typed on their telephone keypads. Then Lay—also known by his hacker sobriquet, Knight Shadow—browsed this data, isolated credit card numbers and PINs, and sold them. His customers used the numbers to play games and chat via computer. In all, MCI, AT&T, and four other phone companies lost upwards of $50 million, authorities say.

Lay, who was arrested in September 1994, pleaded guilty to credit card fraud and awaits sentencing.

Lay's case is unusual for one reason: He was caught. Although theft of information from corporate computer and telecommunications systems continues to soar, few of the criminals are ever apprehended—mostly because the victimized companies would rather not publicize to shareholders, customers, and would-be thieves that they are vulnerable. Still, keeping mum doesn't hide a disturbing fact of life in the corporate U.S.: Protecting sensitive data and safeguarding networks are low priorities.

Safety Is an Illusion

"Security is a pipe dream that people ignore, somehow believing the computer is safe just because they wish it to be," says Noel Matchett, president of Information Security, consultants in Silver Spring, Maryland.

That is precisely the wrong attitude. An Ernst and Young survey of 1271 companies found that more than half had experienced computer-related break-ins during the past two years; 17 respondents had losses in excess of $1 million. And with more and more firms using the Internet, the Computer Emergency Response Team at Carnegie Mellon University reported nearly 4000 hacking incidents last year, almost three times as many as the year before.

According to a former computer security chief at the National Security Agency, a Federal Bureau of Investigation report details 400 open cases of computer-related espionage against U.S. businesses by foreign countries.

Almost every important piece of data is up for grabs because it's stored on unprotected computer systems or sent without security over vulnerable communications links. Among the items most frequently stolen: unpublished financial statements; details of competitive contracts; sales and marketing schemes; personnel files; expansion plans; and information about upcoming mergers and acquisitions.

Ironically, the sheer scope of information that can be cherry-picked probably frightens companies into avoiding the subject of computer security altogether. But some easy and relatively inexpensive technology safeguards could measurably curtail high-tech crime.

The Digital Vigilante

For starters, there's password protection. Unfortunately, it's often used incorrectly, providing a false sense of security. In most cases, employees pick their passwords, and what they choose is easy to remember—a Social Security number, a child's name, a birthday.

To counteract this, experts recommend requiring employees to use passphrases when possible, such as "A rolling stone gathers no moss." They're simple to remember but virtually impossible to crack. To make passphrases even more cryptic, vary capital and lowercase letters—for instance, "A rolling stone GATHERS NO moss." Better yet, combine this tactic with safety mechanisms that shut out a user after two or three failed attempts.

If the information on your network isn't too sensitive and you aren't hooked into a widely distributed corporate information system, passphrase protection is probably enough.

Smart cards are another way to thwart unauthorized users. These credit card–size devices have a microchip that generates random numbers every 60 seconds in sync with a device attached to each entry point on the network. To access the computer system, people enter a password and the number that appears on the smart card.

Big Brother?

Of course, a smart card can be stolen. That's where a whole new field comes in: biometrics. Biometric devices read thumbprints, retinal patterns, and facial capillary makeup to determine if they match the profile of the user whose password or passphrase was entered.

All these solutions go a long way toward making the desktop secure, but many computer hackers get into a network at any of its other numerous entry points. As was the case with Lay at MCI, high-tech thieves commonly find a vulnerable site in a network and then use the system's own language to con it into believing that they're an authorized user.

To guard against such incidents, you can install a fire wall at each critical network juncture. This combination of hardware and software acts as a gatekeeper between the network and the outside world, letting in only what it's programmed to. A fire wall can be set up to request a series of passphrases before allowing access, permit only computers with specific embedded chips to link up, or let

PHOTO: MANUELLO PAGANELLI; ILLUSTRATION: JEFF BERLIN

e-mail messages in but no information out.

Because fire walls aren't foolproof, all data on a network should be encrypted as it travels from one desktop to another. Had MCI taken this step, the information that Lay downloaded would have been unreadable.

The best procedure for encoding data, according to most security experts, is public-key encryption. Simply put, with this approach the message and a secret key—both scrambled—are sent from one person to another. The receiver's system sifts through the jumbled text to locate and decipher the secret key. The user can then unlock the encryption scheme to read the rest of the message. The secret key changes each time it's used, so it's a dynamic safeguard that's tough for hackers to decrypt.

Even with all these high-tech protections, though, the human face of the issue remains. As many as 80 percent of corporate computer crimes are inside jobs, committed by disillusioned or malicious employees. For that reason, corporations need well-publicized awareness programs to show dishonest employees that management is watching and convince the honest that the company and their jobs are threatened by security lapses. "You have to treat it as a business issue," says Tim Low, director of information security and asset protection at Cigna Corporation, which has one of the best—and one of the few—security awareness programs in the corporate U.S.

The Philadelphia-based insurance company puts all employees through a training program. They're taught how important it is to pick obscure passwords, how to identify a breach of the computer system, and why they need to notify management of any suspected break-ins.

Companies could go even further and make security pay, experts say. They could, for example, give $100 for finding the planted individual walking around the building without a security badge or give a bonus to employees who change their passwords monthly.

Safe and Secure: Where to Get Help

For additional information on computer security, contact the following companies and organizations.

American Society for Industrial Security
Trade group representing security chiefs and experts at major corporations.
703/522-5800

Computer Security Institute
Research group that compiles data and publishes information relating to computer security.
415/905-2626

Fischer International Systems Corp.
Computer and data security consultants; provider of fire walls, smart cards, and encryption devices.
813/643-1500

Information Security Inc.
Computer and data security consultants; manufacturer of smart cards.
301/565-8168

Information Systems Security Association
Trade group representing computer and data security executives.
708/699-6441

National Computer Security Association
Industry group representing computer security product makers and consultants.
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RSA Data Security, Inc.
Developer and seller of encryption software.
415/595-8782

Security Dynamics
Manufacturer and marketer of smart cards.
617/547-7820

tion safeguarding medical, telephone, employment, insurance, and bank records, for instance, and the two main privacy laws on the books—the Fair Credit Reporting Act (1970) and the Privacy Act of 1974—are toothless vestiges of the precomputer age.

Even the most secure government records aren't necessarily safe anymore—as some 60,000 users of Intuit's MacInTax tax preparation software found out this year. Intuit disclosed in March that a programming instruction that should have been deleted from the final code provided a way for Mac users to access others' electronically filed returns. "It's possible that anyone could have looked at someone's data or perhaps deleted a file," admits Mark Goines, vice president for Intuit's personal tax group.

The Internal Revenue Service refuses to discuss the incident, claiming it can't vouch for the quality-control procedures used by the companies involved in the IRS's electronic filing program—a remarkable concession, considering that the confidentiality of tax returns is stringently protected by the Privacy Act of 1974 and the IRS code.

Confirming Our Worst Fears

The IRS's response becomes less surprising, though, in light of the agency's own information scandal last year, which "confirmed the worst fears about government mismanagement of data concerning private citizens," says Sen. David Pryor (D-Ark.).

In the midst of a $23 billion IRS computer-modernization campaign aimed at giving employees online access to taxpayer information, hundreds of IRS staffers were caught browsing the tax records of friends, neighbors, relatives, and celebrities, as well as altering files to create false returns.

"Privacy is not a primary concern of the IRS," says David Burnham, author of *A Law Unto Itself*, a book about the agency. "They simply don't put the money into it."

The same could be said of virtually every outfit that peddles information. Dozens of organizations—legitimate data companies such as credit bureaus, direct marketers, and online services, along with reckless information sellers offering tantalizing peeks at all kinds of sensitive material—are at the heart of the multibillion-dollar data-gathering industry. And the big profits come from selling the same information again and again,

even if it means unfairly upending someone's reputation.

Ernest Trent and dozens of other oil workers in the Southwest know this all too well. Their nemesis: Employers Information Service, which has upwards of a million files on people whose only black mark is that they had applied for workers' compensation. EIS subscribers—companies in the accident-prone oil, gas, and construction industries—tap the Gretna, Louisiana, information provider's database when considering a worker for a job.

Filing for workers' compensation is a right, not a crime. But if EIS has a record on a job applicant, it's likely they won't get the job, firms like Hercules Offshore and King Fisher Marine Service admitted in interviews and court depositions a few years ago.

That attitude is no surprise to Trent, who, after 15 years of supplying offshore rigs for Pennzoil, injured his arm permanently during a storm. Soon after going on workers' comp, the Bossier City, Louisiana, father of nine began looking for less-strenuous work. He applied for 200 jobs and was turned down for all of them, despite a spotless résumé. "I'm blacklisted by EIS," says Trent.

EIS admits that its data has a hand in Trent's problem but contends that its purpose is to provide objective information, not make it impossible for workers' compensation claimants to find work.

That may be so, privacy and labor advocates counter, but computerized data often tends to be viewed as implicitly accurate and conclusive, not as just another set of facts among many to consider when making a judgment about somebody.

"With so much private information available about people these days—information that most of us don't have the right to know—we've become a data-driven society and not a values-driven one," says David W. Foerster Jr., executive director of The Resource Center, an Atlanta-based employment counseling firm. "It doesn't matter anymore what people really are—how they live their lives day to day—but what some computer says about them."

A Personal Investigation

The United States is full of computer banks stuffed with the dirty details of our personal affairs, but how easy is it for others to access this information? Armed with a phone, a PC, and a credit card, I set out to stalk myself.

And what did I find? Information that I'd like to think is private—including my Social Security number, address, telephone number, driving record, and criminal history.

The key to the netherworld of information is the Social Security number. With one little white lie (I posed as Wally Jones, a San Francisco property manager), I was able to obtain my SSN by purchasing a credit header from a credit clearinghouse. (Wally Jones had a "legitimate business need" for Richard Overton's credit information under the 1970 Fair Credit Reporting Act.) The cost? Chicago-based Trans Union Corporation, one of the big three credit reporting agencies, was ready to sell Wally the information for a mere $1.80. The header listed my SSN, my date of birth, and some of my previous addresses—five of the dozen or so apartments I had lived in during college.

Next I went online to find my driving record for the time I lived in Illinois. Source Resources of Cookville, Tennessee, maintains a dial-up service called Casebreakers, described as a resource for "business, legal, and investigative professionals." Access is free, but users are charged for documents. I couldn't recall leading any chase scenes through the cornfields, and sure enough, my record came up clean on the Casebreakers report.

At the ripe young age of 27, I have a rather dull paper trail. I was never arrested as a youth in Idaho, although I admit to some petty mischief. (Even if I had been arrested, Idaho's privacy law prohibits the release of such information without a signed waiver—one of the rare respites from public scrutiny.) I've never married or divorced, filed bankruptcy, or been convicted of a felony—and they still don't issue professional licenses for computer journalists.

If your past is juicier than mine, a trip to Hi-Tec Info Resources (http://www.mountain.net/hp/marcom/hitec.htm) could be a real eye-opener. Hi-Tec will research items like criminal history, prior employers, and educational background for $17 to $85. But even if your past wouldn't raise an eyebrow, it's worth remembering how easy it is for someone to get the dirt on you.

—Richard Overton

Medical Records for Sale

Perhaps the most damaging invasion of privacy brought on by the data bank explosion is the increasingly easy access people have to medical records. Such data is as enticing to a would-be snoop as "a swimming pool or an abandoned refrigerator is to a child," states the Institute of Medicine, a branch of the National Academy of Sciences, in a recent report. "The more information they hold, the greater the temptation for others to acquire and covertly use the information."

U. S. Rep. Nydia Velazquez is a prominent example. When Velazquez first ran for office in 1992, her hospital records—detailing an attempted suicide the year before—were downloaded and faxed to newspapers and TV stations. Winning the election didn't dull the pain of this invasion of her privacy, says Velazquez. "I had no power to stop it. I felt violated."

So did victims of a scam perpetrated recently by a 13-year-old girl in Jacksonville, Florida. This daughter of a hospital clerk used her mother's computer to access hospital records. Then she culled a list of emergency room patients, authorities say, and called seven people to say they had tested positive for HIV, the virus that causes AIDS. She was charged with taking confidential data from computers and making threats.

These incidents become especially dismaying when you consider the Clinton ad-

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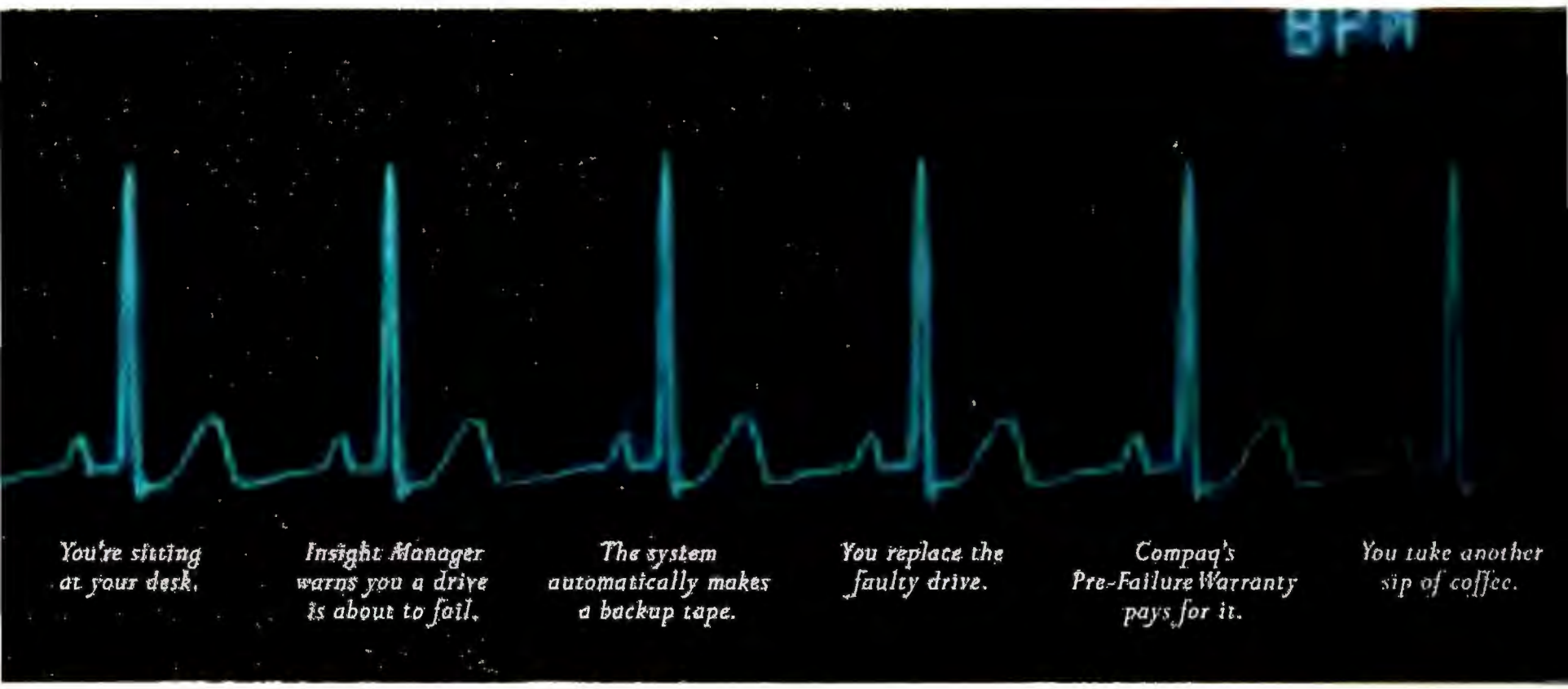
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"It doesn't matter anymore what people really are...but what some computer says about them."

—David W. Foerster Jr., *executive director of The Resource Center*

ministration's 1993 universal health care program, which proposed a national network of patient records. Though the plan is dead for now, the idea of a coast-to-coast data bank isn't. It's still being championed by medical and insurance company lobbyists who support computerized cradle-to-grave health files for every American, ostensibly to improve efficiency. As Carolyn Roberts, former chair of the American Hospital Association, detailed it for Congress, such a data bank would be "an interconnected communications network capable of linking all participants in the U.S. health system."

A smaller version of this network already exists. Run by Medical Information Bureau and funded by nearly 100 insurance companies, the data bank contains files that summarize the health conditions of millions of Americans. Insurers feed into the system whatever they learn from insurance applications, physicians' files, and hospital records. Then MIB staffers enter numeric codes for each condition—there are even codes for what MIB considers habits of unhealthy lifestyles, such as skydiving, poor driving, sexual deviation, and dirty appearance.

This can lead to mistakes that hurt. A freelance writer in upstate New York, who asked that his name not be used, applied for a life insurance policy with New England Life a few years ago. "I got a call the next day from my insurance agent, who was livid," says the writer. "He asked me, 'Why the hell didn't you tell me you were being treated for extreme psychosis?' "

The writer was undergoing no such treatment—MIB got it wrong. Whoever typed his record into the database had tried to

How to Protect Your Privacy

1. Get a copy of your credit report from all three credit bureaus—TRW (800/392-1122), Equifax (800/685-1111), and Trans Union (312/258-1717)—at least once a year. Check for inaccuracies.
2. Don't share personal information with anyone who doesn't have the right to know. Among other things, that means you shouldn't write down your Social Security, credit card, or telephone numbers on checks if it's not appropriate to do so. And don't offer this information to store clerks and unknown telephone marketers.
3. To avoid junk mail and telemarketing calls, write to the Direct Marketing Association, Mail Preference Service, P.O. Box 3861, New York, NY 10163, and request that your name be removed from any junk mail lists.
4. Get an unlisted telephone number, and ask your phone company about how to block Caller ID systems from reading your number. These actions won't guarantee privacy, but they're an extra lock on the door.
5. Be aware that almost every time you call an 800 or 900 number, your name and address are captured by the company you dialed—and this activity becomes part of your electronic profile. Don't call these numbers unless you don't mind others knowing.
6. If you don't want to leave a trail when you move, don't fill out U.S. Postal Service change-of-address forms; instead, personally notify people you know and companies you do business with. The Postal Service sells its change-of-address data to marketers. Of course, you may not get all your mail if you do it this way.
7. Never send personal messages via e-mail and voice-mail systems at work. Both may be monitored by your employer.
8. If you suspect that a government agency may be keeping tabs on you, put in a Freedom of Information Act request with the specific agency that you think may be maintaining information about you in a data bank.
9. Ask your doctor not to share information from your files without your written approval. Limit the scope of blanket medical release forms by writing in that your consent is only for the specific purpose of that form. Obtain a copy of your Medical Information Bureau file by calling the company at 617/426-3660.
10. Ask your bank to notify you in writing when someone requests your records. Examine your automated teller receipts to make sure that the balance is correct and that nobody is tapping your account electronically.

ANN STATES

Drivers' Ed

CHAPTER 1: the speed trap.

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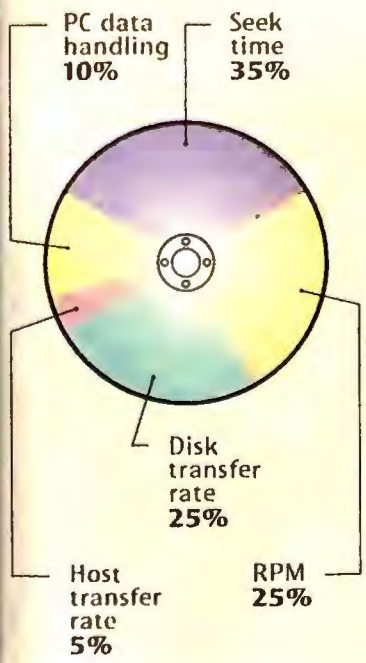

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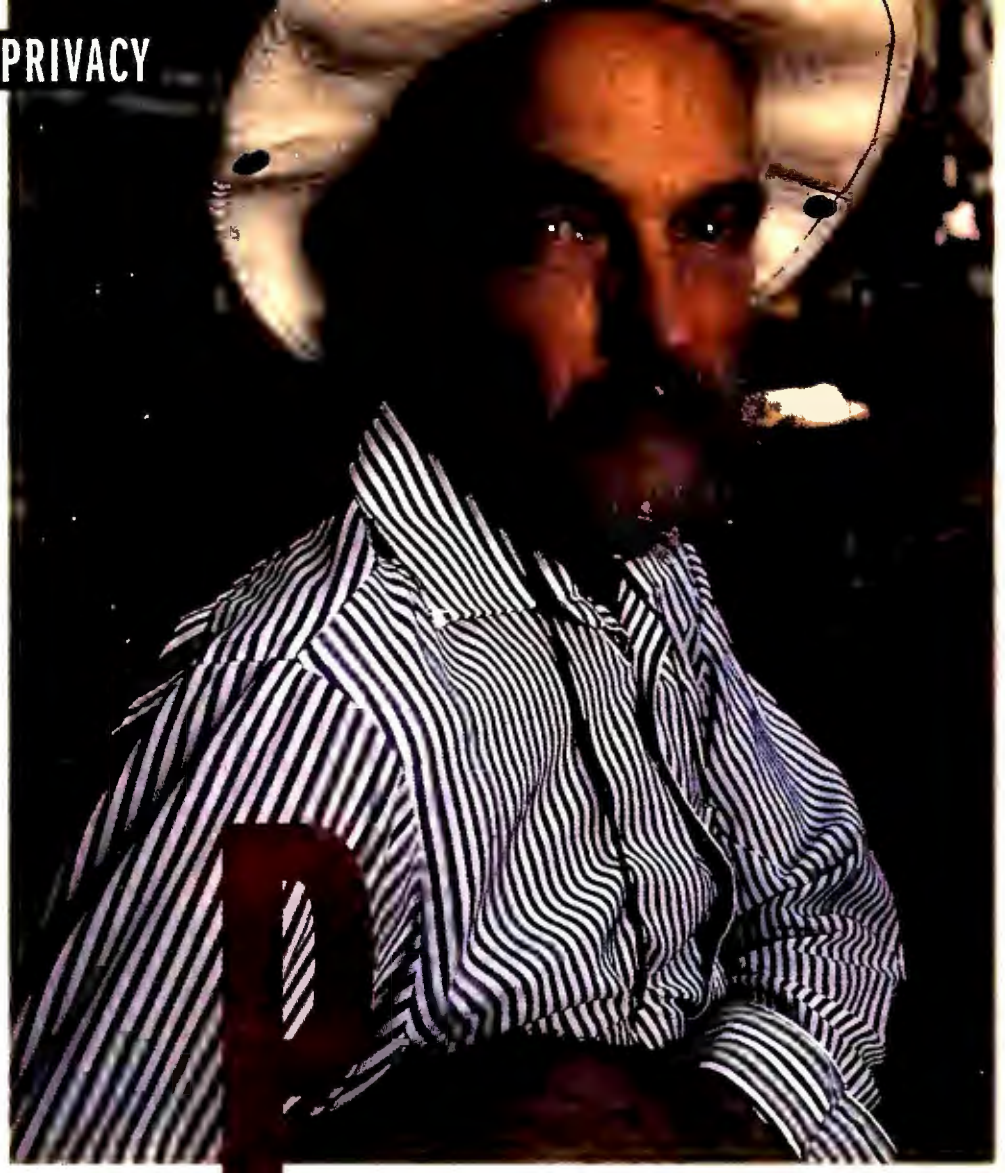

enter the code for mild anxiety—a condition the freelancer once saw a psychiatrist for—but had mistyped one number. It took the writer nearly a year to convince MIB to clear up his file, during which time no insurance company would cover him.

MIB doesn't deny that errors like these happen, but it claims they don't occur often enough to outweigh the pluses the medical data bank provides. "MIB stops fraud by telling an insurer if an applicant is lying or not telling the whole truth about medical conditions," said Neal Day, MIB's president, in an interview last year.

In most cases, insurers will inform applicants that an MIB report contains damaging data. Not so with potential employers who find adverse information during a medical background check on a job applicant. If something disturbing shows up, few applicants are ever informed; they're just told they didn't get the job.

"Most employers view it this way: 'If we don't give a reason, we're less of a target for a legal challenge,' " says Brad Seligman, an attorney for the Impact Fund in Berkeley, California, which handles suits involving background checks and polygraph testing.

No Privacy in the Workplace

It shouldn't be too surprising that employers take advantage of confidential medical data. After all, privacy as a legal concept doesn't exist in the workplace. Because the company owns the place of business, courts have consistently ruled that employers may do—without authorization—what federal and local authorities are permitted to do only with a warrant: bug offices and phones, scan e-mail, and rifle through desks and lockers.

New technology has made snooping on workers easier to do. Video cameras—with pinhole lenses camouflaged in walls or ceilings—are being installed at large and small companies. They're aimed at loading docks, bathrooms, and desks. And electronic mail is increasingly being monitored, either during routine audits or because there are real suspicions that an employee is misbehaving.

"Privacy is not a primary concern of the IRS. They simply don't put money into it."

—David Burnham,
author of A Law Unto Itself

To many employers, what they uncover justifies their snooping. For instance, a few years ago Michael Simmons, former chief of technology for Bank of Boston, was scanning the company's computer files to make sure transactions were in order. When he looked at the electronic-mail network for irregularities, he found a huge one: One employee was using e-mail to distribute odds on dog races and run a bookie operation. "I fired him immediately," Simmons says.

Other workplace communications media are just as likely to be monitored as e-mail. In fact, a lawsuit over voice-mail eavesdropping surfaced recently; it involved a romantic liaison at a 12-outlet McDonald's franchise in upstate New York. Michael Huffcut, a 20-year veteran of the company, claims in the $2 million suit that in 1993, his boss—franchise owner Fred Remillard—and another employee listened to his voice mail and taped the "very personal love messages" he received from Rose Hasset, an assistant manager at a McDonald's restaurant in Binghamton, New York. Remillard played the tapes for Huffcut's wife, the suit charges. Soon after, Huffcut alleges, he confronted Remillard about the incident and was fired.

Remillard's lawyers say there are no laws against supervisors monitoring voice mail, and that the actions he took in this incident were to protect the company against legal actions, such as a sexual harassment suit.

The Byte Cartels

The upshot of all this is impossible to ignore: Information has become a hot commodity. That's why many state and local governments now sell, via computer, any information they have. Buyers can download drivers' files, home ownership records, and police and courthouse activity logs. This information, as confidential as some of it may seem, has always been public and therefore legal to sell. But before it was available through a PC, it was difficult to get—and even harder to get anonymously. In the past, a would-be snoop had to go to separate state and local offices to request the information

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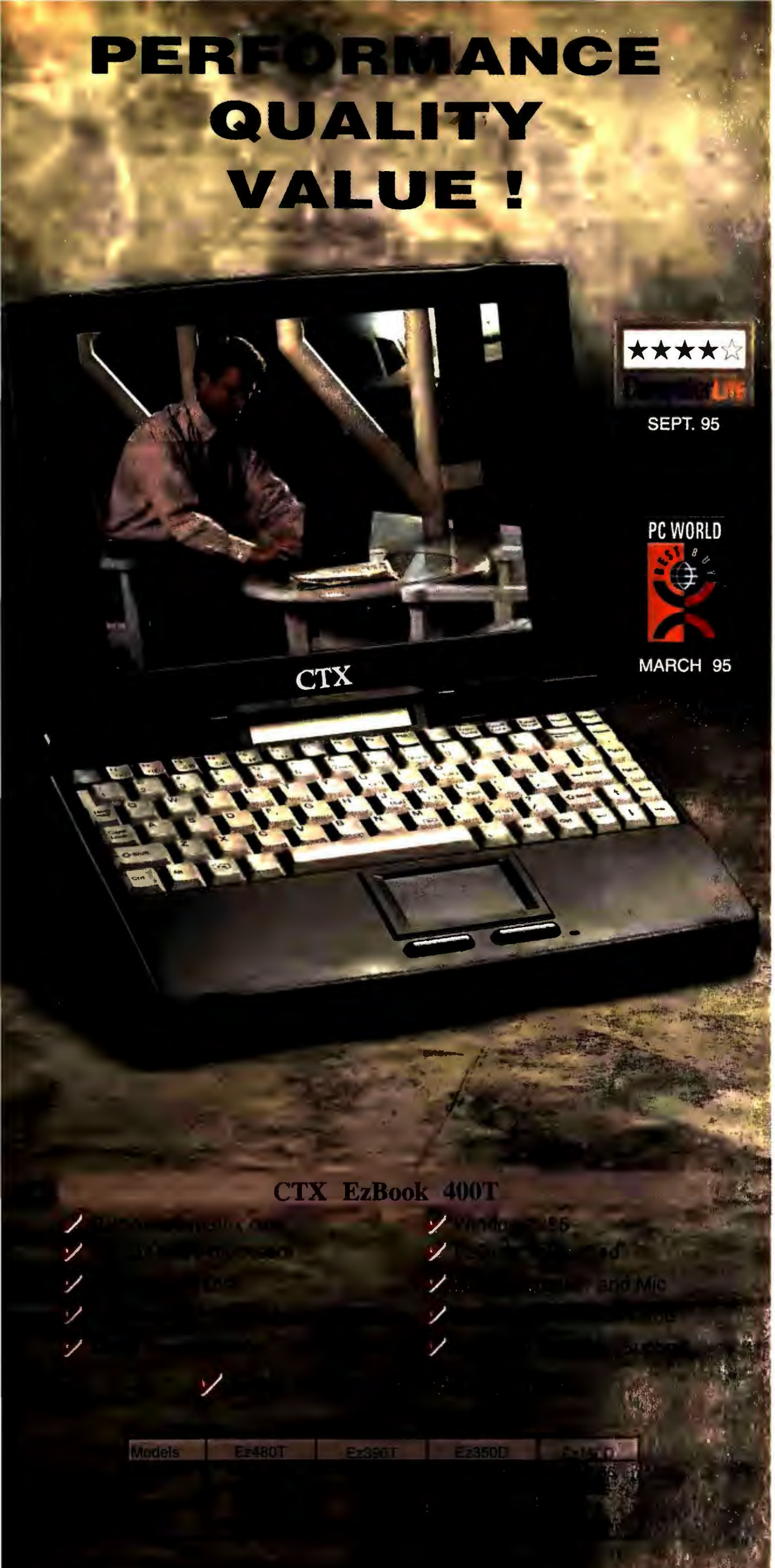

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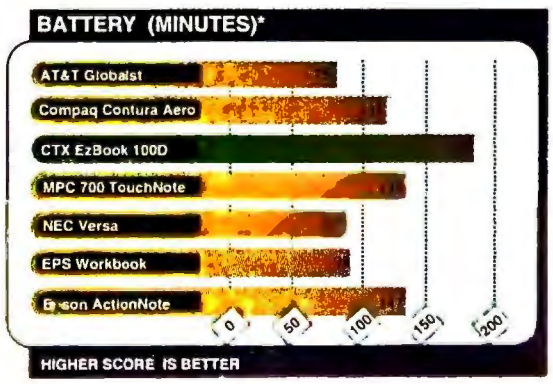

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and then had to fill out numerous forms—leaving an audit trail—before a clerk agreed to pull a file from an overstuffed cabinet.

"If something went awry, like someone was stalked after an address was obtained from a driver's license number, the authorities could more easily find the culprit," says Vincent Brannigan, a professor of fire protection and engineering at the University of Maryland—College Park.

Not anymore. To ensure the widest possible sales for their data and to avoid the difficult business of maintaining computer systems, state and local authorities generally supply this sensitive information through resellers, removing almost all the confidentiality safeguards such data used to carry.

For $10 to $20 a search, companies like CDB/Infotek, National Credit Information Network, and U S Datalink offer an enticing cross-section of information. Virtually undetected, anyone can purchase facts such as how much the neighbors paid for their home, who holds their mortgage, their police records, where their assets are hidden, and who's sued them for nonpayment of bills. You can also buy credit reports, Social Security numbers—even the unlisted phone number of that daredevil who just cut you off on the freeway, if you took down the license plate number.

Among the online services, only CompuServe has dabbled in the profitable business of selling sensitive information online (as opposed to selling information about its subscribers that was gathered online). Among CompuServe's offerings: a database from CACI that details by zip code what kind of credit cards people own, as well as how much they spend each month and what they buy. And another company, CompuTrace, gives the last known address for any living person in the United States. For the deceased, CompuTrace lists Social Security numbers, dates of birth and death, and where their life insurance payout was made.

And if all this freely available data doesn't satisfy the need to know, there is an underground of information resellers—any private eye worth their price knows who these people are—that can pry loose even the most sensitive data. One brochure's offerings: bank account files ($200), credit charges ($150), post office boxes ($100), Social Security earnings ($150), safe-deposit-box contents ($200), phone call logs ($200), and IRS records ($550).

"There is nothing that can't be bought," says Al Schweitzer, a veteran of the information underground who was arrested in 1991 with seven others for obtaining and selling government data from Social Security Administration and FBI computers.

To prove his point, Schweitzer got talk-show host Oprah Winfrey's daily menu from her chef and sold it to a tabloid newspaper. Of course, in this case Oprah could confront the person who invaded her privacy. When a computer is the informant, you have no recourse. Just ask Stephen J. Shaw.

Jeffrey Rothfeder is a freelance writer and author of Privacy for Sale *(Simon & Schuster, 1992, 800/983-5333). Richard Overton is an editorial researcher for* PC World.

Know Your Rights

Several pieces of legislation have made it through the courts, though little of it will do you much good. Here are the laws you should know about.

Fair Credit Reporting Act (1970): Makes it illegal to obtain consumer credit reports unless there is a "permissible business purpose," such as a background check for a credit relationship, a job, or an apartment rental. The act doesn't work, however, because improvements in computer technology have put credit bureau terminals in thousands of sites, including car dealerships, real estate offices, and banks, and information resellers are now selling credit reports via PC, making it easy for people to access credit reports without legitimate reasons—no questions asked. Nobody has ever been prosecuted for illegally obtaining credit reports.

Privacy Act of 1974: Forbids the federal government from maintaining secret data banks and directs it to keep confidential all information collected about U.S. citizens. Under the law, people have the right to know about records that exist pertaining to them and must be told who sees these records and how the information is used. The last full-scale investigation of the act, conducted by the General Accounting Office in 1990, found that it has failed in key ways: For one thing, the public has been kept in the dark about some of the data banks in Washington, D.C. Also, information held in more than half of government computer files is regularly checked without notice by private corporations and educational institutions.

Right to Financial Privacy Act (1978): Prohibits the federal government from examining bank account records without prior consent or a judicial warrant. Curiously, this law may have tightened the reins on federal government while loosening overall safeguards on bank files: Nothing in it restricts state agencies and local law enforcement officials, private employers, investigators, or other individuals from accessing these records.

Electronic Communications Privacy Act of 1986: Passed as an add-on to a 1968 law that forbids telephone wiretapping without a warrant, this legislation prohibits law enforcement authorities or the government from monitoring messages sent via public electronic-mail systems (such as MCI Mail) or online services unless they first obtain a subpoena to do so. These rules, though, don't apply to e-mail systems used by employees at companies; the legislation lets U.S. businesses freely monitor all correspondence on their own e-mail systems and even divulge employees' mail "as may be necessary to protect the rights of the provider of the service."

Video Privacy Protection Act of 1988: Bans retailers from disclosing video rental records without the customer's consent or a court order. This law was passed after the *City Paper*, a Washington, D.C., weekly, published in 1987 the titles rented by Robert Bork, then a Supreme Court nominee.

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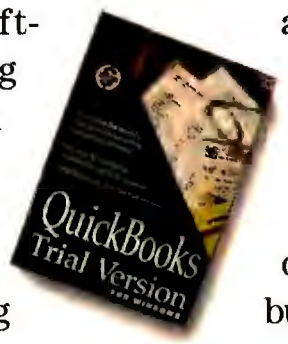

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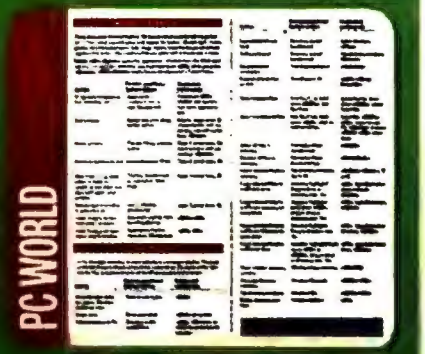

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Simple Questions, Fast Answers

ROBERT NEUBECKER

Q: How many programmers does it take to get information out of your company's database?

A: None. Six Windows query and reporting packages promise to help you get it yourself without any programmers.

By Harry McCracken

Not long ago, if your organization had a gargantuan database of vital information, it probably resided in the impenetrable confines of a far-off mainframe computer. Now, thanks to large hard disks and fast processors, it's just as likely that the information resides on a PC connected to your organization's network, in the form of a Structured Query Language database.

But as you may have discovered, just because SQL databases use PC technology doesn't mean it's easy to get at the information in them. Say you need to determine why sales are soft in New England, or who the top-performing district managers in each region are. A SQL database residing on the network contains all the information you need, but retrieving it may require issuing a request to an overburdened database administrator, who then handcrafts a SQL query to extract the data. By the time a printed report lands in your in-box, your need for it could have long since passed—if you can recall why you requested it in the first place.

The query and reporting tools we evaluate here promise to let you bypass this process, providing a self-service way to turn SQL data into corporate intelligence. They can't do everything a database guru might accomplish with SQL code, but they do let you create basic queries and reports using familiar Windows operations like pointing, clicking, dragging, and dropping—no programming required. And because most of these packages don't include any features for changing or deleting database information, they should allay any fears that your managers or system administrators may have about anyone accidentally damaging irreplaceable data.

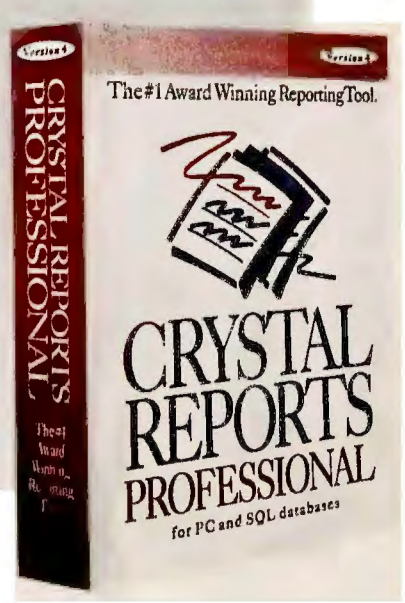
From a wide field of contenders, we chose six products to examine based on their appeal to relatively nontechnical end users: Brio's BrioQuery Explorer 3.1, Crystal's Crystal Reports Professional 4.0, Platinum Technology Software Interfaces Lab's ProReports 1.3.1, Gupta's Quest 3.0, Borland's ReportSmith 2.5 for Windows (SQL Edition), and Concentric Data Systems' R&R Report Writer 6.0. Platinum's Forest & Trees doesn't appear here because it was in the process of being upgraded to version 4.0 at the time of our tests; see *New Products* in the October issue for an early look at the new version. Intersolv Q+E was also in the midst of change; we preview DataDirect Explorer, its successor, in "Q+E Broadens Its Horizons and Changes Its Name."

With the exception of Quest, these packages don't include database engines of their own; rather, they're designed to access information stored in such popular SQL databases as Oracle, Sybase, and Microsoft's SQL Server, as well as dBASE and other PC databases. All support Open Database Connectivity, a standard for database drivers that lets applications access the information in any database that offers an ODBC driver, as all major packages do.

Best Buy

If you're looking for a package that can perform virtually any query and reporting task without requiring any database knowledge, or one that doesn't need to be set up by a SQL expert, you'll be disappointed by the current crop. Assuming you've got some basic database skills, though, Crystal Reports Professional 4.0 makes creating reports easier than any other query/reporting tool we tested. Even its most powerful features, such as report distribution and data dictionary creation, don't require an advanced degree in database administration to use. Other products (notably BrioQuery Explorer and ReportSmith) offer some compelling features of their own, but Crystal Reports Pro's versatility and low price earn it our Best Buy recommendation.

Crystal Reports Professional 4.0



Query and Reporting Basics

Some programs tackle querying and reporting in a unique way—notably BrioQuery Explorer and ProReports—but the basic steps tend to be similar. You construct a query by selecting the relevant database fields and specifying filters that limit your results; for example, you could limit your search to records for transactions of more than $500 that took place in Oregon prior to June 1, 1995. You can also create calculated fields, which use spreadsheetlike functions to perform operations on database fields, such as one that figures out your company's net profit by subtracting total operating costs from gross sales.

Once the program retrieves the data matching your query, it produces a report to hold this information. You can then dress up the report with fonts and graphics, using tools that aren't far removed from those in word processors and desktop publishing applications.

While these packages let you dig into SQL databases without having to be a programmer, they don't let you forget about database concepts altogether. To use any of the products effectively, you need to know enough about databases to perform such tasks as choosing the tables and fields needed for the query and joining fields (matching up fields in multiple tables so they can be treated as a unified database).

Some high-end products not covered here, such as BusinessObjects Inc.'s BusinessObjects and Cognos's Impromptu, shield end users from database complexities by requiring an administrator to replace field names with English phrases, sort data into folders, and the like. The catch is that this requires careful planning by a database expert. Most of the packages here have similar (though sometimes limited) options, but you can work directly with databases if you're comfortable doing so.

Real-World Workout

We limited this review to products that offer a plug-and-play approach to data access—ones that let you explore the information in your company's SQL databases with minimal assistance. (We also wanted packages that were simple to set up, and we were pleased to find that they all installed smoothly.) Some of them—notably Crystal Reports Pro, R&R Report Writer, and ReportSmith—include features for developers, such as the ability to incorporate reporting features into Visual Basic programs, but we concentrated on their tools for less technically minded end users.

To test the packages, we turned to the *PC World* service-and-reliability database, an 800MB Microsoft SQL Server file that contains facts from thousands of readers' responses to our surveys on PC vendors' reliability, service, and support. A 90-MHz Pentium system from Micron with 32MB of RAM, using Windows NT 3.5 and Microsoft SQL Server 4.2, was our database server. We used an Austin Pentium-75 PC from IPC Technologies with 16MB of RAM, running Windows for Workgroups 3.11, as the LAN client on which we created queries and reports. (We used Windows 3.1 versions of these packages, but all the vendors intend to ship Windows 95 editions by early 1996, except for Concentric Data Systems, whose plans for R&R Report Writer are still in flux.)

Room for Improvement

In our tests, we created a series of on-screen and printed reports containing information such as the percentage of customers who would buy again from their PC vendor, the average time callers spend on hold waiting for tech support, and the like. As long as our goals were fairly modest, almost all the packages let us get our work done quickly. But as the queries got more complex, all of these programs became less and less intuitive. Constructing queries that required sophisticated operations such as comparing data from multiple rows in the same database column usually involved piecing together formulas, delving into macro programming, and performing other time-consuming and challenging tasks.

Considering that it's likely you'll need expert help with these packages, it's disappointing how skimpy most of their technical support plans are. Only ReportSmith and Crystal Reports Pro don't limit the amount of free support you're entitled to. You get 60 days of free support with R&R Report Writer, and only 30 days with the other products. Brio has a toll-free support line for BrioQuery Explorer, but the other vendors make you pay for the phone call.

The Best of All Worlds

The ideal query and reporting tool would combine aspects of *all* the programs we reviewed. We'd love to blend Crystal Reports Pro's on-screen assistance with BrioQuery's tools for working with multidimensional data and ReportSmith's single-screen reporting capabilities, then add R&R Report Writer's Wizards for creating basic reports and mailing labels. We'd stir in ProReports' skills at working with multiple databases and Quest's spreadsheetlike data view, then we'd top it off with the natural-language querying offered by English Wizard, an add-on that lets you pose database queries in plain English (see "Teach Your Database English").

Barring a corporate merger of unprecedented proportions, you probably won't be able to buy that particular tool anytime soon. In the meantime, our Best Buy is Crystal Reports Professional 4.0, which provides helpful features that let us get our query and reporting work done with the fewest hassles. Borland's ReportSmith 2.5 and Brio's BrioQuery Explorer 3.1 don't quite merit Best Buy recommendations, but they're also among the least intimidating tools that let you enter the SQL jungle on your own—and come back with just the information you need.

Harry McCracken is a senior associate editor for PC World. *Tests were developed by Celeste Robinson,* PC World *contributing editor and* Data Management *columnist.*

BrioQuery Explorer 3.1

PROS: Highly visual metaphor, strong tools for complex multidimensional data, report formatting window uses live data

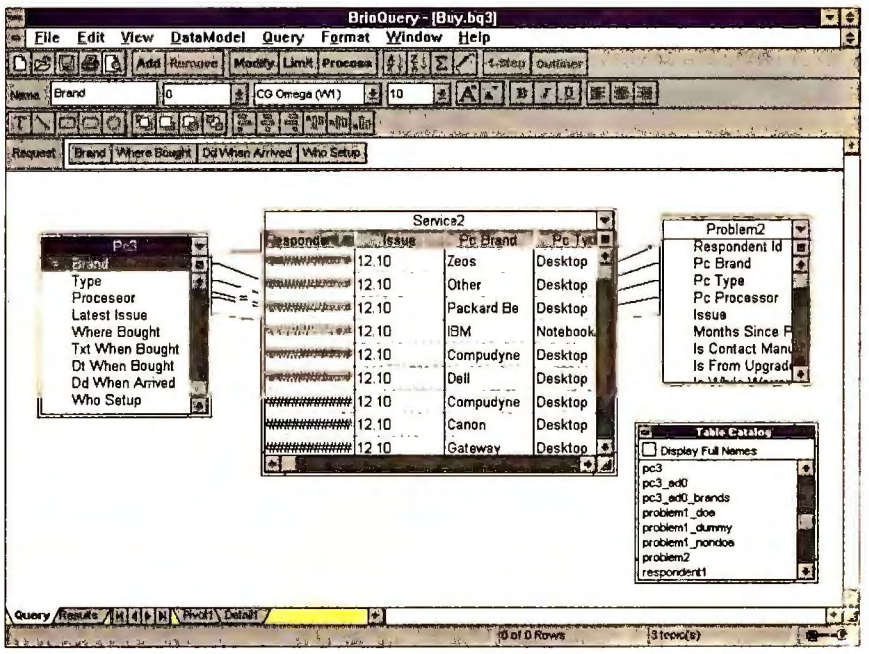
CONS: No automated assistants, no charting, lacks large built-in function library, can't distribute reports to non-BrioQuery users, documentation sometimes lacks detail

In a field full of products with similar approaches to querying and reporting, Brio's BrioQuery Explorer 3.1 is a true original. Crystal Reports Pro and ReportSmith make it easier to get up to speed quickly if you're a novice, but BrioQuery's elegant interface may provide the clearest indication of where query and reporting programs are headed.

Most notably, this program embraces drag-and-drop design with a vengeance, giving you the freedom to build, refine, and change queries and reports without burrowing through layers of dialog boxes. To create a query, you drag tables out of the Table Catalog, establish links between fields in multiple tables by drawing connectors between them, then grab the fields you need for your report and move them onto the Request line. The program's facility for creating calculated columns is less polished: It doesn't come with a large library of built-in functions, so you must rely on whatever standard functions are provided by the database you use.

The program provides uncommonly flexible tools for manipulating the data in a query, and in every view you work with your actual data rather than placeholders. You can inspect results in a familiar spreadsheet-type view, or as a table that lets you perform multidimensional data analysis by simply grabbing hold of a label and moving the entire table into a new layout. Even after you've added color, borders, and other visual trimmings to your report, you can continue to try different layouts by shuffling elements around in a small window that shows the report in outline form.

Unlike products that retrieve data from the database only when they need to display or print it, BrioQuery grabs all your results the moment you issue a query. This process can leave you twiddling



BRIOQUERY EXPLORER'S UNIQUE VISUAL INTERFACE lets you shape complex queries by simply dragging and dropping.

A Query/Reporting Tool or a Database Program?

PC database programs such as Access, Approach, and Paradox now include the ability to query and report on data, much as the packages evaluated here do. Typically, you can work with dBASE-format files and data in various kinds of networked SQL databases in pretty much the same way you use files in the program's own data format. And you can often get these full-fledged databases at dirt-cheap prices.

So how do you know if you should even bother with one of the query and reporting tools covered in this review? For one thing, you may find that the administrator who tends your company's SQL database will approve of these products precisely because they're usually designed to view data but not change it—so there's no chance of anyone accidentally erasing last year's sales figures while creating a report.

Query and reporting programs often provide more reporting options than database managers do, and they simplify common tasks like generating cross-tab tables. (After all, reporting is their specialty.) You also won't need to wade through all the options you'll find in a complete database program to find the tools you need to create reports.

Sometimes, though, a query/reporting tool won't provide enough functionality. If you need to create or edit data files, you'll probably want to go with a database program (or one of the few query/reporting packages that can change data, such as Quest). Even if you don't plan any major changes, you may find that data needs to be cleaned up before you can get useful reports out of it. For example, if your report totals sales by state, and records are entered with both 'CA' and 'Ca' for California, you'll probably get two totals for the Golden State.

Finally, if you want to create a push-button reporting system for yourself or others to use, you're more apt to find the tools you need in a database program. Most query/reporting packages offer little in the way of automation tools, if they offer any at all.

—Celeste Robinson

your thumbs, but it lets you save the results as part of the report file, so you (and others) can work with the data without reconnecting to the database. You can't create forms for browsing through query results, though, and there's no way to distribute your reports to other users as executable files that don't need BrioQuery to run.

As intuitive as BrioQuery's drag-and-drop world is, first-time users could enter it more quickly if it offered more thorough printed documentation and better automated assistance than its terse Advisor window. The program would also benefit from the addition of report templates, predefined report styles, and other ready-made designs for you to quickly plug your own data into.

Even without such hand-holding features—and despite its fairly high $595 price—BrioQuery merits consideration, especially if you're as interested in using its drag-and-drop controls and multiple data views to experiment with on-screen, ad hoc queries as you are in producing standardized printed reports. BrioQuery Explorer 3.5, due out by the time you read this, provides the ability to work with "virtual tables" (which consist of fields from multiple databases); greater color control; and other new features. *Brio Technology Inc., 800/486-2746*

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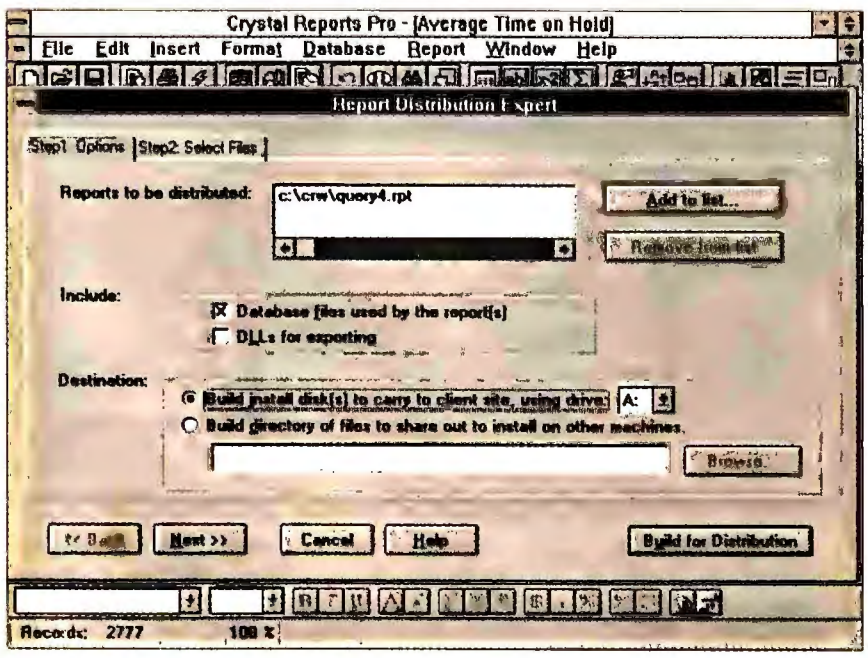

YOU CAN SPEED YOUR WAY THROUGH TOUGH TASKS such as report distribution with Crystal Reports Pro's plentiful Experts.

Crystal Reports Professional 4.0

PROS: Many functions automated, strong built-in charting, features for distributing reports, data dictionaries let you simplify databases for others

CONS: Initial queries can be slow with large data sets, no form designer, documentation could use more beginner-level information

As you use mainstream business applications from companies such as Lotus, Microsoft, and Novell, you may have grown accustomed to the small army of Wizards, Assistants, Advisors, and other step-by-step helpers they provide. Such electronic guidance is much scarcer in query and reporting packages, but the $345 Crystal Reports Professional 4.0 is one program that offers plenty. Combine that with the package's strong collection of features, and you've got a Best Buy.

The program's bevy of friendly Experts offer help with a far greater variety of tasks than do the equivalents in any other product here, ranging from designing an attractive report to creating mailing labels and drill-down, on-screen reports that start with a summary view, then reveal details as you click on desired fields. Tips on dozens of other program capabilities are available through

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Four Rules for Painless Querying and Reporting

1. Know the database.
Designing queries with any of these products will go much faster if you begin with a basic understanding of the database you'll be querying—what its tables and fields represent, the format that data is stored in, and so on. If possible, get this information in printed form to use as a cheat sheet while you work.

2. Save your work.
Creating reports from the ground up takes a lot of effort and planning, but you may find that a particular report you need has a lot in common with one you put together in the past. If you save a personal library of your efforts, you can use an earlier report as a time-saving template for a new one.

3. Limit results.
Executing queries and formatting reports can take a long time when you're accessing large databases. Most of the query and reporting packages in this review let you speed up the process by working with a limited number of records until your report design is picture-perfect.

4. Turn databases into spreadsheets.
Intimidated by SQL databases? Remember, you can use most of these query/reporting packages to extract selected data and export it for use with your spreadsheet. Once it's there, you can use the spreadsheet tools you're already familiar with to modify it.

the Private Tutor feature, which provides a help window that stays visible as you work.

Like BrioQuery, Crystal Reports Pro grabs all the results of a query off the database server at once, which takes time with large queries but lets you save the data as part of your report file. You format reports using both a layout window and a print preview that shows your actual data; it's not as simple as BrioQuery's and ReportSmith's single-screen systems, but at least you can do much of your formatting right in the preview window.

Crystal Reports Pro's industrial-strength features—aimed at developers and other advanced users—aren't unique, but they're far easier to use than their counterparts in other packages. Crystal Reports Pro is the only product here that makes creating stand-alone report files a true no-brainer, thanks to the Report Distribution Expert, which automates the job of turning queries and reports into stand-alone files that you or your coworkers can use to run reports from any PC. You can even e-mail these stand-alone files to others from within the program. Your coworkers can use the files to run reports even if they don't have Crystal Reports Pro. Another advanced tool that's surprisingly easy to use is Crystal Dictionaries, which lets you construct query templates that have prelinked tables, plain-English labels instead of database field names, and appropriate graphics.

The documentation is a mixed bag: There's a lot of it—including separate manuals for end users and developers—but it tends to rush through explanations of technical matters such as constructing formulas, and the tutorials contain a few errors.

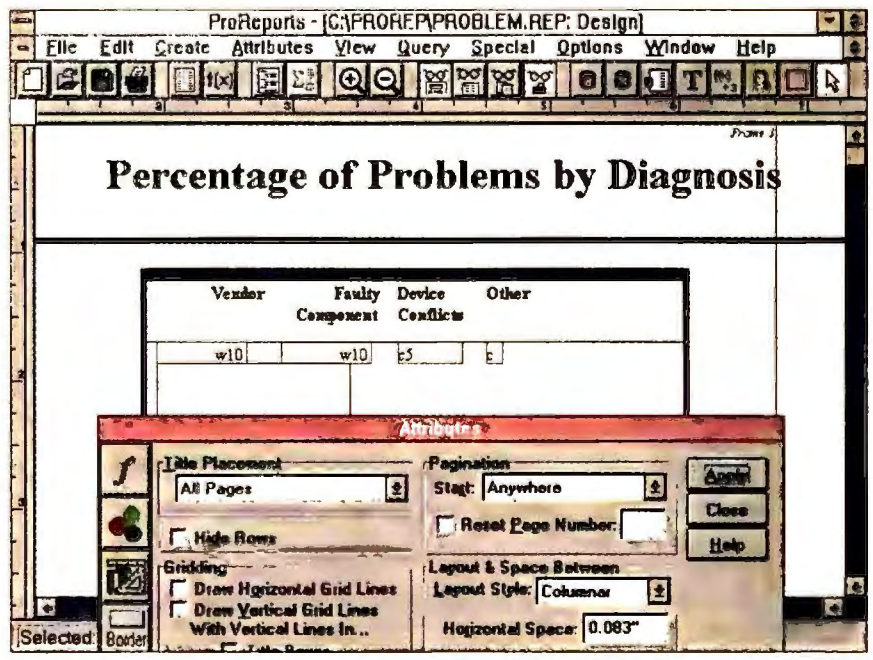
Still, Crystal Reports Professional is powerful, easy to use for most tasks, and reasonably priced, something that can't be said of many packages in this category. While we were evaluating products for this review, Crystal announced Crystal Info, a spin-off of the Crystal Reports product line aimed at letting networked end users share reports using an e-mail–like interface (see *New Products*, October). Also in the works at press time was Crystal Reports Professional 4.5, an upgrade with more charting options, improved compatibility with Access, Notes, and Paradox, and other enhancements. *Crystal, 800/877-2340* **Reader service no. 798**

ProReports 1.3.1

PROS: Reports can contain queries from multiple databases; fast performance with large databases; advanced features such as lookup tables; excellent documentation
CONS: No Wizards, can't substitute aliases for field names or edit in print preview window, no charting or form designer, highest price in roundup

Like BrioQuery Explorer, ProReports strays from the beaten path. The result is a package that's more likely to please if you're a database pro than if you're a relative beginner who needs to crank out simple tables with a minimum of fuss.

With the other packages evaluated here, you begin by creating a database query, then construct a report based on its result. But with ProReports, you start with an empty report layout, then plug query definitions into the areas of the report where you'd like them displayed. These queries can pull information out of different databases and display the results in different formats, so it's relatively simple to produce a report that shows, for example, columns of corporatewide financial figures from a SQL database plus a cross-tab



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of departmental information based on a file on your own hard disk.

You'll need to be a bit of a self-starter to use this package, though, since it doesn't offer Wizard-style assistance and includes only four fairly crude report templates. On the other hand, ProReports' first-rate manual and on-screen help thoroughly explain concepts that other products' documentation tends to gloss over.

You do all your report design in a window that displays placeholders instead of actual data; the only way to see the finished project is to choose the Print Preview command. The program offers a lot of control over the layout of printed reports—it's easy to create one with differing left- and right-hand pages, for instance—but few features for distributing information electronically. (Coworkers need to have either ProReports or an optional $199 viewer program to run the reports you create.)

ProReports includes several features designed to make working with large or cryptic databases easier. For example, you can create lookup tables that display meaningful information in place of the space-efficient codes that many large databases use, so your report can display employee names instead of ID numbers. Because the package retrieves query results a little at a time as it needs them, it handles large reports with less initial waiting than programs such as BrioQuery, which copies the data it needs all at once.

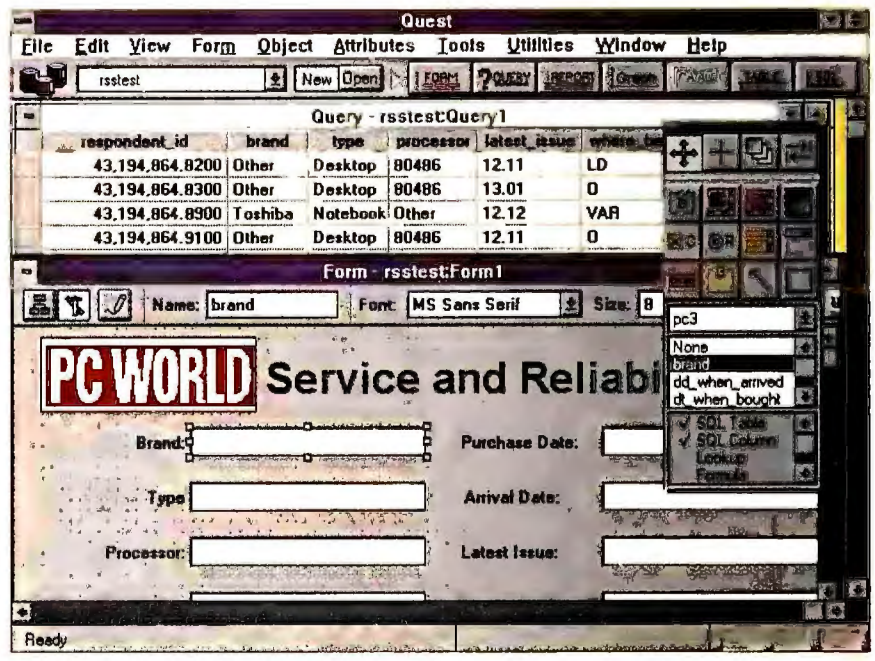
Advanced users will like these power tools, but given the $695 ProReports' emphasis on heavy-duty features and its relative lack of automated assistance, templates, and the like, it's a less appealing choice if you're not already a database maven. At press time the vendor planned to ship version 1.5—an upgrade with faster performance, OLE 2.0 support, and a variety of export options (version 1.3.1 has none)—in October. *Platinum Technology Software Interfaces Lab, 800/742-2237, 713/492-0707* **Reader service no. 799**

Quest 3.0

PROS: Spreadsheetlike view makes it easy to see data; includes SQLBase engine, form creator, and other database-related features

CONS: Interface is sometimes clumsy, limited ability to distribute reports to non-Quest users, charting tool lacks options, no data dictionary

Although you would never mistake most of these query/reporting specialists for full-fledged databases, Gupta's $460 Quest 3.0 could pass for one. It lets you create, modify, and delete data and even comes with a single-user version of Gupta's SQLBase database engine so you can use it as a personal database all by itself.



QUEST'S DATABASE FEATURES include a spreadsheetlike data view and tools for building forms.

Q+E Broadens Its Horizons and Changes Its Name

Along with Crystal Reports and R&R Report Writer, Intersolv Q+E is one of the old-timers of query and reporting software. But that doesn't mean there's no room for improvement. In fact, the newest version has undergone so many changes that Intersolv has given it a new name: DataDirect Explorer.

Judging from a beta version (Intersolv plans to ship the final product by the time you read this), many of the enhancements make the $499 DataDirect Explorer more useful to a broad variety of workers, not just database veterans. Key among the new version's innovations is SmartData, a data dictionary feature that lets an organization's database administrator mix and match fields from multiple tables, give them easy-to-understand names, and perform other setup work so that less experienced employees don't need to worry about database complexities.

DataDirect Explorer

Other packages provide similar features, but SmartData introduces an interesting twist: it's actually an ODBC driver, so it works with an array of databases, query/reporting tools, and other programs that support ODBC. Even if some people who access a database don't use DataDirect Explorer, they still can get SmartData's benefits.

Other data-sharing advances in DataDirect Explorer include the ability to save reports as RTF files and mail them from within the program, so you can distribute information to everyone in your organization without ever printing a page. And reports can now serve as OLE 2.0 containers, so they can include graphics and data created in other OLE-compatible programs, such as Microsoft Word and CorelDraw.

DataDirect Explorer still boasts the unusually broad range of capabilities that made Q+E one of the most feature-rich programs in its class, including charting, a form designer, and a macro language. Like Gupta's Quest, DataDirect Explorer lets you change the information in a database as well as view it—another example of its power, and one that blurs distinctions between it and full-fledged database managers. Intersolv, 800/547-4000. Reader service no. 800

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intel inside pentium

Sure, you might find other portable multimedia machines priced like the new TI Extensa™ 550CD, but they probably won't have Pentium® processors. And if they do, they're not likely to have a built-in CD-ROM. But that's just part of the TI Extensa 550CD's superiority. For better high-speed video and optimal performance for CD-ROM applications, the TI Extensa 550CD uses the same PCI circuitry found in most desktop computers.

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Circle 244 on reader service card

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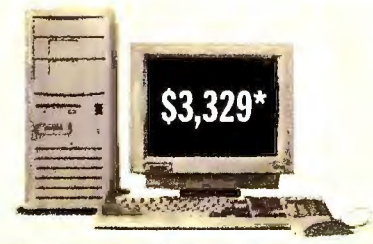

Processor	486DX2/66	Pentium 90MHz	Pentium 133MHz
Processor Upgradable	Yes	Yes	Yes
Std./Max. Memory	8MB/136MB	16MB/192MB	16MB/192MB
Hard Drive	630MB	1GB	1GB
Cache Internal	8KB	16KB	16KB
Cache External	256KB (optional)	256KB	256KB
Local Bus Graphics	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	1MB/2MB
Compaq 150 Color Monitor	Yes	Yes	Yes
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	4	5
Drive Bays (Total)	3	4	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes
Software	Windows 95 or MS-Windows® 3.1	Windows 95 or MS-Windows 3.1	Windows 95 or MS-Windows 3.1
Energy Star Compliant	Yes	Yes	Yes
Warranty†	3-Year	3-Year	3-Year
Price*	$1,699	$2,749	$3,329

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Circle 35 on reader service card

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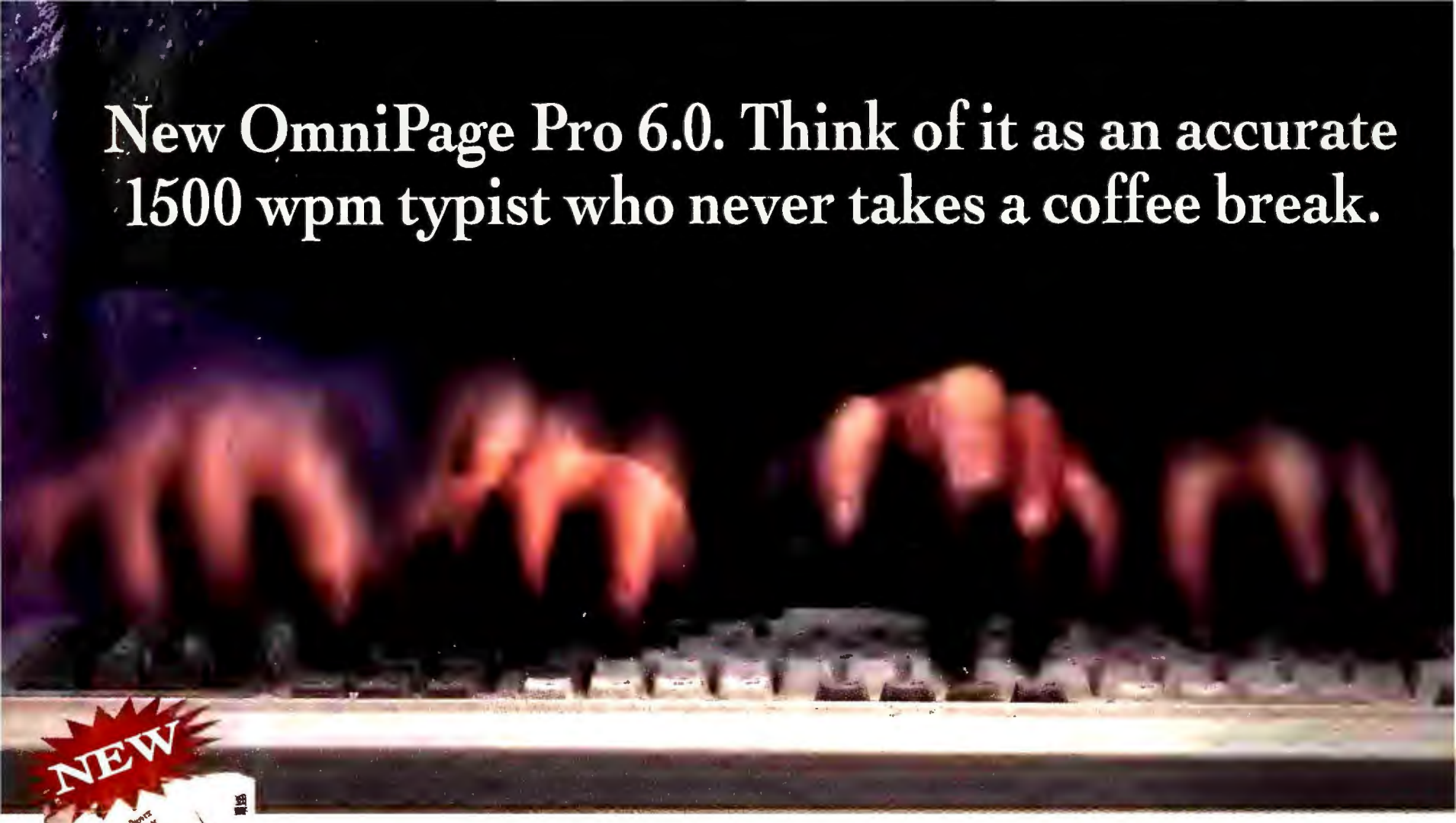

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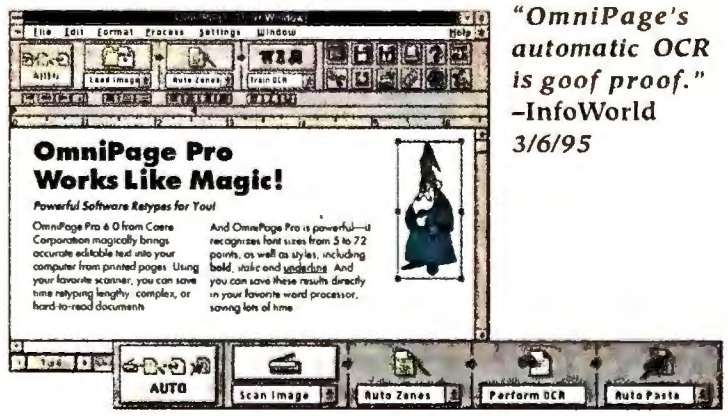
Easy to use. Easy to customize.

Bring text directly into your favorite word processor or simply edit from within OmniPage Pro 6.0. It's fully customizable, so you can tailor OmniPage Pro 6.0 to your individual needs. Or train it to recognize special characters and symbols. You'll save lots of time and thousands of keystrokes. Even complex layouts are no problem, because OmniPage Pro 6.0 excels at handling both text and graphics on the same page. And it features Image Assistant,® an integrated 24-bit color image editor.

So try OmniPage Pro today and stop retyping.



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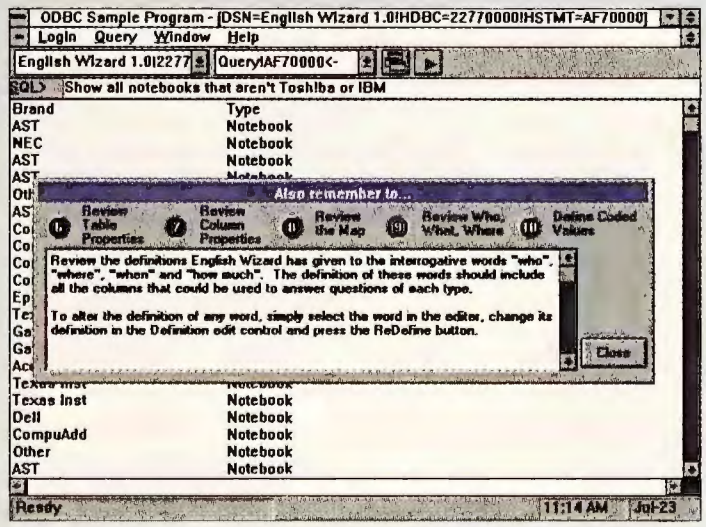
Circle 91 on reader service card.

Teach Your Database English

Constructing queries with the programs reviewed here is a lot easier than mastering the complexities of SQL programming, but you still need to deal with database fields, logical operators, and other technical concepts. What if you could pose database queries in everyday English? With Linguistic Technology's English Wizard 1.1, a natural-language add-on for ODBC-compliant query/reporting tools (as well as Microsoft Access), you can do just that.

You prepare English Wizard to understand a database by creating a dictionary similar in function to the ones that programs like Crystal Reports Pro employ to protect end users from the complexities of databases. The dictionary replaces database field names with English phrases, includes synonyms for words you'll use in queries, and provides the program with other information it will need to interpret your questions, such as the definitions of verbs you'll use. In the case of our service-and-reliability database, the dictionary substituted the phrase *under warranty* for the field IS_WHILE_WARRANTY, added *computer* as a synonym for *PC,* and defined *purchase* as a verb.



ONCE YOU'VE EXPLAINED YOUR DATABASE to English Wizard, it can answer English-language queries.

With our service-and-reliability database, for example, it figured out on its own that 'PC brand' was a concept, with dozens of specific examples ranging from ALR to Zeos. We had to explain more complex concepts—such as how to tell what percentage of purchasers would buy again from a particular vendor—by defining verbs, linking tables, and performing other fairly complicated actions. Creating dictionaries doesn't require SQL programming knowledge, however.

With about 15 minutes of effort, we had English Wizard uncannily answering simple questions like 'How many different brands?' and 'Show all IBM Pentiums'. Configuring the program to understand every concept relating to a database takes more effort than that, and is likely to involve ongoing refinements to the dictionary. But once you're done, the language barrier between your company's workers and database will be a lot less imposing. At $99, English Wizard is an excellent value. Linguistic Technology, 508/266-1818. Reader service no. 801

Building a dictionary requires about the same level of skill required to effectively use the query and reporting tools we evaluated for this article. The program is smart enough to do much of the work itself:

Quest's erratic user interface combines some of the clunkiest and the smoothest touches we encountered in these programs. Just getting properly connected to a database can be tricky, since Quest's list of available databases only includes ones that you've added yourself, using unintuitive controls. Another obstacle: The dialog box you use to join multiple databases doesn't provide a simple visual map that shows what fields you've connected.

On the bright side, as you browse through tables to find the ones you need for your query, Quest can automatically display a list of the fields they contain—a table selection aid that every package should offer. (Most can't.) When you execute a query, the program automatically displays the data in a spreadsheet-style series of rows and columns that make it unusually easy to check out your results.

Designing reports would go faster, though, if Quest had full-featured Wizard-style help to show you the exact steps involved (it offers rudimentary assistance with a few features). It's one of only two products here that have built-in graphing features, but they're far more limited than in Crystal Reports Pro: You can create 3-D pie charts and 2-D bar charts, but you're out of luck if you need a 2-D pie chart or a 3-D bar chart. And there's no way to produce stand-alone report files that you can share with non-Quest users.

That's not to say the package is lacking in features. Using powerful tools, you can set up forms that let users browse through databases using query by example (this feature is most likely to come in handy for developers who use Quest to simplify database access for others, however). In addition, Quest is one of the rare query/reporting tools that can change the contents of databases as well as read them—an option you can disable if you're worried about accidentally corrupting important information.

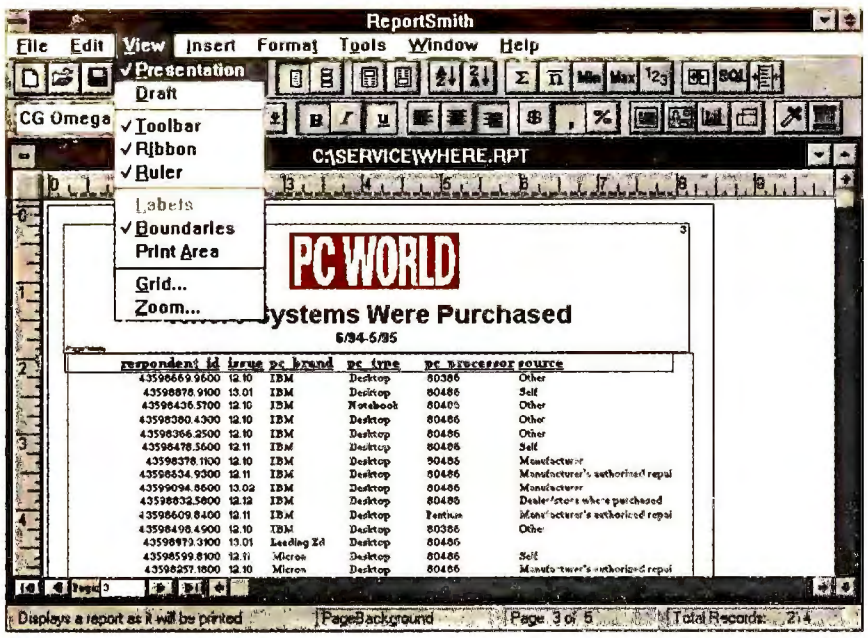
Ultimately, you'll find Quest's databaselike functionality appealing if you're as interested in creating, changing, and viewing data as you are in performing the analysis-related tasks that query and reporting packages usually concentrate on. However, other products here are stronger contenders if you need a program that focuses on making it easy to master the fundamentals of querying and reporting. *Gupta Corp., 800/444-8782* **Reader service no. 802**

ReportSmith 2.5 for Windows (SQL Edition)

PROS: WYSIWYG approach simplifies formatting reports, excellent style editor, data dictionary, powerful macro language

CONS: Limited on-screen assistance, no charting

Borland's ReportSmith isn't the simplest query/reporting product here, or the most innovative, but it's among the most well rounded. Overall, this capable and friendly package lags only slightly



REPORTSMITH SHOWS YOU YOUR DATA as you format reports, an invaluable but uncommon feature.

behind Best Buy Crystal Reports Pro as an all-around reporting tool for users with basic database skills; it's an especially good alternative if you don't need Crystal's wealth of automated help.

ReportSmith doesn't offer true Wizard-style assistance that explains every detail of composing a query. It does, however, use a single, integrated query dialog box that's broken up into sections for each step, making it easy to grasp the logical progression involved even if you're not a database pro.

This query dialog box has several intuitive touches but some surprising omissions. On the plus side, replacing cryptic field names such as TXT_DT_PURCH with aliases such as DateOfPurchase is a snap (although they'd be even clearer if they could include spaces). You can also quickly create filters to restrict your query's results by simply selecting fields, connectors, and values from scrolling lists that use English phrases instead of symbols. But you can't see the fields within a table before you select it, or get samples of actual data from the database as you build your query, so it's vital to start with a basic knowledge of your database.

One of ReportSmith's great strengths is that it lets you format your report by making changes to the pages that show your actual query results, rather than making you juggle separate layout and print preview windows. Spiffing up a report with colored lines and borders, appropriate fonts, and other style choices is easy, whether you tell ReportSmith to apply one of its 22 built-in styles or use the nifty point-and-click style editor to build a library of your own.

Like Crystal Reports Pro and R&R Report Writer, ReportSmith boasts some features aimed more at developers and other database pros than typical end users. For example, its ReportBasic language is one of the richest programming environments in any of these products. The package also provides a data dictionary that lets a knowledgeable user simplify database access for less experienced coworkers—this is similar to Crystal Reports Pro's Crystal Dictionaries, though it's harder to set up.

One notable omission in ReportSmith's generally fine lineup of features: It doesn't have built-in charting, although if you already own Microsoft's Graph applet (included with Excel and other applications), it's accessible from an icon in ReportSmith's toolbar. ReportSmith's on-screen and printed documentation is passable, although some illustrations are murky and the index somehow manages to omit such crucial entries as *query*. But such flaws aren't fatal, considering that at $299.95, this is the cheapest product here. *Borland Int'l, 800/233-2444* **Reader service no. 803**

R&R Report Writer 6.0

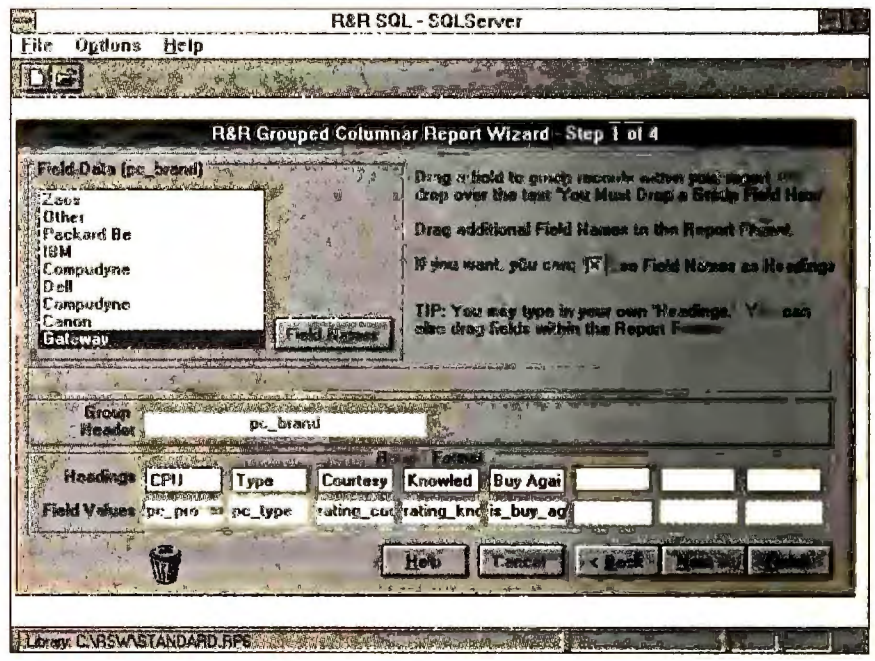
PROS: Wizards make creating simple reports and mailing labels easy, wide range of importable graphics formats

CONS: Shows print preview in noneditable window, some advanced features are difficult to use, no charting

Concentric Data Systems' $335 R&R Report Writer 6.0 may be a reporting veteran, but with its Microsoft Office–compatible interface and Wizard help, this package has adopted a contemporary look. At its core, though, it's still a traditional product that focuses more on printed reports than on ad hoc, on-screen data analysis.

R&R's Wizards make it exceptionally easy to create basic columnar reports and mailing labels. You specify where data goes by dragging database field names off a scrolling list into a grid that shows the layout of your report or label. The big limitation of these Wizards is that they're devoted entirely to report creation, unlike Crystal Reports Pro's Experts, which also help you build queries.

As with ProReports, you do all report formatting in a layout window that displays placeholders where your data will go, then



CREATING SIMPLE REPORTS AND MAILING LABELS IS EASY with R&R Report Writer's Microsoft Office–style Wizards.

switch to a noneditable preview of how your document will print. That's the system most of the products here use, although it seems a little archaic in a world where word processors and other applications have gone WYSIWYG. The package also lacks built-in charting and pivot table options; if you've got Excel 5.0, though, R&R can commandeer that program's chart and pivot tools.

R&R's tools for creating stand-alone report files are among the beefiest of any product here, but you must create text files that contain programming-style commands to set them up, a much more complex process than working with Crystal Reports Pro's

The computer pointing device that's an extension of your brain, not your arm. As easy to install as a mouse. More accurate than a trackball. The product of eight years of neural network research, and the end of repetitive motion risk. Point, drag, tap. Now you're using your head. For the dealer nearest you, call **1-800-223-6433**.

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Touch Pad

point-and-click controls. Similarly, the data dictionary feature allows you to replace cryptic field names with longer descriptions, but you must create the dictionary in your own database program.

These issues show that R&R Report Writer is trying to please both everyday business users and developers at the same time. That's true of Crystal Reports Pro and ReportSmith too, but those packages have taken greater pains to make their powerful features accessible—making them better choices if you're comfortable with databases but aren't a programmer. *Concentric Data Systems, 800/325-9035, 508/366-1122* **Reader service no. 804**

Expert Help Gives Crystal Reports Pro the Edge

● = Yes ○ = No

Standard features	BrioQuery Explorer 3.1	Crystal Reports Professional 4.0	ProReports 1.3.1	Quest 3.0	ReportSmith 2.5 for Windows (SQL Edition)	R&R Report Writer 6.0
Street price as of 7/20/95 [1]	$595	$345	$695	$460	$299.95	$335
Minimum/maximum hard disk space required (MB)	2.5/10.5	15/22	8/11	5/10	12/24	4/6
OLE support	none	version 2.0	none	version 1.0	version 2.0	none
Includes Wizard-style assistants	○	●	○	●	○	●
Runs under Windows 95	●	●	○ [2]	●	●	●
Connectivity						
SQL databases supported with native drivers	DAL, EDA/SQL, MDI, Oracle, Sequelink, Sybase	DB2, Oracle, Scalable SQL, SQLBase, SQL Server, Sybase	DB2, Informix, Ingres, Oracle, Rdb, SQL Server, Sybase	AS/400, Cincom Supra, DB2, HP Image, Informix, Ingres, Oracle, SQLBase, SQL Server, Sybase	DB2, Informix, Ingres, Interbase, Oracle, SQLBase, SQL Server, Sybase, Unify	none [3]
PC databases supported with native drivers	none	Access, ACT, Btrieve, Clipper, dBASE, Excel, FoxPro, Paradox	none	dBASE, Paradox	dBASE, Paradox	none [3]
Supports ODBC	●	●	●	●	●	●
Exportable formats	1-2-3, Excel, SYLK, text	1-2-3, DIF, Excel, Quattro Pro, RTF, text, Word, WordPerfect	none [2]	1-2-3, dBASE, Excel, Paradox, text	1-2-3, DIF, DIS, Excel, Quattro Pro, text	dBASE, Excel, Excel pivot table, text, Word
Query features						
Limit number of rows returned	●	○	○ [2]	●	●	●
Reports can prompt user for input	●	●	●	○	●	●
Substitute aliases for actual field names	●	●	○	●	●	●
Modify and delete database information	○	○	○	●	○	○
Number of built-in formula functions	6 [4]	150	61	78	57	92
Reporting features						
Cross-tab/mailing label creation	●/○	●/●	●/○	●/●	●/●	○/●
Summary/drill-down report creation	●/●	●/●	●/○	●/○	●/●	●/○
Report templates included	none	10	4	none	22	4
Includes charting	○	●	○	●	○	○
Create stand-alone run-time reports	○	●	○	○	●	●
Scheduling	●	●	●	○	○	○
Service and support						
Free start-up support (days)/toll free	30/●	unlimited/○	30/○	30/○	unlimited/○	60/○
Weekday support (hours)	10	10	10	12	11	8
Weekend support	○	○	○	○ [5]	○	○
Online/fax	●/●	●/●	○/●	●/●	●/○	●/●

BEST BUY

[1] Mail-order or based on vendor estimate.

[2] Planned for version 1.5 due October 1995.

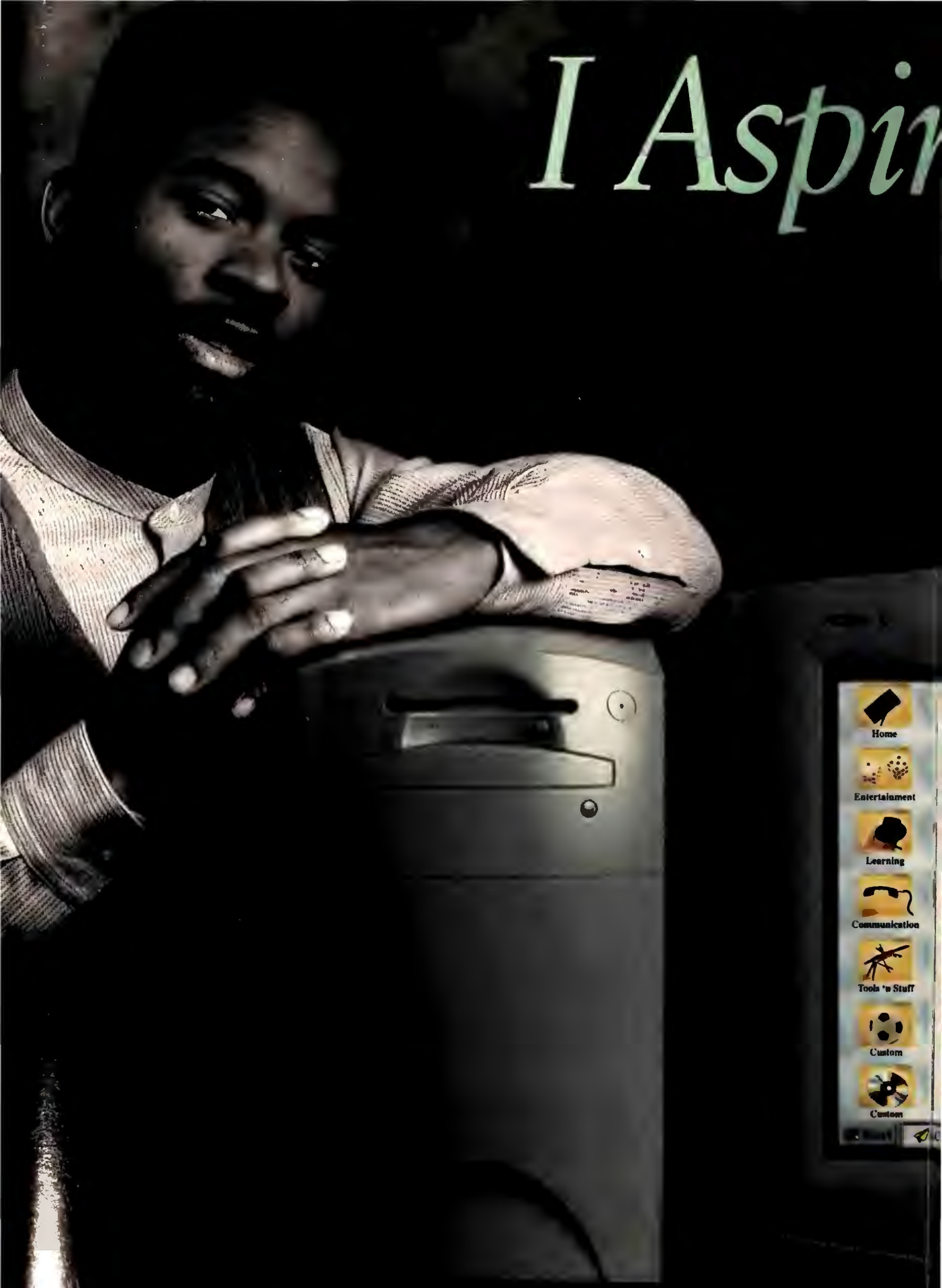
[3] Uses ODBC for all data access.

[4] Uses functions provided by database.

[5] Extra-cost option.

For more information about all products in this table, circle reader service no. 912.

What do you Aspire to?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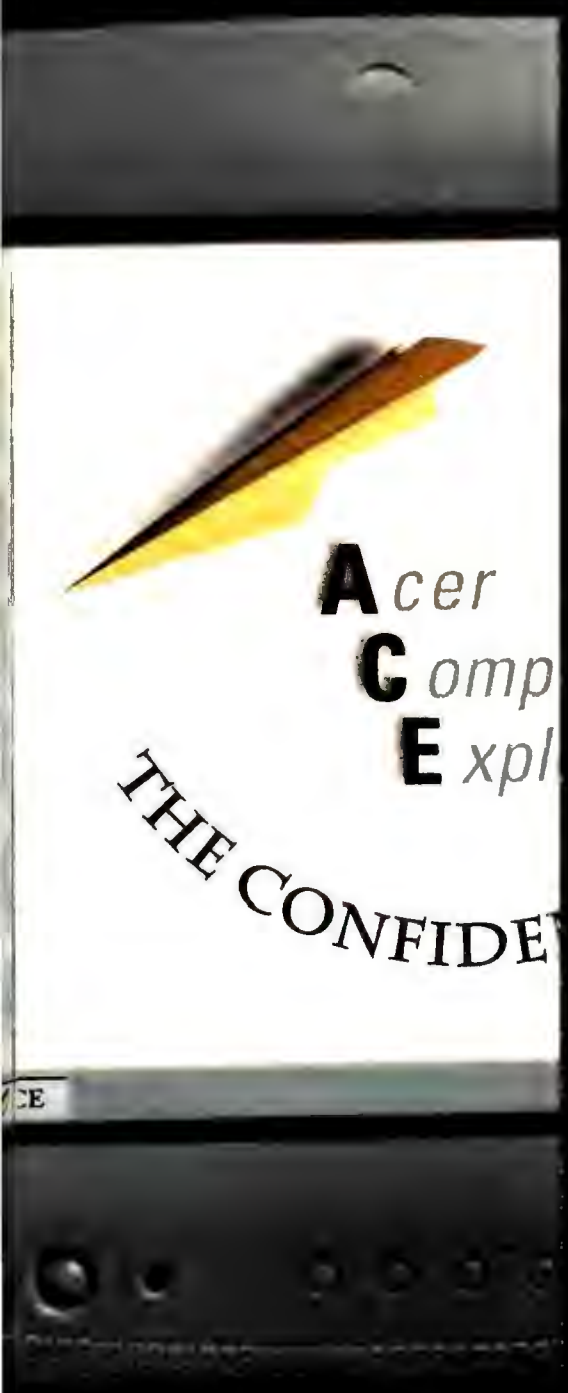

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Never miss an important phone call.
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Aspire Desktops

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- 486DX4/100
- Intel Pentium processor

System Memory
- 8MB system memory; expandable to 128MB*

Expansion
- Two PCI slots*
- Two ISA slots (three on DX4/100 models)
- One shared by PCI and ISA*

Modem
- 14.4kbps fax modem

Mass Storage
- 540MB to 1GB hard drives

Aspire Minitowers

Processor
- Intel Pentium processor

System Memory
- 8MB system memory; expandable to 128MB

Cache
- 256KB second-level cache

Expansion
- Three PCI slots
- Four ISA slots
- One shared by PCI and ISA

Devices/Bays
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- 28.8kbps fax modem

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- CD-ROM drive in 5.25" bay

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Dot Pitch
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- 15" Aspire 56s: 1024 x 768 at 75Hz, 800 x 600 at 72Hz, 640 x 480 and all VGA modes
- 17" Aspire 76is: 1280 x 1024 at 60Hz, 1024 x 768 at 75Hz

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LD • NOVEMBER 1995

Clockwise from upper left: Micron 4100 Magnum, Dell Latitude LX 4100D, Dell Dimension XPS P133c, Dell Latitude XPi P90

As the holiday season approaches, price cuts from leading PC vendors make buying a fast, loaded system more affordable than ever. This month's top picks: a smorgasbord of Dell PCs plus Micron's 4100 Magnum.

PC Shoppers

THE TOP 20
PC WORLD
Power pg. 196
Budget pg. 204
Notebooks pg. 216

IF YOU'VE BEEN HOLDING OFF BUYING A NEW PC until that next big markdown, get out the checkbook. In a price war that began in August, one major vendor after another has been slashing prices. In this month's Top 20 charts, units from Gateway, NEC, and Polywell have become more affordable by almost 10 percent. Over the next few months, look for even bigger reductions from Digital, Hewlett-Packard, Compaq, and IBM. These companies announced cuts of up to 25 percent as we went to press. By the time you read this, you should have a choice of 75-MHz Pentium desktops for as little as $1700.

With higher speed than its predecessor and a lower price ($3899), the new version of Dell's Dimension XPS P133c lands at the top of the Power Desktops chart. All five new systems on this month's Power Top 20 are P-133s; one—Quantex's QP5/133 SM-1—costs only $3249. For not much more

By Bryan Hastings and Brad Grimes

than $3500, you currently can buy one of the fastest Pentium processors, a 17-inch monitor, a 1GB hard disk, 16MB of RAM, and full multimedia. Some power systems have a 14.4- or 28.8-kbps fax-modem built in. If you go for a system with a fax-modem, we recommend spending the extra $100 or so to get one of the new 28.8-kbps models (see "Top 10 Modems").

P-100s: The Next Budget PCs?

This month we add our first 100-MHz Pentium to the Budget Desktops Top 20: SmartWorks' basic $2049 minitower, the MT100HI. It's not the fastest machine on the list; that distinction still belongs to a P-90—Micro Express's $1949 MicroFlex-PCI/P902—but expect to see some fast P-100 systems showing up in the category before too long. Two new Pentium-75s from Swan and HiQ round out the Budget newcomers.

Basic Pentiums are becoming better deals all the time, with some costing well under $2000 even before the latest cuts. You can expect a Pentium in that price range to have a 15-inch monitor, respectable multimedia (quad-speed CD-ROM drive and 16-bit sound card), a 540MB or larger hard disk, and sometimes a fax-modem. Our Budget Desktops Top 20 now features mainly 75-MHz and 90-MHz Pentiums. The fast but basic Vektron PCI P-75 is our cheapest budget Pentium; it has neither CD-ROM drive nor sound but costs a rock-bottom $1695. Pentium CPUs are also steadily infiltrating notebook ranks. The top four power notebooks this month are based on P-75 and P-90 CPUs and include two new Dell Latitudes and a new Texas Instruments TravelMate. But Pentiums don't make good budget notebooks—yet. They're still too expensive. A new DX4-100 from Dell and a DX4-75 from NEC takes this month's budget Best Buy honors.

We finally got our hands on an IBM Butterfly 701C for formal performance testing and confirmed—to no one's surprise—that this unique subnotebook is for trendsetters with deep pockets, not for people who need a fast portable. With its expanding keyboard and big screen packed into a small case, the Butterfly is one of the most delightful, elegantly designed notebooks we've seen. You get a very comfortable keyboard on a unit that weighs less than 6 pounds and is an inch narrower than the typical notebook. The Butterfly's pleasing configuration includes a 10.3-inch color active-matrix screen, a 540MB hard disk, a fax-modem that also handles voice mail, and a battery that lasts for nearly 5 hours on a charge. But the model we tested performed like the 486DX2-50 it is—fine for word processing and light spreadsheet work but not for anything demanding. Even at the just-announced lower price of $3299, the 486DX2-50 Butterfly would not have made either section of our Notebook Top 20—it still costs $500 more than the most expensive budget notebook we've tested. It's a raw deal based purely on price/performance, but your obvious choice if you need a comfortable-to-use portable in a supersmall package. Look for a review of the 75-MHz Butterfly in an upcoming *PC World*.

Soon: More Choices

As you read this, Intel is poised to add its latest-generation CPU (now called the Pentium Pro) to its passel of PC processors, and rivals AMD, Cyrix, and NexGen are promising new Pentium competitors. Stay tuned...

Bryan Hastings is a senior associate editor and Brad Grimes an associate editor for PC World. *They can be reached on PC World Online (see page 12 for contact information).* PC World *staff members John Goddard, Eric Hellweg, Arden Hoffman, and Harry McCracken and freelance writers Geoffrey Coffey and Jon Jacobi contributed to this article. Testing done in the PC World Test Center by Ulrike Diehlmann and Mike Salayko; research by Andrew Hawn and Julian Weatherby.*

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For more information about all products in this article, circle reader service no. 907.

Bridging the Testing Gap

Windows 95 has been out almost three months, so why is *PC World* still using a Windows 3.1–based test suite? Like the rest of the world, we're still waiting for common Windows 95 applications.

We could have switched to testing Windows 95 systems without missing a beat if we had settled for a benchmark that doesn't test everyday chores. But we want our new Windows 95 benchmark, like the old one based on Windows 3.1, to be as relevant as possible by using actual business applications. We want to test systems performing common tasks like loading and saving files, editing documents, sending queries, and doing spreadsheet calculations. When our new test suite is finished, it will be a blend of new 32-bit Win 95 applications and current 16-bit Windows 3.1 applications, running the kinds of tasks you typically perform with your PC.

In the meantime, starting next month and for the next several issues, we'll review all PCs that arrive with Windows 95 or Windows 3.1 (or both). We'll report which operating system they come standard with. However, we'll load Windows 3.1 on all Windows 95–equipped systems so we can run our current benchmark on them and test all PCs on the same playing field. Systems tested with our new Windows 95 benchmark will appear as early as our February roundup.

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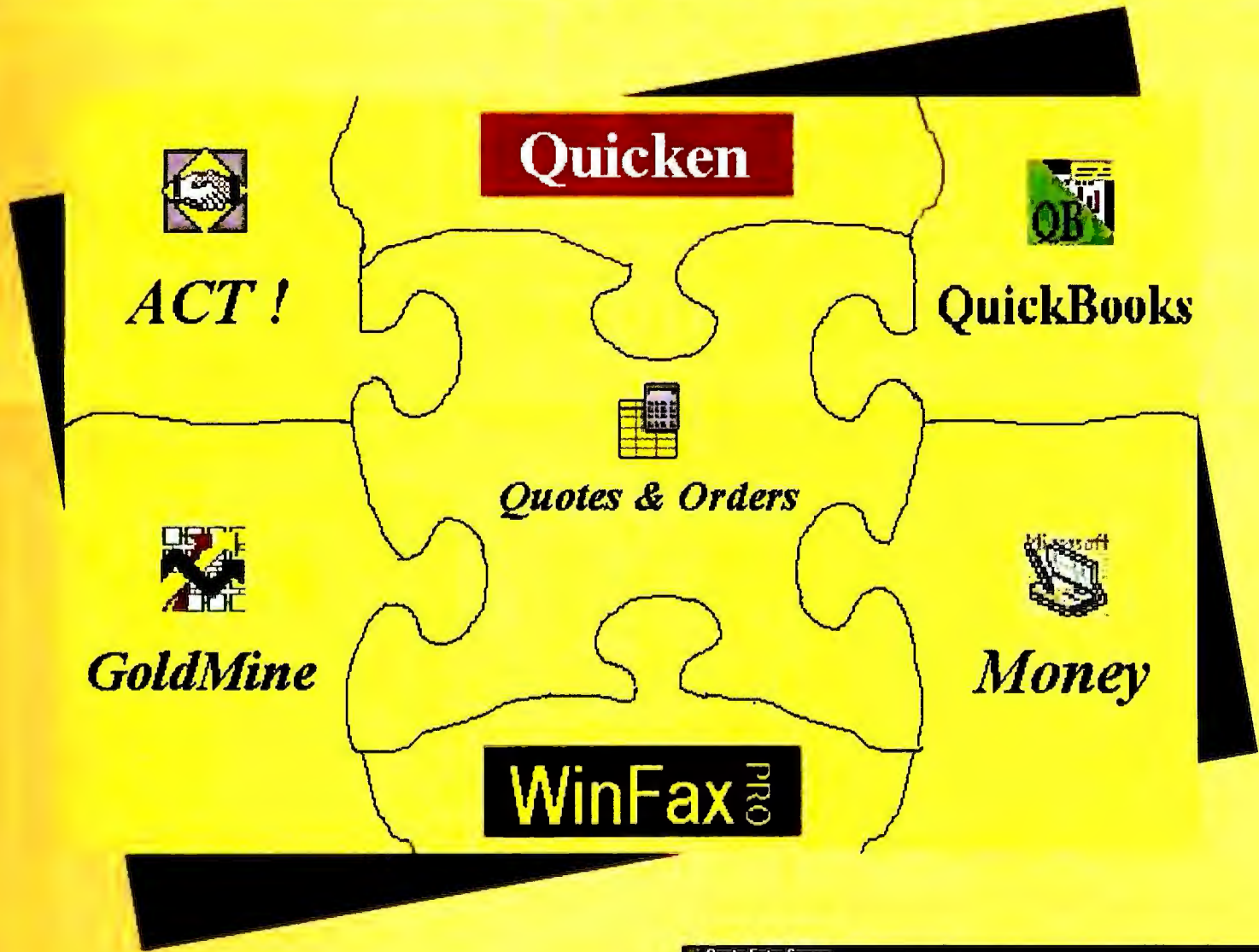

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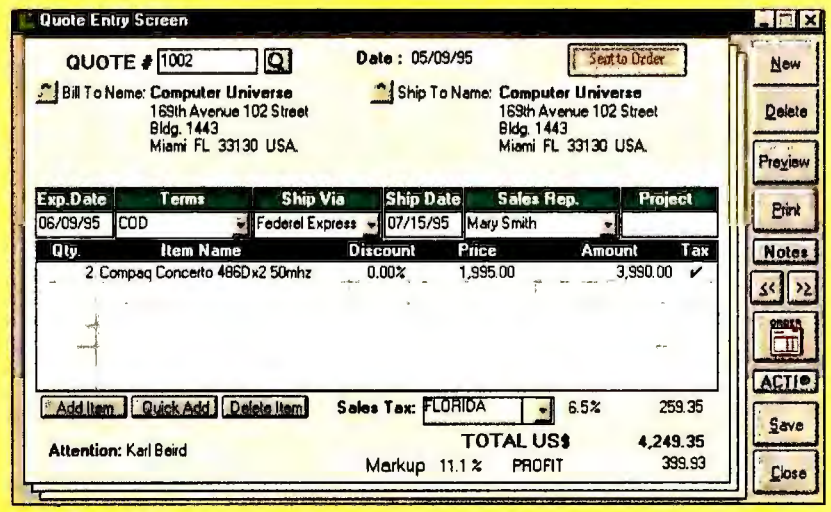

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THE PC WORLD TOP 20

POWER DESKTOPS

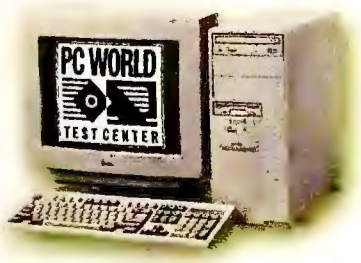
1 Dell Dimension XPS P133c
Faster than ever.

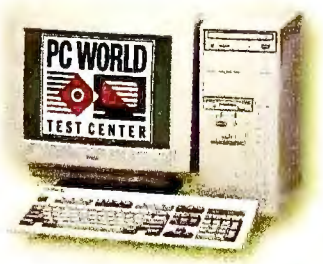
	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 BEST BUY Dell Dimension XPS P133c	–	1	current	85	115	71/74	$3899	Pentium-133	16	1080
2 BEST BUY Dell Dimension XPS P120c	1	3	Sep 95	84	111	71/74	$3749	Pentium-120	16	1080
3 BEST BUY Dell Dimension XPS P100c	3	4	Aug 95	83	100	71/74	$3101	Pentium-100	16	1083
4 BEST BUY Dell Dimension XPS P90	4	3	Sep 95	83	93	71/74	$2649	Pentium-90	8	1080
5 BEST BUY Micron P133 Millennia	5	4	Aug 95	82	119	65/69	$4299	Pentium-133	16	1624
6 Micron P120 Millennia	6	6	June 95	81	111	65/69	$3299	Pentium-120	16	1278
7 Micron P100 Millennia	7	4	Aug 95	81	107	65/69	$2999	Pentium-100	16	1278
8 AT&T Globalyst 630	8	5	July 95	79	93	75/67	$3980	Pentium-100	16	1083
9 HP Vectra VL3 5/120	9	6	June 95	79	90	78/73	$3629	Pentium-120	16	850
10 Tangent MediaStar 5133	–	1	current	79	126	[2]	$3295	Pentium-133	16	1080
11 Gateway 2000 P5-120XL	12	6	June 95	79	113	58/60	$3569	Pentium-120	16	1624
12 Dell OptiPlex XMT 590	10	11	Jan 95	78	82	71/75	$2999	Pentium-90	16	1083
13 Quantex QP5/133 SM-1	–	1	current	78	103	58/67	$3249	Pentium-133	16	1624
14 Micron P90 Power Station	13	10	Feb 95	78	86	65/69	$2699	Pentium-90	16	1080
15 Gateway 2000 P5-133XL	11	4	Aug 95	77	120	58/60	$4329	Pentium-133	16	1624
16 Digital Celebris XL 590	15	7	May 95	77	86	75/73	$4800	Pentium-90	16	1083
17 Dell OptiPlex XMT 5100	14	7	May 95	77	83	71/75	$3591	Pentium-100	16	1083
18 Everex Step Pro P133	–	1	current	77	117	[2]	$3695	Pentium-133	16	1278
19 Gateway 2000 P5-100XL	17	6	June 95	77	111	58/60	$3322	Pentium-100	16	1083
20 Austin PowerPlus 133	–	1	current	77	112	[2]	$4499	Pentium-133	16	1624

BEST BUY

[1] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash

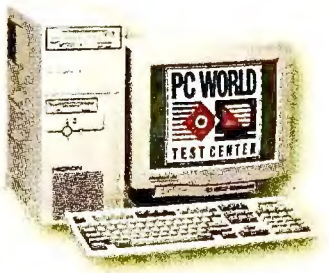
2 **Dell Dimension XPS P120c**
Speedy and loaded.





3 **Dell Dimension P100c**
Backed by quality support.

4 **Dell Dimension XPS P90**
Nice price.



5 **Micron P133 Millennia**
Ultrafast with 6X CD-ROM drive.

	CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number	Reader service no.	Comments (Recommended as home system)
	4X	ISA, PCI	17"/.28	800/289-3355	3299	630	Price drop, more speed put new version of P-133 Dimension on top; 28.8-kbps fax-modem.
	4X	ISA, PCI	17"/.28	800/289-3355	3281	631	Decent price for fast performance, big monitor, and three-year parts warranty.
	4X	ISA, PCI	17"/.28	800/289-3355	3265	632	Sound costs extra in fast P-100, but the system's priced right and backed by excellent support.
	4X	ISA, PCI	17"/.28	800/289-3355	3282	633	Very affordable, fast P-90 with big monitor is an attractive business machine.
	6X	ISA, PCI	15"/.28	800/223-6571	3268	634	Very fast, with 6X CD-ROM drive; but it's pricey and has a small monitor for a P-133.
	4X	ISA, PCI	15"/.28	800/223-6571	3242	635	This P-120 keeps up with most of the P-133s we've tested, and the price is nice.
	4X	ISA, PCI	15"/.28	800/223-6571	3267	636	Good price, great 100-MHz performance, solid configuration make for a fine value.
	4X	ISA, PCI	17"/.27	800/447-1124	3252	637	Decent Pentium-100 performer with a nice monitor and telephony features.
	4X	ISA, PCI	15"/.28	800/322-4722	3243	638	Slow for a Pentium-120, but still a solid deal—and HP's support is hard to beat.
	4X	ISA, PCI	17"/.28	800/342-9388	3300	639	Fastest desktop on the planet, at a very attractive price.
	4X	ISA, PCI	17"/.25	800/846-2000	3244	640	Price cut keeps speedy P-120 up on the chart; CD-ROM changer, 14.4-kbps fax-modem.
	4X	ISA, PCI	15"/.28	800/289-3355	3173	641	Pricey for what you get, but designed for trouble-free use on LANs.
	4X	ISA, PCI	17"/.26	800/896-4898	3301	642	Low price, full-featured, with 28.8-kbps fax-modem, but the slowest 133 we've seen.
	4X	ISA, PCI	15"/.28	800/223-6571	3184	643	Faster than most Pentium-90s we've tested; now has a very budget-like price.
	4X	ISA, PCI	17"/.25	800/846-2000	3269	644	Pricey P-133 is superfast with a tempting configuration and a CD-ROM changer.
	4X	ISA, PCI	17"/.26	800/642-4532	3223	645	Staggering price for a typical Pentium-90 power station, but it's backed by excellent support.
	4X	ISA, PCI	15"/.28	800/289-3355	3222	646	Corporate PC aimed at LAN environments is selling for a bit more this month.
	4X	ISA, PCI	17"/.28	800/821-0806	3302	647	Not a bad price for a speedy Pentium-133 multimedia tower.
	4X	ISA, PCI	17"/.25	800/846-2000	3245	648	Superfast Pentium-100 has full multimedia and a fax-modem.
	6X	ISA, PCI	17"/.28	800/331-1501	3303	649	Good speed and a 6X CD-ROM drive, but pricey even for a P-133.

Report, $9.95; available October 23). Touch-tone phone required. [2] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 100 responses.

For more information about all products in this table, circle reader service no. **904**.

Top 20 Power Desktops

FIVE NEW SYSTEMS—ALL PENTIUM-133S AND almost all towers or minitowers—debut on the Power chart this month. Our number one system, Dell's $3899 Dimension XPS P133c, is a great value with excellent support. But you can get close to the same configuration and better performance from cheaper systems that have lower support ratings. Tangent's new MediaStar 5133, for instance, costs $600 less than the Dell XPS P133c and is much faster. Everex's $3695 Step Pro P133 is a fast, nicely configured multimedia tower. The new Quantex QP5/133 SM-1 costs only $3249 and comes with a 1624MB hard drive, but it's as slow as some P-100s we've tested. Austin's new PowerPlus 133 barely makes the chart; at $4499 it's expensive, even for a P-133 with a 6X CD-ROM drive.

1 Dell Dimension XPS P133c

NEW THIS MONTH

PROS: Fast performance, first-class components, excellent reliability and service records

CONS: On/off button looks too much like a floppy eject button

Thanks to a little added speed and a lower price ($3899), the updated Dimension XPS P133c leads the parade of Dells atop our Power Desktops list. It took a little time, but now the Dell system with the fastest processor is also the fastest based on real-world performance. Overall, not much has changed since the company sent us one of its first Pentium-133 PCs in August—the unit still comes with 16MB of EDO RAM, a 1080MB hard drive, and 512K of pipeline-burst secondary cache—but Dell has fine-tuned this P-133 to eke out even more power. Although it's not the speediest Pentium-133 on the market (this month's tenth-place entry from Tangent is nearly 10 percent faster), a combination of quality features and Dell's superior service makes the Dimension XPS P133c the number one Best Buy.

Dell Dimension P133c

A list of this system's components reads like a who's who of industry leaders: NEC quad-speed CD-ROM drive, Creative Labs Sound Blaster AWE32 wave-table sound card, Number Nine 9FX Motion 771 full-motion video accelerator, and U.S. Robotics 28.8-kbps V.34 fax-modem. Topping it all off is Dell's D1728-LS 17-inch monitor. The whole shebang is backed by Dell's complete support package, which includes a three-year warranty on parts (one year on labor), 24-hour tech support, and a year of free on-site service. In addition, the manuals are well illustrated and easy to understand. It's hard to put a price on Dell's enduring reputation for service and reliability; the company continues to look after customers of its entire Dimension line, as shown by the high praise it receives in our reader survey.

2 Dell Dimension XPS P120c

REVIEWED: September 1995

PROS: Great performance, multimedia, video-accelerated graphics card, 28.8-kbps fax-modem

CONS: On/off button can be mistaken for floppy eject button

One of the most powerful Pentium-120s to come our way, the $3749 XPS P120c keeps pace with many P-133 systems we've reviewed. And with multimedia, 16MB of RAM, a 17-inch monitor, a 1080MB hard drive, a 2MB VRAM Number Nine 9FX Motion graphics board with full-motion video acceleration, and a 28.8-kbps modem, it's a very well appointed unit.

3 Dell Dimension XPS P100c

REVIEWED: August 1995

PROS: Very good performance, outstanding service, 17-inch monitor, full-motion video

CONS: On/off button can be easily mistaken for the floppy eject button

With a 1083MB hard drive and 16MB of EDO RAM, this $3101 offering from Dell scores well on our performance tests. Even if you spend another couple of hundred dollars on a 16-bit sound card and set of external speakers, you're still getting a very nice power system at a decent price.

4 Dell Dimension XPS P90

REVIEWED: September 1995

PROS: Top performance for a Pentium-90, great service and reliability, 17-inch monitor

CONS: 8MB of RAM is meager for a Pentium desktop these days; on/off switch looks deceptively like a floppy eject button

Featuring super-quick EDO RAM and pipeline-burst secondary cache, the XPS P90 covers all the bases of performance, service, and support. Its 8MB of RAM is skimpy for a Pentium desktop these days, but you still get a lot of machine, including a large monitor, for the budget-like $2649 price.

5 Micron P133 Millennia

REVIEWED: August 1995

PROS: Huge hard drive, 6X CD-ROM drive, good service

CONS: One-year warranty, expensive

Leading the pack of the Micron offerings, this $4299 minitower tears through our test suite. We expected a monitor larger than the supplied 15-incher, but you do get 16MB of EDO RAM; a fast, capacious 1624MB hard drive; multimedia trimmings; and a big software bundle, including Microsoft Office Professional. Readers give Micron good marks for service.

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6 Micron P120 Millennia

REVIEWED: June 1995

PROS: Super-speedy performance, excellent expandability, spacious 1278MB hard drive

CONS: Its brief one-year warranty is considered subpar these days

7 Micron P100 Millennia

REVIEWED: August 1995

PROS: The $2999 price is attractive for a fast Pentium-100 PC with large 1278MB hard drive

CONS: PC shoppers now expect more coverage than the standard one-year warranty

8 AT&T Globalyst 630

REVIEWED: July 1995

PROS: Lots of room to add components, excellent reliability record, 17-inch monitor, bundled teleconferencing and alphanumeric paging applications

CONS: Poor documentation, $3980 price a bit high for a Pentium-100 PC

9 HP Vectra VL3 5/120

REVIEWED: June 1995

PROS: Excellent design, one of the best records in the business for service and reliability

CONS: Relatively sluggish, performs more like a Pentium-100

10 Tangent MediaStar 5133

NEW THIS MONTH

PROS: Unmatched desktop speed, amply configured, very nice multimedia

CONS: No bundled software

If you're looking for the fastest machine on the market, look no further. The Tangent MediaStar 5133 Pentium-133 blitzed our test suite in record time and has more goodies than you can shake a stick at—like 16MB of EDO RAM, 512K of secondary cache, a 1080MB hard drive, and a Teac quad-speed CD-ROM drive—all for a very reasonable $3295.

The MediaStar incorporates multimedia intelligently. Speakers are built into the case so they don't clutter your desk, and volume and tone controls and line-in and headphone jacks are easily accessible on the front panel. The 17-inch ADI MicroScan 5EP monitor is driven by a Diamond Stealth 64 Video VRAM board with 2MB of video memory. The Diamond board not only supports high flicker-free resolutions, it also accelerates full-motion video. Our evaluation unit had a 16-bit FM synthesis sound card, but Tangent says it will soon replace that card with a high-quality wave-table model. With all this multimedia hardware, we would have liked some cool software, but Tangent didn't bundle any titles with the unit. For expansion, the MediaStar's compact desktop case houses plenty of options. The system we tested comes with two free externally accessible drive bays, one free internal bay, plus three open PCI slots and two open ISA slots.

Tangent

So why isn't the Tangent a Best Buy? Its support policies, though not shabby, don't quite equal those of giants like AT&T, Dell, Hewlett-Packard, and Micron. Still, Tangent's warranty covers parts and labor for three years, and there's a fast two-day factory repair turnaround. Toll-free phone support is available 12 hours on weekdays, 6 hours on Saturday. Competition is stiff at the top, but the Tangent stands as a premier value, especially if you want the fastest desktop on the block.

11 Gateway 2000 P5-120XL

REVIEWED: June 1995

PROS: Roomy 1624MB hard drive, easy-on-the-eyes 17-inch monitor, superfast

CONS: Sparse documentation, no guaranteed turnaround time for factory repairs

12 Dell OptiPlex XMT 590

REVIEWED: January 1995

PROS: Three-year warranty, compatibility-tested for networks, 1083MB hard drive

CONS: Seven-day guaranteed turnaround time for repairs is longer than most

13 Quantex QP5/133 SM-1

NEW THIS MONTH

PROS: Amazing price, nicely designed, documentation easy to follow

CONS: Slow for a P-133, subpar tech support

Even with performance scores that place it more among Pentium-120 desktops, the Quantex QP5/133 SM-1 still delivers a whopping amount of computer for the money. It costs just $3249, nearly $1000 less than its typical Pentium-133 competitor, yet it boasts 16MB of RAM, a spacious 1624MB hard drive, a fine graphics subsystem, multimedia, a giant software bundle, and even a fast 28.8-kbps fax-modem. It's no surprise that this Quantex makes our power system shortlist.

Quantex

The unit's ATI Mach 64 graphics card with 2MB of DRAM is an excellent match for the 17-inch MAG monitor. Multimedia components consist of a Toshiba quad-speed CD-ROM drive, a 16-bit sound card, and 5-watt external stereo speakers. The company throws in a slew of software, including Novell's PerfectOffice suite, Quicken Special Edition, and the Mindscape Complete Reference Guide on CD. Inside the QP5/133 SM-1 tower are three free externally accessible drive bays and four free internal bays, in addition to two open PCI and two open ISA slots. The comprehensive set of user manuals includes a folder that has easy-to-digest information about the system's setup and company warranties and technical support policies.

Unfortunately, Quantex offers a mere one-year warranty (although on-site service is free during that year), and we had to wait more than 3 hours for responses from tech support. Readers, however, give Quantex's service favorable marks, which goes to show

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that vendors have good days and bad days. Toll-free tech support is available 11 hours Monday through Thursday, 9 hours on Friday, and 6 hours on Saturday. Even considering these unimpressive support policies, it's hard to go wrong with the QP5/133 SM-1.

14 Micron P90 Power Station

REVIEWED: February 1995

PROS: Fast Pentium-90 performance, 1080MB hard drive, good reliability and service records

CONS: One-year warranty is minimal these days

15 Gateway 2000 P5-133XL

REVIEWED: August 1995

PROS: Knock-your-socks-off speed, 1624MB hard drive, 17-inch monitor

CONS: $4329 is a bit pricey, could use more documentation, no set turnaround time for repairs

16 Digital Celebris XL 590

REVIEWED: May 1995

PROS: Speedy, accepts a second CPU, excellent reliability and service ratings, 17-inch monitor

CONS: Very expensive for a Pentium-90 without full multimedia

17 Dell OptiPlex XMT 5100

REVIEWED: May 1995

PROS: Large 1083MB hard drive, space to add lots of peripherals, three-year warranty

CONS: Seven-day turnaround policy for repairs is considered slow by today's standards

18 Everex Step Pro P133

NEW THIS MONTH

PROS: Quad-speed CD-ROM drive, integrated 16-bit sound chip

CONS: No weekend telephone support, no free SIMM sockets

Everex edges onto the Top 20 this month with the Step Pro P133, a full-size tower system with impressive performance and a sturdy design. Powered by a Pentium-133 chip and supported by 16MB of EDO RAM and 256K of pipeline-burst secondary cache, the Step Pro made short work of our test suite. Factor in the system's $3695 price, and you have a very tempting power machine.

No system achieves fast performance without a speedy hard drive, and the Step Pro's Conner Peripherals 1278MB model fills this bill. Multimedia components include a Mitsumi quad-speed CD-ROM drive and an integrated 16-bit sound chip, while a programmable TVM Professional 17-inch monitor and 64-bit ATI WinTurbo graphics card (with full-motion video acceleration and 2MB of fast VRAM) combine for a crisp, spacious, and quick display. DOS and Windows come installed, but we didn't receive any multimedia software to show off the Step Pro's strong line of features. The tower case houses two free externally accessible drive bays and two open internal bays, as well as two free PCI slots, two free ISA slots, and one slot that accepts either a PCI or an ISA card. Unfortunately all four SIMM sockets in our test model were filled. If you order from Everex, make sure you specify 8MB SIMMs instead of the 4MB flavor our configuration used.

Everex

Service and support is solid. Everex provides a three-year warranty, a fast two-day turnaround on factory repairs, and toll-free phone support 24 hours a day Monday through Friday. All told, the Everex Step Pro P133 is a well-built, high-performance PC that's aptly suited for demanding business applications.

19 Gateway 2000 P5-100XL

REVIEWED: June 1995

PROS: Fastest Pentium-100 system we've tested, quad-speed CD-ROM drive

CONS: No free SIMM sockets, sparse documentation, no set turnaround time for repairs

20 Austin PowerPlus 133

NEW THIS MONTH

PROS: 6X CD-ROM drive, excellent tech support policies

CONS: Poor upgradability, sloppy design

The Austin PowerPlus 133 may not be the best-designed system on the market, and it costs a hefty $4499, but its speed and long list of features earn it a spot on the Power chart. It performed well compared to other Pentium-133s we've tested (which is to say, it smokes), and it offers plenty of processing power, with 16MB of RAM, 256K of secondary cache, and a roomy 1624MB hard drive.

The 64-bit graphics card has 2MB of VRAM, a nice match for the fine Nokia 447L 17-inch monitor that came with our test system. Also impressive are the Plextor 6X CD-ROM drive, 16-bit integrated sound chip, and internal 28.8-kbps fax-modem. Add to that a solid software bundle that includes Microsoft Office (which contains the popular Word text editor and Excel spreadsheet) and the Delrina fax and data communications suite, and you've got a nice package of extras.

Austin

Inside the PowerPlus minitower, you'll find lots of cable clutter and relatively few free slots: one PCI slot, one ISA slot, and a third that accepts either a PCI or an ISA card. No SIMM sockets are free, so you'll need to replace chips to upgrade memory. The drive bays (two externally accessible and two internal) are difficult to reach.

Austin's support policies are first-rate. Its three-year warranty and year of free on-site service are completely in line with support offerings from top-tier vendors. The company promises to repair systems in four business days, and toll-free technical support is available every day around the clock.

The PowerPlus 133 may be poorly designed, but it sure can perform. If you like to poke around inside a computer, you may find it rough going. Then again, the machine doesn't need much upgrading. It's a fully loaded powerhouse that will satisfy your craving for speed and more.

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THE TOP 20

PC WORLD BUDGET DESKTOPS

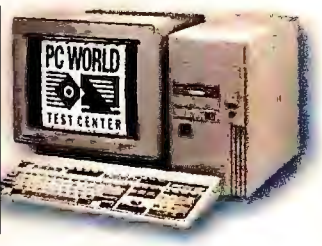
1 Micron 4100 Magnum
Multimedia for less.

		Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Micron 4100 Magnum	1	4	Aug 95	78	70	65/69	$1999	DX4-100	8	1278
2	Vektron PCI P-75	2	5	Jul 95	76	74	[2]	$1695	Pentium-75	8	852
3	DTK Quin-35M/75	3	4	Aug 95	76	70	62/58	$1875	Pentium-75	8	1083
4	Polywell Poly DX4-100	15	2	Apr 95	75	69	[2]	$1823	DX4-100	8	540
5	Micron P90 Home MPC	5	4	Aug 95	75	74	65/69	$2198	Pentium-90	8	541
6	Micro Express MicroFlex-VL/80	16	9	Mar 95	75	57	[2]	$1383	Am486DX2-80	8	540
7	Polywell Poly 486-80VB	7	10	Feb 95	75	63	[2]	$1585	Am486DX2-80	8	540
8	Blackship P-75 Neptune	9	2	Oct 95	74	67	[2]	$1795	Pentium-75	8	540
9	PerComp 4100 VIP	8	5	Jul 95	74	60	[2]	$1839	AmDX4-100	8	850
10	Micro Express MicroFlex-PCI/P902	10	2	Oct 95	74	86	[2]	$1949	Pentium-90	8	540
11	Quantex QP5/75 M-1	11	3	Sep 95	74	65	58/67	$1975	Pentium-75	8	850
12	HiQ Mars Station	6	4	Aug 95	74	60	[2]	$1591	AmDX4-100	8	540
13	Intelesys Star 75	14	4	May 95	74	67	[2]	$1949	Pentium-75	8	850
14	Netis N575	12	2	Oct 95	74	76	[2]	$2015	Pentium-75	16	1278
15	HiQ Saturn Station	—	1	current	73	79	[2]	$2065	Pentium-75	16	1200
16	Blackship P-90 Neptune	17	2	Oct 95	73	65	[2]	$1995	Pentium-90	8	850
17	Swan Pentium 75 Series	—	1	current	72	67	[2]	$2049	Pentium-75	8	855
18	SmartWorks MT100HI	—	1	current	72	80	[2]	$2049	Pentium-100	8	857
19	MiS Multimedia DX4-100	18	3	Sep 95	72	64	[2]	$1995	DX4-100	16	732
20	CompuTrend Premio P75	19	3	July 95	72	65	58/56	$1999	Pentium-75	16	1083

BEST BUY

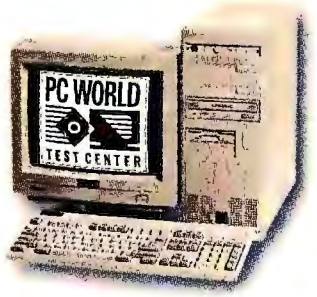
[1] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash

2 Vektron PCI P-75
Low-cost Pentium-75.



3 DTK Quin-35M/75
Tons of storage.

4 Polywell Poly DX4-100
Great price, lots of software.



5 Micron P90 Home MPC
Pentium for the family.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [1]	Reader service no.	Comments (Recommended as home system)
4X	ISA, PCI	15"/.28	800/223-6571	3273	650	Four-time champion has full multimedia configuration, fine DX4-100 performance.
—	ISA, PCI	15"/.28	800/725-0026	3257	651	There's no CD-ROM drive or sound, but the price is fabulous for a fast Pentium-75 desktop.
4X	ISA, PCI	15"/.28	800/289-2385	3274	652	Good performance, attractive price on multimedia tower unit.
4X	ISA, PCI	15"/.28	800/999-1278	3297	653	Another price drop nabs a Best Buy for multimedia minitower; big CD-ROM bundle.
4X	ISA, PCI	15"/.28	800/223-6571	3275	654	Pentium-90 comes with a full multimedia configuration, 14.4-kbps fax-modem.
—	ISA, VLB	15"/.28	800/989-9900	3208	655	Sparsely configured DX2-80 can't keep up with the DX4-100s, but price is rock-bottom.
4X	ISA, VLB	14"/.28	800/999-1278	3194	656	Fast, reasonably priced business starter PC with small monitor.
4X	ISA, PCI	15"/.28	800/531-7447	3294	657	Competitively priced multimedia system holds firm on the chart.
4X	ISA, PCI	15"/.28	800/856-6688	3260	658	Multimedia-configured DX4-100 priced a bit higher than last month, but still a great value.
4X	ISA, PCI	15"/.28	800/989-9900	3295	659	Small hard drive and no 16-bit sound, but it's the fastest desktop on the Budget chart.
4X	ISA, PCI	15"/.28	800/896-4898	3284	660	Full-multimedia Pentium-75 comes with a 14.4-kbps fax-modem.
2X	ISA, PCI	15"/.28	800/827-5836	3277	661	Entry-level configuration makes its mark with an ultralow price.
4X	ISA, PCI	15"/.28	800/577-2486	3276	662	Slight price drop keeps multimedia P-75 solidly on the chart.
—	ISA, PCI	15"/.28	800/577-7526	3296	663	Quick, with lots of RAM and generous hard drive, but no multimedia components.
—	ISA, PCI	15"/.28	800/827-5836	3304	664	No multimedia—but this new Pentium-75 performs like a P-90.
4X	ISA, PCI	15"/.28	800/531-7447	3298	665	Don't let its P-90 processor fool you—many P-75s are faster—but it's still a good value.
4X	ISA, PCI	15"/.28	800/261-7926	3305	666	Good price for a multimedia Pentium-75 with fax-modem.
—	ISA, PCI	15"/.28	800/441-2210	3306	667	Second-fastest system on the Budget chart (and the only P-100), but no multimedia.
4X	ISA, VLB	15"/.28	800/733-9188	3290	668	Respectable multimedia system with an attractive price.
—	ISA, PCI	15"/.28	800/667-6477	3263	669	Lots of RAM and hard disk space, but no multimedia components.

Report, $9.95; available October 23). Touch-tone phone required. [2] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 100 responses.

For more information about all products in this table, circle reader service no. 905.

Top 20 Budget Desktops

DELL'S DECISION TO DROP ITS DIMENSION XPS P75 system leaves our Budget Desktops Top 20 as the only chart this month without a Dell in first—or any other—position. But we expect Dell to bounce back next month with a replacement system, the updated Dimension P75. Our preliminary evaluation shows the Dimension P75 is likely to be a Budget Best Buy hit in December. In the meantime, a DX4-100, Micron's 4100 Magnum, claims first place on the Budget honor roll for the fourth consecutive month.

SmartWorks' MT100HI, debuting at number 18, is the first Pentium-100 to appear on our Budget Desktops chart. It's slow for its CPU class, and you have to add a CD-ROM drive and sound card to make it a multimedia machine, but it's still very fast for its $2049 price.

Another $2049 unit, Swan's Pentium 75 Series, is on the slow side for a P-75, but it has a fax-modem and decent multimedia, including a quad-speed CD-ROM drive. The other new P-75 on this month's chart, HiQ's Saturn Station, is almost as fast as the SmartWorks but lacks a CD-ROM drive.

1 Micron 4100 Magnum

REVIEWED: August 1995

PROS: Very fast for a DX4-100 desktop, 1278MB hard drive, solid multimedia configuration

CONS: One-year warranty, 32MB RAM limit

The Magnum reigns as the top budget PC for the fourth successive month. For $1999, you get a system that keeps up with most Pentium-75 desktops, comes equipped with multimedia and a large hard disk, and is backed by one of the top service-and-support packages in the business.

2 Vektron PCI P-75

REVIEWED: July 1995

PROS: One of the cheapest Pentium-75 computers you can buy, fast performer

CONS: Short one-year warranty, tech support available only during business hours

Talk about bang for the buck! At just $1695 this Pentium-75 system gives you serious speed, a 2MB Stealth 64-bit graphics card, and lots of expandability (three free drive bays and six free slots). If Vektron included a sound-card and a CD-ROM drive and lengthened its one-year warranty and short technical support hours, it would have a definite shot at the top spot.

3 DTK Quin-35M/75

REVIEWED: August 1995

PROS: 1083MB hard drive, solid Pentium-75 performance, good price

CONS: Cluttered motherboard, no money-back guarantee (system replacement only)

Yesterday's power configuration belongs to today's budget system. The performance of this $1875 offering from DTK is worthy of its Pentium-75 CPU, and you get a 1083MB hard drive, a 2MB PCI graphics controller, and a CD-ROM drive.

4 Polywell Poly DX4-100

REVIEWED: April 1995

PROS: Great price for multimedia DX4-100 machine, nice software bundle

CONS: Some internal cable clutter

A price drop of more than $100 makes this $1823 system an excellent deal. You get near P-75 performance, multimedia, and a big software bundle that includes 15 CD-ROM disks. Even if you opt for a hard disk larger than the 540MB drive supplied and more RAM than 8MB, you can still keep your outlay way down.

5 Micron P90 Home MPC

REVIEWED: August 1995

PROS: $2198 is a great price for a fast budget PC with a strong multimedia configuration

CONS: The one-year warranty that comes with this system is considered short nowadays

6 Micro Express MicroFlex-VL/80

REVIEWED: March 1995

PROS: Ultra-low $1383 price buys close to DX4-100 performance, good expandability

CONS: 540MB hard drive is pretty small, manuals overly technical, interior cluttered

7 Polywell Poly 486-80VB

REVIEWED: February 1995

PROS: Near DX4-100–level performance for an enticing price of only $1585

CONS: Included 14-inch monitor is on the small side by today's standards

8 Blackship P-75 Neptune

REVIEWED: October 1995

PROS: Aggressively priced at $1795, good multimedia configuration, 14.4-kbps fax-modem

CONS: Short parts warranty, cluttered interior

9 PerComp 4100 VIP

REVIEWED: July 1995

PROS: Above-average support policies, good multimedia PC for a reasonable $1839 price

CONS: Awkward on-screen monitor controls, only 1MB of DRAM on graphics controller

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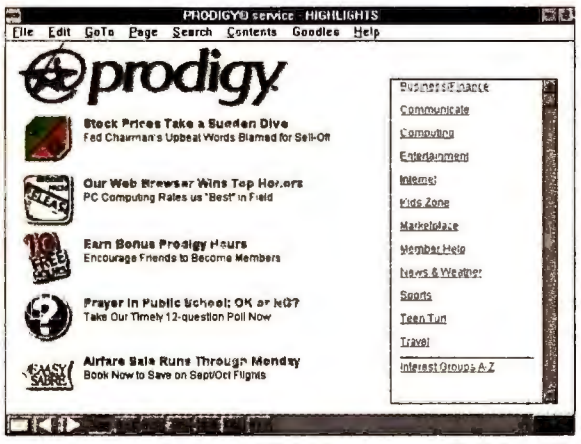

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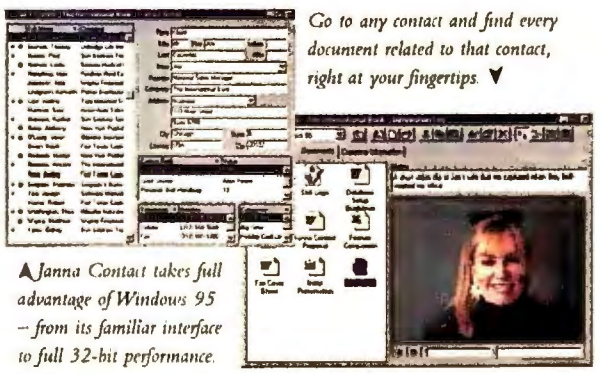

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Circle 119 on reader service card

10 Micro Express MicroFlex-PCI/P902

REVIEWED: October 1995

PROS: This $1949 Pentium -90 unit is the fastest budget desktop computer on the chart

CONS: You will probably want to get a larger hard disk than the supplied 540MB unit

11 Quantex QP5/75 M-1

REVIEWED: September 1995

PROS: Full multimedia setup and a generous software bundle for less than $2000

CONS: One-year warranty, shaky reliability, few open slots on motherboard

12 HiQ Mars Station

REVIEWED: August 1995

PROS: Very attractive $1591 price for a system based on AMD's AmDX4-100 processor

CONS: One-year parts warranty is brief, system comes with only one free SIMM socket

13 Intelesys Star 75

REVIEWED: May 1995

PROS: Solid P-75 performance, quad-speed CD-ROM drive, low $1949 price, 850MB hard drive

CONS: Cluttered cable-strewn interior makes adding expansion cards a bit of a chore

14 Netis N575

REVIEWED: October 1995

PROS: Excellent price, outstanding Pentium-75 performance, generous RAM, large hard drive

CONS: Short parts warranty, no CD-ROM drive or sound

15 HiQ Saturn Station

NEW THIS MONTH

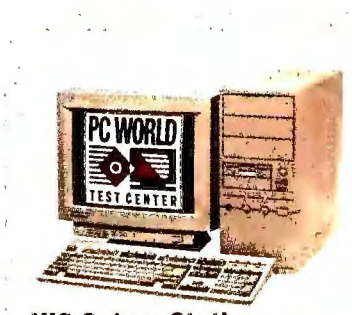
PROS: Powerhouse performance, ample storage, elegant design

CONS: Bare-bones feature set, lean software bundle, no system manual

If the auto industry mirrored the computer industry, say the pundits, today's cars would go 500 miles per hour, fit in a matchbox, and cost $25. But nothing can match the furious development of computers—their speeds increase exponentially while their prices come down by the day. Take the HiQ Saturn Station: It's about the fastest Pentium-75 we've tested and costs just $2065. With such awesome performance for the price, this Saturn assumes its rightful place on our intensely competitive Budget Top 20.

The Saturn Station ripped up the track in our performance tests; its scores equal those of many Pentium-90s. And the motherboard leaves plenty of room for expansion, thanks to one free PCI slot, three free ISA slots, and one slot that accommodates either a PCI or an ISA card. Upgraders will find one free externally accessible 3½-inch drive bay, three free externally accessible 5¼-inch drive bays, and two free internal 3½-inch drive bays—ample space for a CD-ROM drive or another hard drive.

That roominess is welcome, because the Saturn Station doesn't come with a lot of extras (a common condition in budget systems: manufacturers cut features in order to cut price). There's no CD-ROM drive, no sound card, no modem, and precious little in the way of software. But the basics are excellent. With 16MB of RAM, 256K of secondary cache, and a generous 1200MB hard drive, there's no shortage of memory or storage. And the graphics accelerator is a PCI-based Diamond Stealth 64 card with 2MB of DRAM that supports refresh rates up to an ultrasmooth 120 Hz. This excellent card offers slightly more power than the Hitachi SuperScan Pro 15-inch monitor can take advantage of, with its 72-Hz refresh rate at 800 by 600 resolution. While the card and monitor together support 1280 by 1024 resolution, most users will want to stick to 800 by 600 with the supplied monitor.



HiQ Saturn Station

Support policies aren't the best around, but they're not the worst. HiQ's warranty covers parts for one year and labor for two. The company offers a 30-day money-back guarantee, promises to repair your system in one business day, and will sell you two years of on-site service for $69. Toll-free phone support is available 9 hours on weekdays and 5 hours on Saturdays. We have not received enough responses in our ongoing fax-back survey to report on the company's reliability and service record.

The bottom line? The Saturn Station may be a bare-bones system, but it's superfast and has lots of room for upgrades. If you don't mind installing extra hardware yourself, take a closer look at this machine—it has near-matchless performance for the price. Even if you spend a few hundred dollars more on a CD-ROM drive and a set of speakers, you're still getting a great deal.

16 Blackship P-90 Neptune

REVIEWED: October 1995

PROS: Low price, multimedia configuration, 14.4-kbps fax-modem

CONS: Poor Pentium-90 performance, short parts warranty, cluttered interior

17 Swan Pentium 75 Series

NEW THIS MONTH

PROS: Great price for multimedia PC with 14.4-kbps fax-modem and loads of software

CONS: One-year warranty, cable tangle makes adding components difficult

Swan's $2049 Pentium 75 Series midsize tower has no outstanding features, but it's an uncommonly good package for the money. While many similarly priced systems are faster, you'd have a hard time finding an equal combination of speed and multimedia capabilities for such a low price.

In our tests, this Swan turned in the type of performance we've come to expect from a Pentium-75 PC. And it comes loaded with 8MB of RAM, an 855MB hard drive, a Toshiba quad-speed CD-ROM drive, and a Creative Labs 16-bit sound card. The graphics subsystem won't blow your doors off, but it's good enough for basic applications that don't require multicolor display at high resolution. The 15-inch monitor is paired with a 64-bit STB Powergraph graphics card armed with only 1MB of DRAM, which means you're limited to 65,536 colors at 800 by 600 resolution, or 256 colors at 1024 by 768. We generally recommend that you get 2MB of

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Circle 96 on reader service card

Model 2010
20 inch Color Monitor

18.8" viewable image size; digital on-screen controls include RGB, color temperature, zoom and tilt; 30 memory settings (18 user storable); anti-reflection, anti-static coating (AR-ASC); .28mm dot pitch; dynamic focusing; up to 1280x1024 @ 77 Hz, flicker-free; auto-scan to 1600x1280 NI; MPR II compliant; VGA and BNC inputs.

Model 1727
17 inch Color Monitor

EST. 16.1" viewable image size; digital on-screen controls include zoom, tilt and auto diagnostic; 34 memory settings (27 user storable); non-glare, anti-static coating; .28mm dot pitch; dynamic focusing; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.

Model 1527
15 inch Color Monitor

EST. 14" viewable image size; digital on-screen controls include RGB, color temperature and zoom; 40 memory settings (32 user storable); non-glare, anti-static coating; .28mm dot pitch; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.

VRAM or DRAM with the graphics card. On the other hand, most people won't want to spend large amounts of time at resolutions above 800 by 600 with the supplied 15-inch monitor; higher resolution images on a monitor that size can make text, icons, and other images look very small.

The company even tosses in a 14.4-kbps fax-modem and software to get you rolling on the Internet. But if you plan to do much net surfing (especially Web browsing), we suggest you upgrade to a 28.8-kbps fax-modem. Unfortunately, excessive cable clutter makes it hard to upgrade the components. As for software, the Swan P-75 has plenty. Among the bundled CDs are Microsoft's Encarta 95 multimedia encyclopedia and Managing Your Money personal finance software.

Swan

Even with all these components, you have lots of room to add more goodies. Our system had six free drive bays (three internal and three externally accessible), in addition to two PCI slots, one ISA slot, and one slot that accepts either type of card. If you decide you want to beef up RAM beyond the supplied 8MB, two free SIMM sockets give you an ample amount of room to do so.

Swan's support policies could be more robust—the one-year warranty and the business-hours-only tech support during the week are minimal. To its credit, Swan also offers Saturday support and one year of free on-site service, and you get a 30-day money-back guarantee. In addition, the company promises a three-day turnaround on factory repairs and provides the standard fax and BBS support lines. We have received few responses from users of Swan systems in our ongoing service and reliability fax-back survey, so it's too early to evaluate the company's performance.

With this Pentium-75 unit, Swan cut surprisingly few corners to deliver a solid-performing, decently outfitted multimedia PC for a great $2049 price. The budget-system seeker can hardly go wrong.

18 SmartWorks MT100HI

NEW THIS MONTH

PROS: Exceptionally inexpensive for a Pentium-100

CONS: Modest feature set, scant support

No, your eyes are not deceiving you. That *is* a Pentium-100 desktop on our Budget chart. Who could have predicted how soon you'd be able to buy a Pentium-100 for less than $2250 (our budget desktop price ceiling), let alone for $2049, the asking price for SmartWorks' MT100HI.

It should come as no surprise, then, that the MT100HI is about the fastest budget PC. It's not as fast as most P-100 systems we've seen, but it still whips by most of the Pentium-90s we've tested.

So what's the trade-off? In the case of this snappy little unit, it's a bare-bones configuration. Our MT100HI minitower came with 8MB of RAM, an 857MB hard drive, 256K of secondary cache, and a 15-inch monitor. There was no CD-ROM drive, no sound card, and no software bundle to speak of. But there's plenty of room for expansion—our unit had four free externally accessible drive bays and one free internal bay. For extra add-in cards, there are two free PCI slots, three free 16-bit ISA slots, and one extra slot that accepts either a PCI or an ISA card. Fortunately, two free SIMM sockets give you room to add memory without discarding the original modules—and you may want to add RAM if you plan to upgrade to Windows 95. Our preliminary test show that while most business applications in Windows 3.1 run almost as fast with 8MB as they do with 16MB, Windows 95 takes much greater advantage of the extra RAM.

With this system's rock-bottom price and a Pentium-100 processor to build on, you'll likely have room in your budget to add extras: A quad-speed CD-ROM drive might run you $400, a sound card $50 to $200, and a 28.8-kpbs internal fax-modem a few hundred dollars (see this month's "Top 10 Modems")—which means you can have a nicely decked out unit for well under $3000. And you may never need to upgrade the included Diamond Stealth 64 graphics card with 2MB of DRAM. A recipient of our World Class Award for 1995, the Diamond Stealth is an excellent performer—all it lacks is full-motion video acceleration. For that, check out one of the Diamond Stealth 64 Video 2200 family of cards (about $250 each with 2MB of DRAM).

SmartWorks' service and support policies could be better. True, the company's two-year warranty provides decent coverage, and you get the usual 30-day money-back guarantee. However, on-site service will cost you extra, and technical support is available only 9 hours a day, weekdays only. SmartWorks doesn't even offer tech support via BBS—one of the few vendors that doesn't these days. It does, however, promise to push repairs through the factory in a comparatively brisk two days. But whatever a company's policies and promises may be, the truest measure of its service comes from you, the readers, through our ongoing reliability and service fax-back survey. We'll report the results for SmartWorks as soon as we receive a sufficient number of responses.

SmartWorks

In short, SmartWorks' contender is a sparsely configured unit backed by generally minimal support policies. It takes its place on the Budget Desktops Top 20 because it's faster than most other systems at this price point. If you're a PC-savvy person and can find your way around inside a system to add components, we suggest you give this one a serious look.

19 MIS Multimedia DX4-100

REVIEWED: September 1995

PROS: This is a pretty quick machine for the $1995 price, and it comes with multimedia to boot

CONS: There's only one free high-speed slot (VL bus) at your disposal, one-year warranty

20 CompuTrend Premio P75

REVIEWED: July 1995

PROS: $1999 is not a bad price for a Pentium unit with 16MB of RAM and a 1083MB hard drive

CONS: A little slow for a Pentium-75 desktop, service-and-support policies are minimal

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Max. Res.:	1600 x 1200	1600 x 1200	1280 x 1024
Memory:	2MB (up to 4MB) VRAM	2MB VRAM	1MB (up to 2MB) DRAM

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Various Video CODECs supported and Software Drivers included
*Formerly known as Stealth64 Video VRAM

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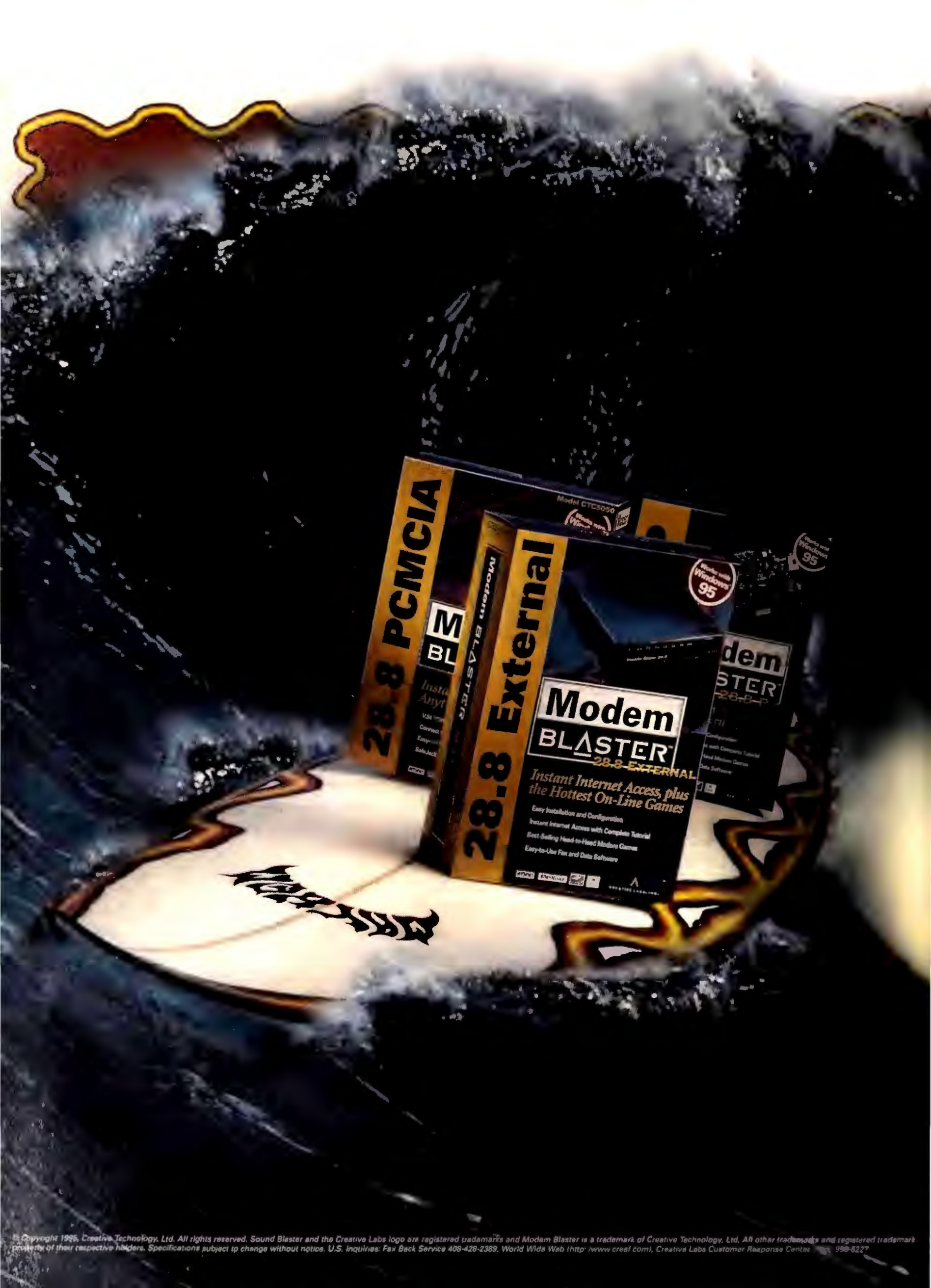

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Circle 54 on reader service card

THE TOP 20

PC WORLD NOTEBOOK PCs

1 **Dell Latitude XPI P90T**
Long-lasting Pentium.

POWER SYSTEMS

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Latitude XPI P90T	–	1	current	105	71	[3]	$5399	Pentium-90	16	810
2 Dell Latitude XPI P75D	–	1	current	104	61	[3]	$3899	Pentium-75	16	810
3 Texas Instruments TravelMate 5100	–	1	current	104	66	[3]	$5899	Pentium-90	16	1215
4 Texas Instruments TravelMate 5000	1	2	Oct 95	102	58	[3]	$4799	Pentium-75	8	810
5 Compaq Contura 420CX	–	1	current	101	42	83/82	$3199	DX4-75	8	420
6 AST Ascentia 910N	3	8	Apr 95	96	42	[3]	$3799	DX4-75	8	510
7 Compaq LTE Elite 4/75CXL	4	4	Aug 95	96	38	83/82	$4599	DX4-75	8	810
8 Gateway 2000 ColorBook2 DX4-100	6	4	Aug 95	95	58	[3]	$4199	DX4-100	24	720
9 Gateway 2000 Liberty DX4-100	5	5	July 95	95	54	[3]	$2999	DX4-100	8	352
10 Toshiba Satellite Pro T2150CDT	8	5	July 95	94	48	80/74	$5100	DX4-75	8	500

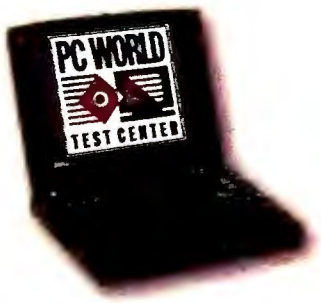
BUDGET SYSTEMS

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Latitude LX 4100D	–	1	current	96	50	[3]	$2629	DX4-100	8	420
2 NEC Versa V/75C	–	1	Apr 95	92	44	[3]	$2715	DX4-75	8	540
3 MPC TouchNote 700	2	5	July 95	91	33	[3]	$2159	DX4-75	8	528
4 Sharp PC-3010	1	3	Sep 95	90	33	[3]	$1899	Cx486DX2-66	8	324
5 WinBook XPC	5	2	Oct 95	89	30	[3]	$2519	486DX2-50	16	351
6 SwanNote DX4-75	–	1	current	88	36	[3]	$2199	DX4-75	8	520
7 Acom Patriot 4000 F	–	1	current	88	49	[3]	$2235	DX4-100	8	540
8 CTX EzBook 200D	4	3	Sep 95	88	36	[3]	$2398	DX4-75	8	340
9 Austin Business Audio 4/75	3	10	Feb 95	88	36	[3]	$2458	DX4-75	8	340
10 CTX EzBook 400D	–	1	current	87	40	[3]	$2399	DX4-100	8	520

BEST BUY

[1] CA = color active, CD = color dual-scan, CP = color passive [2] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top

Dell Latitude XPI P75D
Great speed for the money.



Dell Latitude LX 4100D
Speedy, light, you name it.

NEC Versa V/75C
Quality display.

Weight (pounds)	Battery life (hours)	Screen type/ size [1]	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments
7.2	6:38	CA/10.3"	800/289-3355	3712	670	Fastest notebook on chart has lots of RAM, roomy hard drive, and highly rated service.
7.2	6:18	CD/10.4"	800/289-3355	3713	671	Not as fast as P90T, but still speedy for a P-75 notebook, and $1500 cheaper.
7.6	6:09	CA/10.4"	800/848-3927	3714	672	It's pricey, but has a huge hard drive, lots of RAM, and long battery life.
6.4	5:47	CA/10.3"	800/848-3927	3710	673	Quick, light, great performance, excellent screen, and outstanding battery life.
7.4	6:08	CA/10.3"	800/345-1518	3715	674	Slow for a power note, but priced right and backed by top support.
7	7:55	CA/10.4"	800/876-4278	3683	675	Could be peppier, but has long battery life, three-year warranty, and decent price.
7.2	7:15	CA/10.3"	800/345-1518	3704	676	Slowest power note on chart has big hard drive, super battery, and fantastic support.
6.8	5:16	CP/10.3"	800/846-2000	3703	677	$200 price drop keeps Gateway ColorBook competitive.
6.6	6:47	CD/10.4"	800/846-2000	3700	678	Dual-scan color model with very good performance, light weight, fine battery, great price.
8.8	5:20	CA/10.4"	800/334-3445	3701	679	Multimedia note includes CD-ROM drive, 16-bit sound, and 65,536-color screen.
7.4	5:48	CD/10.4"	800/289-3355	3716	680	Dell's top-ranked Budget note features DX4-100 speed and long battery life.
8.8	3:01	CA/9.5"	800/632-4636	3717	681	Latest price drop lands speedy NEC note with 800 by 600 screen on Budget chart.
7.6	4:53	CD/9.4"	800/672-9919	3702	682	New price makes solid budget note a near Best Buy; good battery life.
7.2	5:14	CD/10.4"	800/237-4277	3705	683	Light Cyrix DX2-66 notebook sports a low price and long battery life.
7.2	4:34	CD/10.3"	800/468-2162	3711	684	WinBook has a fine mix of features; price drop keeps it high on the chart.
6.8	3:16	CP/9.3"	800/261-7926	3718	685	Great price for a DX4-75 notebook with a roomy hard drive.
7.8	3:12	CP/10.2"	800/898-2665	3719	686	Want great speed and don't need long battery life? Check out this DX4-100.
7.6	5:49	CP/10.3"	800/289-8808	3706	687	Performs well for a DX4-75; large screen and almost 6 hours of battery life.
8.2	3:57	CD/9.5"	800/331-1501	3676	688	Austin's notebook covers all the bases at an attractive price.
6.8	3:57	CP/10.5"	800/289-8808	3720	689	Light notebook has a large screen and a roomy hard disk.

20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available October 23). Touch-tone phone required.
[3] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 100 responses.

For more information about all products in this table, circle reader service no. 906.

Top 20 Notebooks

DELL DELIVERS A ONE-TWO PENTIUM PUNCH in the power notebook lineup this month. In top spot is the $5399 Latitude XPi P90T, a P-90 note with just about everything you could want in a totable except multimedia. It's the fastest notebook available, keeping pace with most P-75 *desktops*. The Pentium-75 Latitude XPi P75D, our number two power note, costs $1500 less and is virtually identical to its pricier stablemate except for its dual-scan screen and slower performance.

Five DX4-75 and DX4-100 notebooks debut on our budget chart. Dell is at the top again, with the Latitude LX 4100D, a nicely configured unit with long battery life and backed by terrific support. NEC's Versa V/75C, reviewed in April but on the Top 20 for the first time, follows in second place. This 8.8-pound DX4-75 is heavy and its 3-hour battery life marginal, but it's as fast as some DX4-100s.

Power Notebooks

1 Dell Latitude XPi P90T

NEW THIS MONTH

PROS: Excellent battery life, fast performance, good documentation, three-year warranty

CONS: Pricey

Dell's Latitude notebooks have repeatedly found their way onto both the budget and the power sections of our Notebook Top 20, so it's not surprising this Pentium-90 Latitude with 16MB of RAM and an 810MB removable hard drive has the right stuff. In fact, its combination of exceptional battery life, solid performance, top-notch feature set, and pleasing ergonomics propels it all the way to the top of the power notebook list. Yes, the stiff $5399 price is not for the faint of budget. But you get your money's worth—the P90T is clearly your top choice in a high-performance portable PC.

This computer's outstanding feature is marathon battery life: In tests, its lithium ion battery delivered over 6.5 hours of computing on a charge, the longest we've seen a Pentium notebook chug along untethered from the wall. This portable's performance is also pretty impressive. Although the P90T is not the fastest Pentium-90 notebook we've had on the test bench, it's not far behind. And at 7.2 pounds, including a slim AC adapter, it's also one of the lighter Pentium notebooks you can find.

Another plus is the 10.3-inch active-matrix screen, which displays up to 16.8-million colors, a boon for travelers who need to work with color-rich images on the road. With such a large, bright display producing rich images viewable from various angles, the Dell is a natural for giving presentations to small groups without using an external monitor. The active-matrix screen also makes the P90T much easier to use on planes and in other places with varying light conditions than its siblings with passive screens. The oversize, sculpted wrist rest and full-travel keyboard allow for comfortable typing, while a medium-size trackball centered below the keyboard let us wend our way smoothly and quickly around the screen.

Dell Latitude P90T

The Latitude's documentation—both printed and on-screen—is thorough and readable, and a setup poster makes getting started a snap. Dell is one of the few notebook vendors that designs software bundles especially for mobile workers. The Latitude comes with remote control and remote access utilities from Traveling Software, an AutoMap trip-routing package, and other programs that should prove handy on the road.

Based on our surveys, readers are enthusiastic about Dell's service and support, and for good reason: The company offers 24-hour phone support and a year of free on-site service. And bravo to Dell for including a lengthy three-year warranty—a rarity among notebook vendors that helps firmly establish the Latitude XPi P90T as our top Best Buy this month.

2 Dell Latitude XPi P75D

NEW THIS MONTH

PROS: Long battery life, strong performance, comprehensive documentation, three-year warranty

CONS: None

If your lust for portable power is tempered by a limited budget, this $3899 75-MHz Pentium notebook from Dell may be just what you need. It provides many of the virtues offered by the Dell Latitude XPi P90T—this month's top power note—for $1500 less.

Dell Latitude P75D

This Latitude comes with 16MB of RAM and an 810MB removable hard drive and is among the fastest Pentium-75 notebooks we've seen. Its battery life is most impressive: We got more than 6 hours of operation on a single charge of its lithium ion battery. Although the XPi P75D's 10.4-inch color dual-scan screen is less vivid (and more difficult to view from an angle) than the active-matrix screen on its costlier P-90 sibling, its more than 65,000 hues provide much richer images than most notebooks, even most of those sporting color active-matrix screens.

Apart from processor speed and screen type, the Latitude XPi P75D is identical to the XPi P90T, with the same pleasing features, ergonomics, and documentation and backed by Dell's strong service and support and a three-year warranty.

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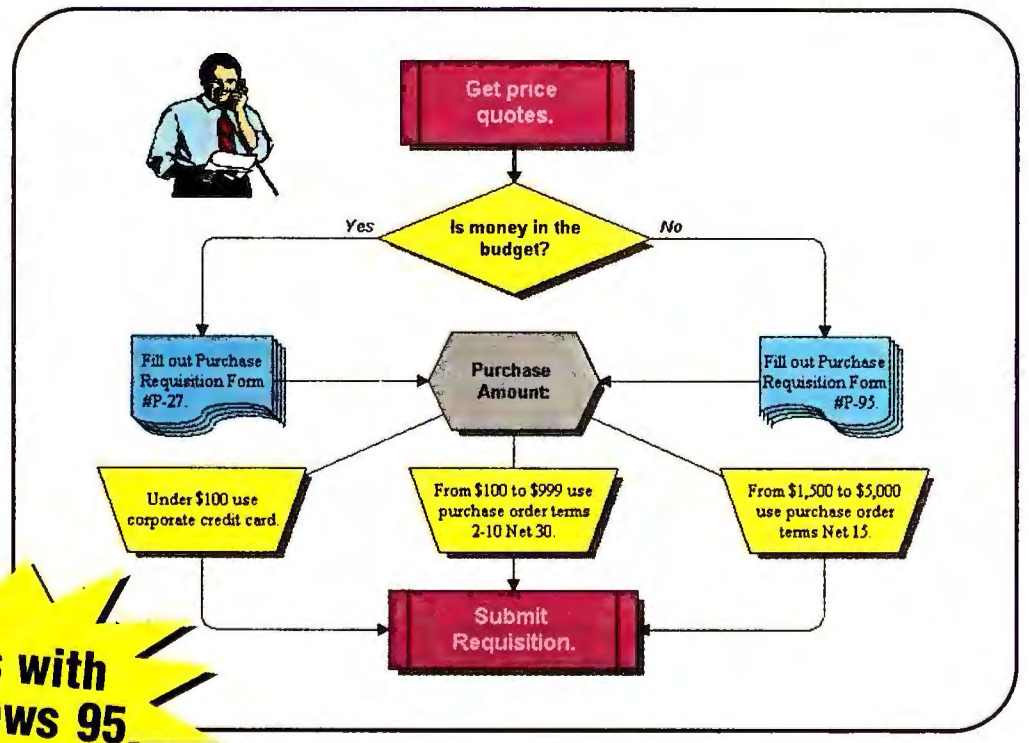

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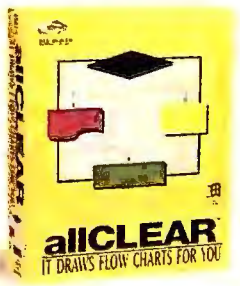

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3 Texas Instruments TravelMate 5100

NEW THIS MONTH

PROS: Outstanding battery life for a Pentium note, 1215MB hard drive

CONS: Pricey

The newest flavor of Texas Instruments' TravelMate series is Pentium-90. Thanks to an impressive list of features, it checks in near the top of our power notebook section. Its $5898 price can be hard on the wallet, but considering the hardware—including 16MB of RAM, 256K of secondary cache, and a huge 1215MB removable hard drive—you get what you pay for.

TI TravelMate 5100

The TravelMate's crisp 10.4-inch active-matrix screen supports more than 65,000 colors—a plus for graphics mavens on the go. Multimedia features include 16-bit sound, a speaker, and a microphone. It all adds up to just 7.6 pounds, making this one of the lightest Pentium notebooks we've seen.

The TravelMate also ranks high among Pentium notes in terms of battery life, running for more than 6 hours on a charge. And it performs like a P-90 notebook, meaning it's one of the fastest you can buy.

The TravelMate's design is sturdy. Its keyboard has a smooth, comfortable feel, with a minijoystick TrackPoint device located above the B key. Expansion options include a PC Card slot that supports either two Type II cards or one Type III. You can attach an external mouse and keyboard simultaneously through a single port using a Y-cord. An infrared port lets you connect to compatible peripherals without using cables.

Most of the on-screen documentation is available only within Windows, but it's generally thorough. TI provides a three-year warranty on the TravelMate, with 24-hour toll-free support available every day of the week.

It's pricey, but this TravelMate hits all the bases with top-end power, loads of features, and good support—it's almost a Best Buy.

4 Texas Instruments TravelMate 5000

REVIEWED: October 1995

PROS: Light, great performance, outstanding battery life

CONS: Documentation lacks detail, mouse buttons tough to master

5 Compaq Contura 420CX

NEW THIS MONTH

PROS: Fast, good price, excellent reliability and service ratings

CONS: No software bundled with the system

To rank among the top five power notebooks, a DX4-75 system must combine exceptional features and performance with outstanding reliability and a competitive price. That's what you get with Compaq's $3199 Contura 420CX. Thanks to smart design, long battery life, and top-rated reliability and service, the 420CX breaks the Pentium notebooks' monopoly at the top of the chart. Its performance numbers equal the scores of some DX4-100 notes.

The 420CX comes with 8MB of RAM, a 420MB removable hard drive, and a PC Card Type III slot that alternatively accepts two Type II cards. We were particularly impressed with the system's 10.3-inch color active-matrix screen. The bright, sharp display doesn't shorten battery life as active-matrix screens sometimes do. In fact, the 420CX ran for over 6 hours in our tests. All that our test system lacked was application software.

A front-and-center trackball is easy to control and works nicely with the quiet, comfortable keyboard. Screen hinges appear rigid enough to keep the screen from loosening up over months of your opening and closing the lid, and the sturdy casing should endure the rigors of the road well. And at 7.4 pounds, the Contura 420CX won't strain your back or arms when you tote it around.

Compaq Contura

A large majority of Compaq notebook buyers responding to our reliability and service survey give the company a thumbs-up. The Contura line includes a three-year warranty and nonstop technical support. You can also find answers to questions without unwrapping the manual through the host of electronic help files Compaq puts on its hard drive. The 420CX is set for heavy road work, thanks to fast performance, a battery that keeps going and going, very manageable travel weight, and thoughtful design.

6 AST Ascentia 910N

REVIEWED: April 1995

PROS: Lithium ion battery runs for nearly 8 hours, fast DX4-75 performance, small and light

CONS: Fairly high price for a DX4-75, some looseness in the screen hinge

7 Compaq LTE Elite 4/75CXL

REVIEWED: August 1995

PROS: Compaq's service and reliability gets top ratings; has nice screen, long battery life

CONS: This notebook's performance is quite sluggish for an expensive DX4-75 unit

8 Gateway 2000 ColorBook2 DX4-100

REVIEWED: August 1995

PROS: A nimble performer that's nicely decked out with 24MB of RAM, light 6.8-pound weight

CONS: Passive screen displays dull, faded hues and can be hard to read in variable light

9 Gateway 2000 Liberty DX4-100

REVIEWED: July 1995

PROS: Great performer, and it chugged along for nearly 7 hours in our battery run-down tests

CONS: Screen has dull, faded colors, pointing device can be awkward to use

10 Toshiba Satellite Pro T2150CDT

REVIEWED: July 1995

PROS: Excellent performance, good battery life, one of the few notes with built-in CD-ROM drive

CONS: $5100 is a steep price for this heavy 8.8-pound unit, battery swapping can be awkward

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Budget Notebooks

1 Dell Latitude LX 4100D

NEW THIS MONTH

PROS: Fine performance and battery life, packs large screen into small case, thorough documentation, three-year warranty

CONS: Cramped keyboard

How good is the new $2629 Dell Latitude LX 4100D? This DX4-100 is so far and away our number one budget notebook, it could even rank among our top power notes. With a thrifty price, excellent features, speedy performance, and top-rung support, this budget notebook may not be surpassed for a long time.

Simply put, with its 8MB of RAM and a 420MB hard drive, the LX 4100D is the fastest notebook we've tested for the money. Its NiMH battery provides nearly 6 hours on a single charge—another terrific statistic. If that isn't enough power, you can replace the system's floppy drive with an additional battery.

This 7.4-pound Latitude is compact for a full-size notebook, a virtue if you need to cram it into a crowded briefcase. The system's relatively petite case contains a spacious 10.4-inch dual-scan color screen. The trade-off for the compact size? The keyboard is slightly compressed, and our hands felt a bit cramped as we typed. Fortunately you get a wrist-rest area, along with a center-mounted trackball that's easy to maneuver with your thumbs.

Dell Latitude 4100D

The software bundle includes AutoMap mapping software, which helps you quickly plot out the best travel route, and Traveling Software's CommWorks communications suite, which will come in handy on the road. Our unit came with a 14.4-kbps modem installed in one of the two PC Card Type II slots. The system's manual and wealth of on-screen help are among the best we've seen for a notebook, its three-year warranty is far superior to the one-year plans still commonplace for mobile PCs, and readers give Dell one of the highest reliability and service ratings we've seen among notebook vendors.

2 NEC Versa V/75C

REVIEWED: April 1995

PROS: Fast, 800 by 600 screen, three-year warranty

CONS: Hefty 8.8-pound traveling weight

The Versa's latest price reduction—to $2715—brings the unit onto our budget list. It's an excellent deal, considering the 540MB hard disk, color-rich active-matrix screen, solid DX4-75 performance, and long warranty.

3 MPC TouchNote 700

REVIEWED: July 1995

PROS: Great price, good battery life, decent built-in sound

CONS: One-year warranty, no weekend tech support, mushy keyboard

4 Sharp PC-3010

REVIEWED: September 1995

PROS: Inexpensive, long battery life, excellent screen, GlidePoint touchpad, infrared capability

CONS: Somewhat limited support policies

5 WinBook XPC

REVIEWED: October 1995

PROS: Reasonable $2519 price, 14.4-kbps internal fax-modem, 16MB of RAM

CONS: None

6 SwanNote DX4-75

NEW THIS MONTH

PROS: Low price, extra battery, on-site service

CONS: Poor documentation, one-year warranty

The $2199 SwanNote DX4-75 satisfies bargain hunters without skimping on essentials. You get 8MB of RAM, a 520MB removable hard drive, and a 9.3-inch passive color display. Despite below-average performance for its CPU class, it's worthy of a place on our budget notebook chart.

Although the SwanNote is slower than most DX4-75 notes we've tested, it's fast for a notebook in its price range. The unit's nickel–metal hydride battery lasted a respectable 3.3 hours in our tests. For extra juice on those long business trips, the SwanNote comes with a second battery pack that can slide in the slot where the floppy drive normally resides, bringing total battery life to over 6 hours. Sure, the extra battery adds to the travel weight. However, since the notebook weighs only 6.8 pounds to begin with (including the external AC adapter), the additional half pound won't slow you down.

SwanNote

The SwanNote has a slot for one Type III or two Type II PC Cards, plus an extra proprietary slot for adding sound capabilities. A TrackPoint-type miniature joystick is embedded in the keyboard, and mouse buttons are located directly below the keyboard—convenient for both left- and right-handed users. You even get the Internet in a Box software package for scanning the Net on the road. (We recommend that you get a 28.8-kbps V.34 fax-modem if you plan on doing doing any serious Networking.) However, the PC Card slot proved difficult to open, and the screen's slight dullness tired our eyes after a while. Still, many people will find these trade-offs more than acceptable in light of the system's low price.

The company's support policies are a mixed bag. On the downside, the SwanNote comes with a short one-year warranty, and weekday tech support is available only during business hours. You can also reach support on Saturdays, however, and Swan provides a year of free on-site service—unusual for a notebook. In addition, you get the typical 30-day money-back guarantee. All told, the SwanNote DX4-75 is a fine value: a no-frills system that delivers the basic goods and decent performance for an excellent price.

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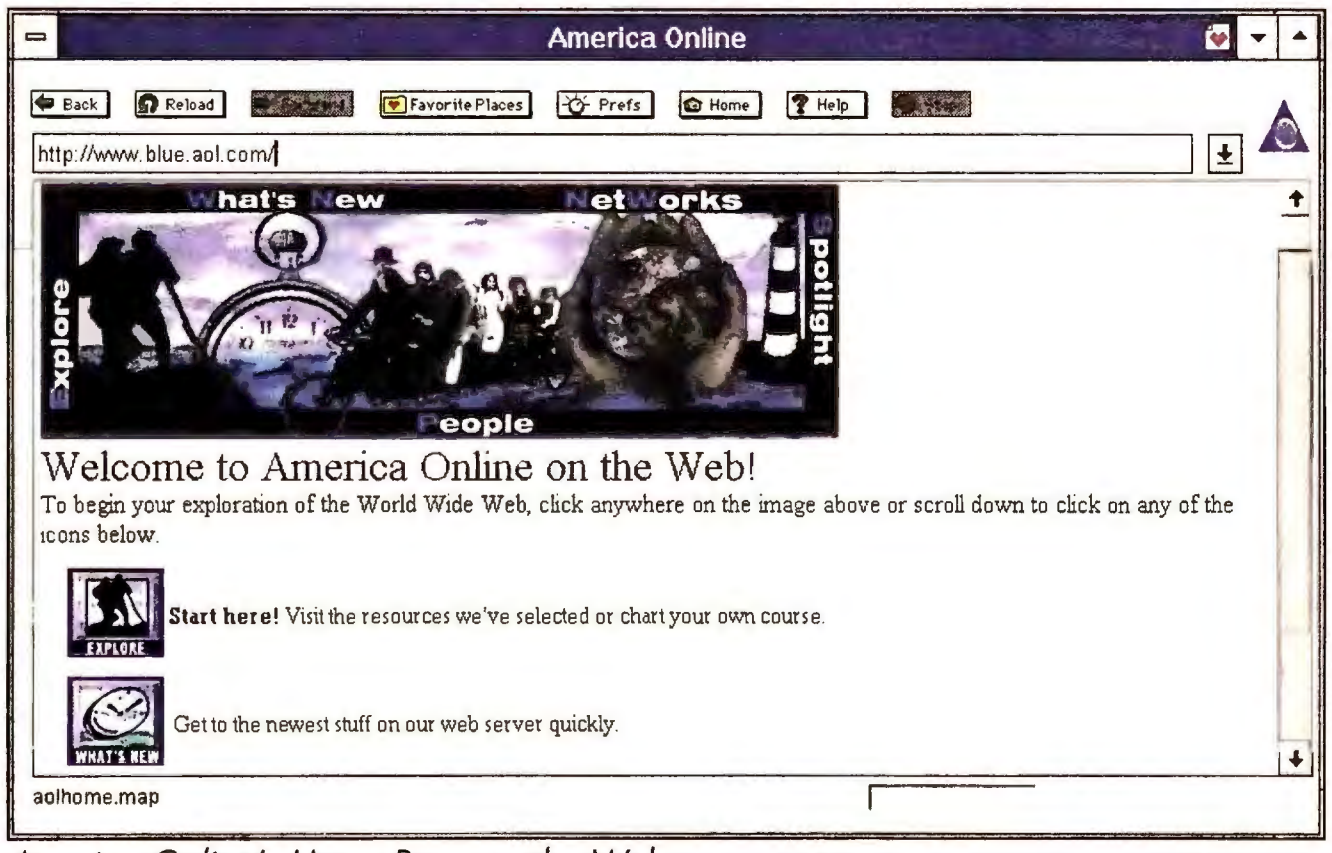

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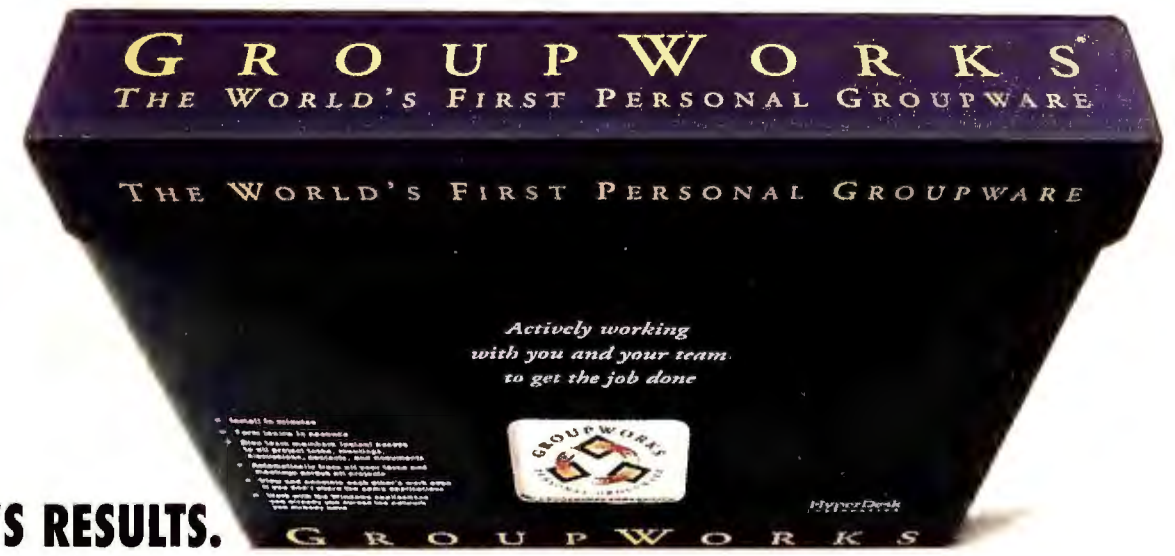

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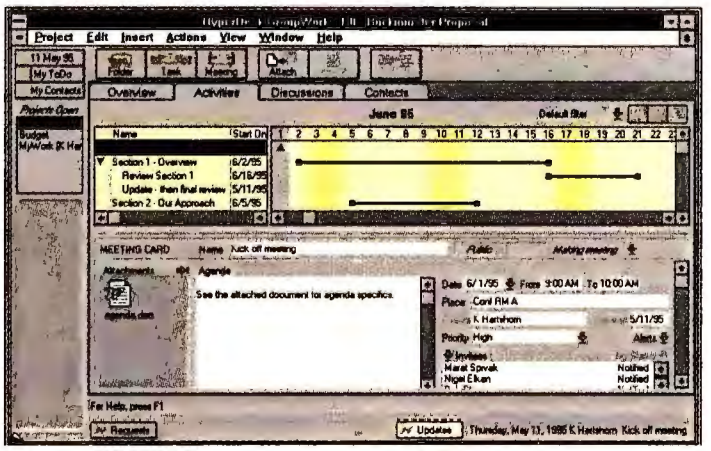

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7 Acom Patriot 4000 F

NEW THIS MONTH

PROS: Low price, roomy 540MB hard disk, good performance

CONS: One-year warranty, sparse documentation, awkward pointing device

This unit has a few design problems, and Acom's service and support policies could be better, but you'd be hard-pressed to find a notebook that delivers more performance for the price. With a great $2235 price tag and performance numbers markedly higher than those of the typical DX4-100 notebook, the Acom Patriot 4000 F lands comfortably on our budget list.

The Patriot comes well equipped with features, including a 10.2-inch passive color screen, 16-bit sound, built-in speakers, and a microphone. Acom notebooks we've tested in the past typically have had relatively short battery life, but this one lasted an acceptable 3.2 hours in our rundown tests. Its 7.8-pound travel weight is not overly heavy.

Acom

Drawbacks? A lackluster screen and limited brightness range. In addition, the unit we saw had no application software. But our biggest criticism concerns the pointing device. You need strong fingers to operate the two mouse buttons that control the built-in GlidePoint, and the device didn't work reliably for double-clicking. Removing the drive and battery also was difficult.

Acom's support policies are meager—a one-year warranty, a 30-day money-back guarantee, and technical support only during weekday business hours. But the support we received was commendable: Hold times averaged just 2 to 3 minutes.

With a great price, generally solid features, and exceptional performance, the Acom Patriot 4000 F is a decided improvement over the company's previous DX4-100 notebook.

8 CTX EzBook 200D

REVIEWED: September 1995

PROS: Very good performance for the price, long battery life, easy-to-use pointing device

CONS: No money-back guarantee

9 Austin Business Audio 4/75

REVIEWED: February 1995

PROS: Decent $2456 price for solid DX4-75 performer with nearly 4 hours of battery life, 24-hour tech support

CONS: One-year warranty, 8.2-pound travel weight, limited power management

10 CTX EzBook 400D

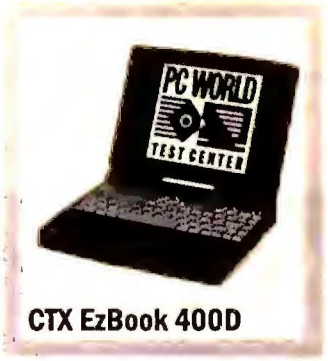
NEW THIS MONTH

PROS: Good price for a DX4-100 notebook

CONS: Sluggish performance for its CPU class, marginal support policies

For just $2399, the CTX EzBook 400D delivers a DX4-100 processor and has a light travel weight. Few notebooks on our budget chart offer such a powerful CPU for such a low price. Only thing is, the EzBook 400D performs slower than most notes in its processor class. It's also not the best designed unit we've seen, but it costs so much less than its speedier peers and scores so well on the luggability scale, it lands on the Notebook chart.

Weighing in at a lean 6.8 pounds, the CTX comes with 8MB of RAM, a 520MB removable hard disk, and a bright 10.5-inch passive color screen. The unit also has one PC Card Type III slot, which alternatively holds two Type II cards. The nickel–metal hydride battery we tested lasted almost 4 hours—a decent, if not fabulous, battery life.

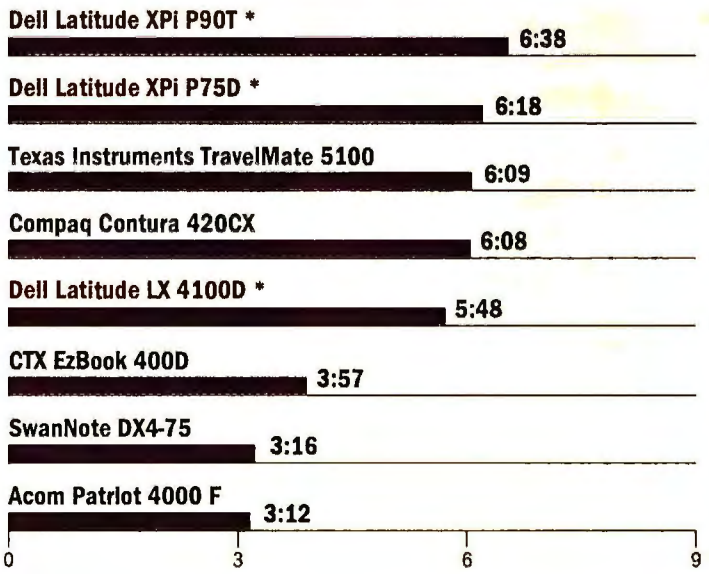


CTX EzBook 400D

We were less impressed with the hard-disk and battery release mechanisms, which were tough to use, and with the flimsy gate on the port bay. Nor did we like the mouse buttons' placement on the wrist rest—we kept hitting them inadvertently while typing. And the GlidePoint tracking device frequently didn't recognize double-clicking.

The one-year warranty and 9-hour toll-free tech support on weekdays are skimpy by today's standards, and there's no question CTX should work on this unit's design. But despite performing more like a quick DX4-75 than a DX4-100, the EzBook 400D is still fast for a budget notebook. Consumers working with word processors, electronic calendars, and other less-demanding applications may find it fits their needs—and their budgets—very neatly.

TEST REPORT Battery Life



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Time in hours:minutes.

Methodology
We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

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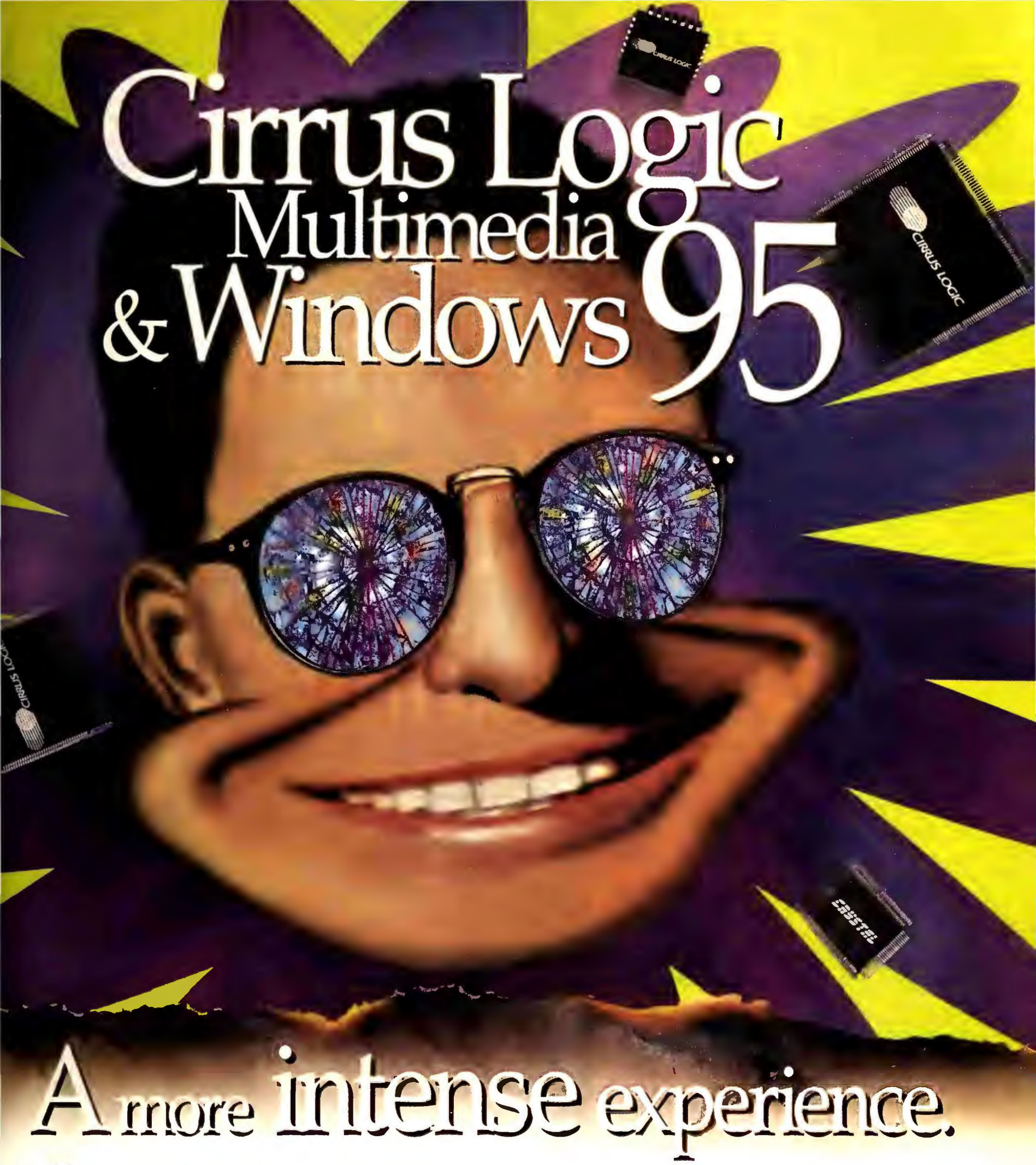

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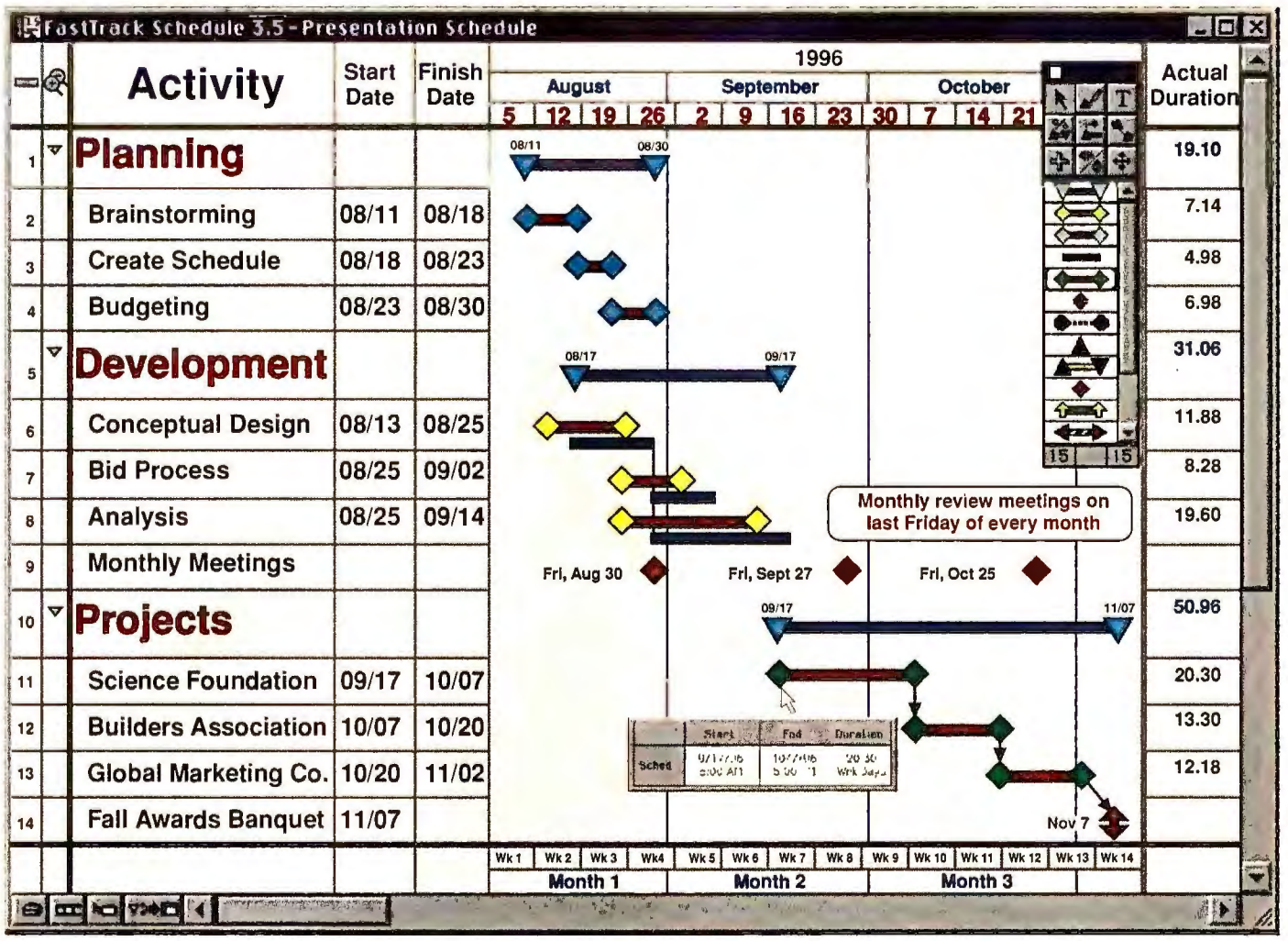

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Start

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Windows Magazine

FEATURES COMPARISON This Month's Contenders—Desktops

● = Yes ○ = No

n/a = not applicable

Standard features	Austin PowerPlus 133	Dell Dimension XPS P133c	Everex Step Pro P133	HiQ Saturn Station	Quantex QP5/133 SM-1	SmartWorks MT100HI	Swan Pentium 75 Series	Tangent MediaStar 5133
Street price as of 7/31/95 [1]	$4499	$3899	$3695	$2065	$3249	$2049	$2049	$3295
CPU	Pentium-133	Pentium-133	Pentium-133	Pentium-75	Pentium-133	Pentium-100	Pentium-75	Pentium-133
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	AMI 5/10/95	AMI v1.00.02	AMI v1.00.02	AMI v1.00.01BS0	P&P 6/7/95	Phoenix 5/3/95	Phoenix 1/19/95	Award 6/27/95
Installed/maximum RAM (MB)	16/128	16/128	16/128	16/128	16/128	8/128	8/128	16/128
SIMM sockets/number free	4/0	4/2	4/0	4/2	4/2	4/2	4/2	4/2
Secondary RAM cache installed/maximum (K)	256/1024	512/512	256/512	256/256	256/512	256/512	256/512	512/512
Case style	minitower	minitower	tower	minitower	tower	minitower	tower	compact
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/2	0/2	1/3	0/3	1/3	0/3	1/1
Free internal 3½-inch/5¼-inch drive bays	2/0	1/0	2/0	2/0	4/0	1/0	3/0	1/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/2/0 [2]	0/2/0 [2]	0/3/0 [2]	0/4/0 [2]	0/2/0	0/4/0 [2]	0/2/0 [2]	0/2/0
PCI or VL bus slots/number free	4 PCI/2 [2]	4 PCI/3 [2]	4 PCI/3 [2]	3 PCI/2 [2]	3 PCI/2	4 PCI/3 [2]	4 PCI/3 [2]	4 PCI/3
Hard disk	WD Caviar 31600	Quantum 1080A	Conner CFA1275A	WD Caviar 31200	WD Caviar 31600	WD Caviar 2850	Seagate ST5850A	Quantum 1080A
Size (MB)	1624	1080	1278	1200	1624	857	855	1080
Adapter	integrated	integrated	integrated	integrated	integrated	integrated	integrated	integrated
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	ATI Mach 64	Number Nine FX Motion 771	ATI WinTurbo	Diamond Stealth 64 DRAM	ATI Mach 64	Diamond Stealth 64 DRAM	STB Powergraph 64	Diamond Stealth 64 Video VRAM
Installed VRAM/DRAM (MB)	2/0	2/0	2/0	0/2	0/2	0/2	0/1	2/0
Monitor	Nokia 447L	Dell D1728-LS	TVM Professional	Hitachi SuperScan Pro 15	MAG DX17F	AOC Int'l/Spectrum Series 5Hlr	Sampo KM-500	ADI MicroScan 5EP
Tube/viewable area (diagonal inches)	17/15.6	17/15.6	17/15.8	15/13.6	17/16	15/14.1	15/14.1	17/15.3
Dot pitch (mm)	.28	.28	.28	.28	.26	.28	.28	.28
Modem speed for fax/data (kbps)	14.4/28.8	14.4/28.8	n/a	n/a	14.4/28.8	n/a	14.4/14.4	n/a
Sound board	integrated 16-bit	Sound Blaster AWE32	integrated 16-bit	n/a	Ensoniq SoundScape	n/a	Creative Labs 16-bit	Mozart Sound Card
CD-ROM drive	Plextor 6Plex PX-63CS	NEC CDR-272	Mitsumi CRMC-FX400	n/a	Toshiba XM-5302B	n/a	Toshiba XM-5302B	Teac CF-506A
Data transfer rate (K/sec)	900	600	700	n/a	600	n/a	684	600
Parallel/serial/mouse/SCSI ports	1/2/0/1	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/1/0	1/2/0/0
Service and support								
Warranty (years)	3	3 [3]	3	2 [4]	1	2	1	3
30-day money-back guarantee	●	●	●	●	●	●	●	●
On-site service first-year price	free	free	free	$69 [5]	free	$65	free	free
Repair turnaround policy (days)	4	○	2	1	1	2	3	2
Daily toll-free phone support (hours)	24	24	24	9	11 [6]	9	9	12
Weekend support	●	●	○	● [7]	● [7]	○	● [7]	● [7]
BBS/fax	●/●	●/●	●/●	○/●	●/●	○/●	●/●	●/●

BEST BUY

[1] All systems priced as configured with DOS 6.0 or later version, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] One less 16-bit slot available when PCI slots are filled and vice versa.

[3] Three years parts, one year labor.

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[6] 9 hours on Fridays.

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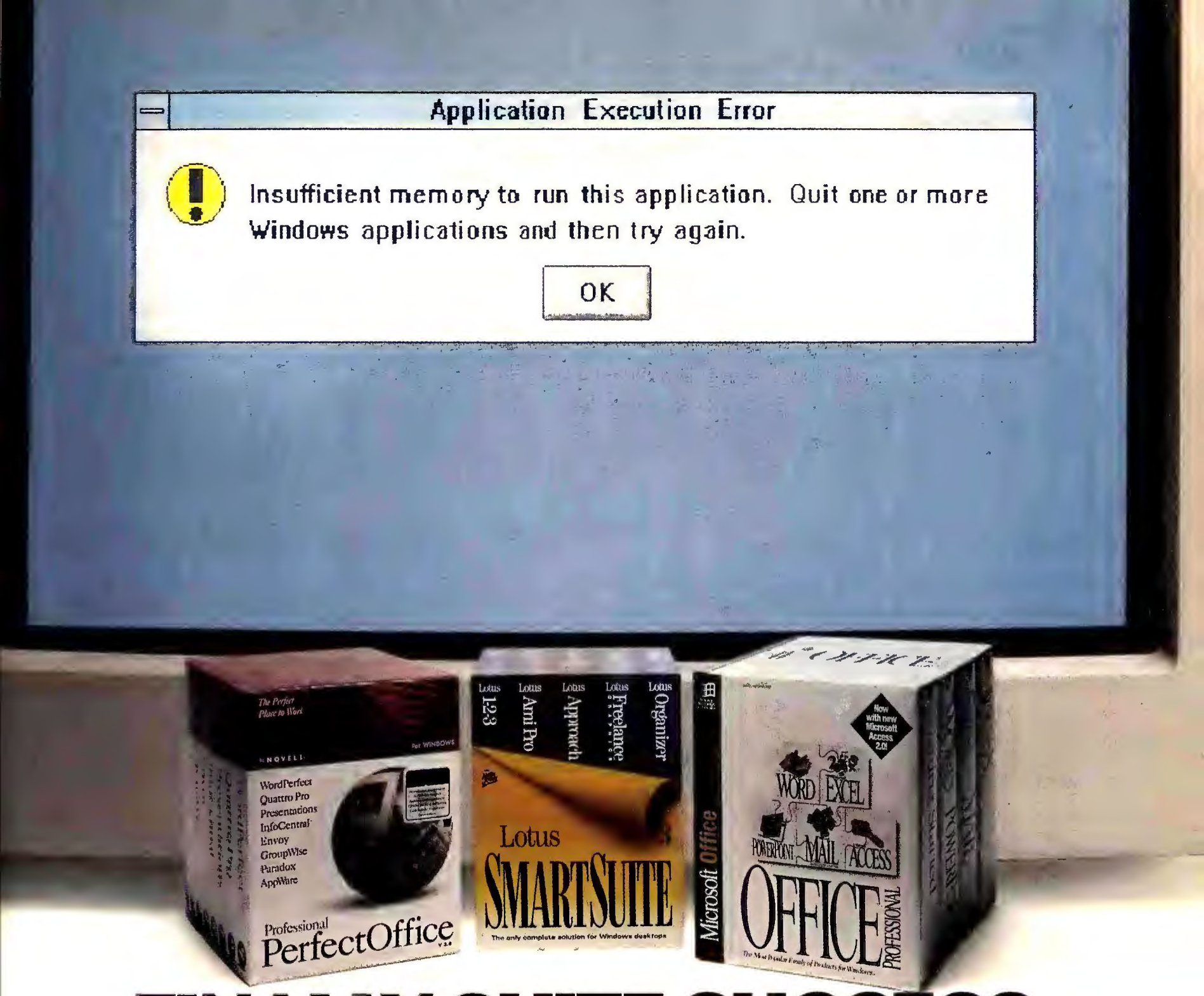

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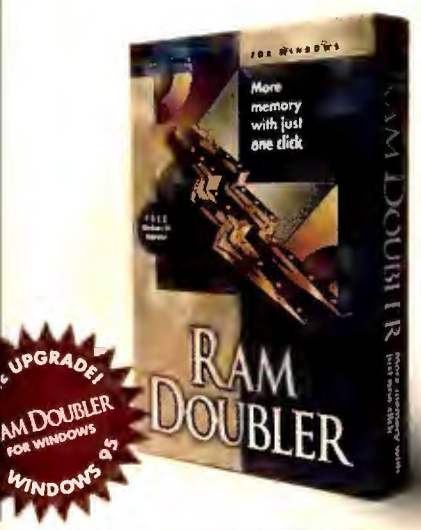

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Uses Compression To Double Application Memory Space	✓	✓	✓	✓
Doesn't Modify Autoexec.bat Or Config.sys.	✓			✓

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SYSTEM REQUIREMENTS: A PC equipped with a 386, 486, Pentium or equivalent processor. Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11, running in 386 enhanced mode. 4 MB RAM required. 8 MB RAM recommended. RAM Doubler for Windows works in tandem with any DOS memory extender, such as QEMM or Netroom. © 1995 Connectix Corporation. 2655 Campus Drive, San Mateo, CA 94403 USA. 800 839 3628 • 415-571-5100 • FAX 415-571-5195. RAM Doubler is a trademark of Connectix Corporation.
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System Snapshots

These desktops and notebooks were tested and reviewed along with the others but didn't score high enough to reach the Top 20 charts.

BSI NP7660T

PROS: Matchless speed, 810MB removable hard disk

CONS: One-year warranty, 15-day money-back guarantee

At $3725, this Pentium-100 screamer is the fastest notebook we've ever tested, and it has some impressive extras like built-in sound. But weak service policies and a flimsy keyboard keep it off the Notebook chart. *Broadax Systems, 800/872-4547, 818/442-0020* **Reader service no. 691**

Caliber Viking DX4/100

PROS: Toshiba quad-speed CD-ROM drive

CONS: Slow for a DX4-100, no toll-free support

Even considering its low $1988 price, the Caliber Viking is modestly configured—8MB of RAM, 545MB hard drive, no audio. Slow DX4-100 performance, subpar support policies, and scant bundled software hurt its value further. *Caliber Computer, 510/353-1220* **Reader service no. 692**

DTK DTN-5P90

PROS: Great price for a Pentium-90 notebook

CONS: Heavy, poor display quality, no toll-free tech support

This $3200 notebook with 16MB of RAM and an 810MB hard drive almost makes the chart, but faint lines across its color dual-scan screen are distracting, and at 8.8 pounds, it's heavier than most notebooks. Plus, the 3.7-hour battery life can't cut it on the power list. *DTK Computer, 800/289-2385, 818/810-0098* **Reader service no. 694**

Gateway 2000 P5-100

PROS: Low price, big software bundle, three-year warranty

CONS: Modest features, except for 1GB hard drive

This fine-tuned version of Gateway's P5-100 desktop is faster than the model we saw in September but not as fast as the souped-up P5-100XL we reviewed in June. Even so, at $2714 (including Microsoft Office) it's an excellent value that just misses the Top 20. *Gateway 2000, 800/846-2000, 605/232-2000* **Reader service no. 695**

IBM ThinkPad 701C

PROS: Only subnotebook with full-size notebook keyboard; 5-hour battery life

CONS: $4348 too much for a DX2-50 note

Too much money for too little power. Still, this subnotebook's full-size collapsible keyboard is the coolest thing to pop up on briefcase PCs since the flat-panel color screen. *IBM PC Co., 800/426-2968, 9191/517-1850*

Intelesys Pentium 120MHz

PROS: Low price, 28.8-kbps fax-modem, 16-bit sound, Mitsumi quad-speed CD-ROM drive

CONS: 15-inch monitor small for high-end power system

The Intelesys Pentium-120 offers an attractive bundle for $2899, including 16MB of RAM, a 1GB hard drive, solid multimedia, and a fast modem. With decent speed, it's an above-average value. *Intelesys, 800/577-2486, 510/226-0200* **Reader service no. 696**

Maximus Magna Media P100

PROS: Fast for the money, decently configured

CONS: One-year warranty, short support hours

This Maximus isn't a bad deal for $2675—16MB of RAM, an 850MB hard drive, a 15-inch monitor, and multimedia. Plus, it runs faster than most Pentium-100 systems. However, support policies are on the thin side. *Maximus Computers, 800/888-6294, 818/305-5925* **Reader service no. 697**

Polywell Poly 5133T3

PROS: Lightning fast, feature rich, excellent support policies

CONS: Monitor has low refresh rate; no CD-ROM manual

The high-velocity Poly 5133T3 tower PC misses the Top 20 by a hairbreadth. At $3995, it comes with a 1080MB hard drive, plus a quad-speed CD-ROM drive, an internal 28.8-kbps fax-modem, and a 16-bit sound card. Polywell's warranty covers labor for five years and parts for three. *Polywell Computers, 800/999-1278, 415/583-7222* **Reader service no. 699**

Robotech Cobra XLT P75

PROS: Good price for P-75 multimedia system, good support

CONS: Smallish 540MB hard drive, poor manuals

At $2170, this compact system offers a strong configuration, with loads of software, six-watt speakers, and decent speed for a Pentium-75. It's an above-average unit if not a Budget Top 20 value. *Robotech, 800/533-0633, 801/565-0645* **Reader service no. 700**

Sceptre Pentium Soundx

PROS: 10.4-inch screen, built-in microphone and speakers, three-year warranty, roomy keyboard

CONS: Tinny speaker quality, 8.4-pounds, short battery life

Sceptre offers a lot of notebook for $3995, including good P-90 performance, a large active-matrix screen, 16MB of RAM, a 540MB hard drive, and a good warranty. But short 2.3-hour battery life keeps it off the chart. *Sceptre Technologies, 800/788-2878, 818/369-3698* **Reader service no. 701**

SmartWorks MT120HI

PROS: Low price, good expandability

CONS: Lackluster documentation, weak software bundle for a multimedia system

This $3000 multimedia minitower with 16MB of RAM, a 1278MB hard drive, and a 17-inch monitor doesn't fall far short of our Top 20 chart with its near-typical Pentium-120 speed and relatively low cost. *SmartWorks, 800/441-2210, 510/441-2211* **Reader service no. 702**

Tatung Uniq 5210

PROS: Great price for a P-90 multimedia PC

CONS: One-year warranty, relatively slow, SIMM slots not easily accessible

Pentium-90 prices are plunging, but a $2100 P-90 multimedia minitower with 8MB of RAM, a 540MB hard drive, and a 15-inch monitor is still a rare find. Had this unit not performed like a P-60, it would have placed on the Top 20. *Tatung Co. of America, 800/829-2850, 310/637-2105* **Reader service no. 703**

ZDS Z-Select VP DX2/66

PROS: Well designed, nonstop tech support

CONS: 14-inch monitor, one-year warranty

This $1650 DX2-66 system is a bare-bones entry-level computer—8MB of RAM and a 428MB hard drive are low-end—and it doesn't have multimedia. Though clean and sturdy, it's far from a Top 20 value. *Zenith Data Systems, 800/582-0524, 708/808-5000* **Reader service no. 705**

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FEATURES COMPARISON This Month's Contenders—Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	Acom Patriot 4000 F	Compaq Contura 420CX	CTX EzBook 400D	Dell Latitude LX 4100D	Dell Latitude XPi P75D	Dell Latitude XPi P90T	SwanNote DX4-75	TI TravelMate 5100
Street price as of 7/31/95 [1]	$2235	$3199	$2399	$2629	$3899	$5399	$2199	$5898
CPU	DX4-100	DX4-75	DX4-100	DX4-100	Pentium-75	Pentium-90	DX4-75	Pentium-90
Traveling weight (pounds) [2]	7.8	7.4	6.8	7.4	7.2	7.2	6.8	7.6
Width x depth x height (inches)	11.4 x 9 x 2.3	11.9 x 8.9 x 2	11.1 x 8.5 x 2.1	10.4 x 8.7 x 1.9	11 x 8.7 x 2.1	10.9 x 8.7 x 2.1	10.9 x 8.7 x 1.9	10.9 x 8.7 x 2.3
Installed/maximum RAM (MB)	8/32	8/24	8/32	8/20	16/40	16/40	8/20	16/24
Secondary RAM cache installed/maximum (K)	0/0	0/256	0/0	128/128	256/256	256/256	0/0	256/256
Installed/maximum hard disk (MB)	540/1300	420/720	520/810	420/810	810/1200	810/1200	520/1000	1215/1215
Removable hard disk	●	●	●	●	●	●	●	●
Display type	passive color	active color	passive color	dual-scan color	dual-scan color	active color	passive color	active color
Measured screen diagonal (inches)	10.2	10.3	10.5	10.4	10.4	10.3	9.3	10.4
Maximum colors of LCD	256	256	256	65,536	65,536	16.8 million	256	65,536
Simultaneous LCD and external monitor	●	●	●	●	●	●	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1280 x 1024
Mouse/keyboard ports	1/0 [3]	1/0 [3]	0/1	1/0 [3]	1/0 [3]	1/0 [3]	1/0 [3]	1/0 [3]
Cursor keys in inverted T	●	●	●	●	●	●	●	●
Dedicated page-control keys	●	○	●	○	●	●	●	●
All 12 function keys dedicated	●	●	○	●	●	●	●	○
Standard <Ctrl> and <Alt> layout	○	●	○	○	○	○	○	○
Built-in pointing device	●	●	●	●	●	●	●	●
Modem speed for fax/data (kilobits per second)	n/a	n/a	n/a	14.4/14.4	n/a	n/a	n/a	n/a
Docking station available	○	○	○	○	○	○	○	○
PC Card (PCMCIA) slot Type II/III	0/1 [4]	0/1 [4]	0/1 [4]	0/1 [4]	0/1 [4]	0/1 [4]	0/1 [4]	0/1 [4]
Power management								
Supports Advanced Power Management	●	●	●	●	●	●	●	●
Type of battery	NiMH	NiMH	NiMH	NiMH	lithium ion	lithium ion	NiMH	lithium ion
Suspend button	●	●	●	●	●	●	●	●
Suspends when case closed	○	○	●	○	●	●	●	●
Service and support								
Warranty (years)	1	3	1	3	3	3	1	3
30-day money-back guarantee	●	● [5]	○	●	●	●	●	●
On-site/replacement service first-year price	○	$149 [6]	○	free	free	free	free	○
Repair turnaround policy (days)	5	2	3	○	○	○	3	3
Daily toll-free phone support (hours)	9	24	9	24	24	24	9	24
Weekend support	○	●	○	●	●	●	● [7]	●
BBS/fax	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●

BEST BUY

[1] All notebooks priced as configured with DOS 6.0 or later version, Windows 3.1, VGA monochrome or better display, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, and external floppy drive if notebook has one.

[3] Mouse port doubles as a keyboard port.

[4] Type III slot alternatively holds two Type II devices.

[5] If purchased through Compaq DirectPlus.

[6] Covers three years on-site.

[7] Saturdays only.

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six computers,
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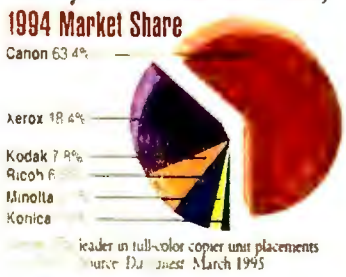

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Circle 42 on reader service card

TEST REPORT This Month's Contenders

DESKTOPS

▼ Overall performance rating		◀ FASTER — Application test times — SLOWER ▶
126	**Tangent MediaStar 5133** Pentium-133 (compact)	
117	**Everex StepPro P133** Pentium-133 (tower)	
115	**Dell Dimension XPS P133c** Pentium-133 (minitower)	
112	**Austin PowerPlus 133** Pentium-133 (minitower)	
103	**Quantex QP5/133 SM-1** Pentium-133 (tower)	
80	**SmartWorks MT100HI** Pentium-100 (minitower)	
79	**HiQ Saturn Station** Pentium-75 (minitower)	
67	**Swan Pentium 75 Series** Pentium-75 (tower)	

NOTEBOOKS

71	**Dell Latitude XPi P90T** Pentium-90	
66	**Texas Instruments Travel Mate 5100** Pentium-90	
61	**Dell Latitude XPi P75D** Pentium-75	
50	**Dell Latitude LX 4100D** DX4-100	
49	**Acom Patriot 4000 F** DX4-100	
42	**Compaq Contura 420CX** DX4-75	
40	**CTX EzBook 400D** DX4-100	
36	**SwanNote DX4-75** DX4-75	
	Time in minutes	0 — 5 — 10 — 15

BEST BUY

Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from seven tests. A system may have a better overall performance rating than another system that took less time to complete our test suite.

Methodology

We tested each system as supplied by the manufacturer, using the version of DOS supplied. If we installed Windows, we used the default installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows

We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0

We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows

We used a custom form to add a moderate number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows

We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; then previewed and saved it.

WordPerfect 6.0 for DOS

We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS

Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS

We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

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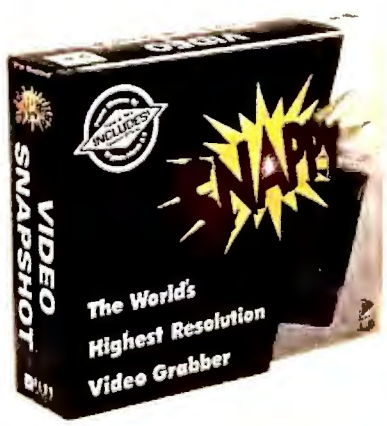
GRAB YCURSELF

"I'm astounded... get one, you'll love it."
John Dvorak, PC Magazine



SNAPPY Brings Stunning Pictures From Video Into Your PC

Snappy lets you grab sensational stills from any camcorder, VCR or TV right into your PC. It's easy! Just plug Snappy into the printer port on the back of your desktop or laptop PC. Then connect any video source to Snappy with the included cable. Watch the on-screen moving preview and when you see the picture you want, click *Snap*.

Includes Award Winning Software

Each Snappy includes **Fauve® Matisse SE**, the outstanding paint, retouching and titling program. You also get **Gryphon Morph™ 2.5**, the same morphing, warping and special effects software used on the cover of *Time Magazine*.

Snappy is guaranteed to grab the highest quality video stills you've ever seen on *any* computer at *any* price. Play's engineers developed a sophisticated new chip called the HD-1500 that captures sensational images in 16.8 million vibrant colors at breathtaking resolutions up to 1500 x 1125. It's perfect for thousands of uses from desktop publishing, presentations, databases, and Internet images, all the way to PC photo albums, school reports, real estate imaging or just morphing your friends into your favorite celebrities grabbed from TV.

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Demo also available for direct download (at up to 28.8K bps) from Play's BBS at 916.983.3288. Although Snappy Video Snapshot is an odd name, it's a trademark of Play Incorporated anyway. All other trademarks are the property of their respective holders.
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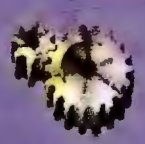

The fax machine and the copy machine are at polar opposites on my floor. And the nine people I had to get drafts of my document to? Two on my floor. Three on floors you'd be embarrassed to take the elevator to. And four not even in this office.

How I walked four miles in a 9,000 square foot office.

And then I had to get each draft back with comments, and incorporate those comments into my document by the following morning. So I basically faxed and copied and delivered and then typed and re-typed and re-faxed and re-copied and re-delivered

until my feet hurt and my legs were tired and I was sitting there starting to wonder why the heck running shoes aren't considered standard business attire.

INTRODUCING
LOTUS SMARTSUITE 96.

SmartCenter *will tie together and organize everything you do. SmartCenter drawers provide a single place to launch, store, and access all your work and the Internet.*

LotusScript *provides object oriented, basic compatible scripting language integrated across SmartSuite applications for rapid application development. A key part of Lotus SmartSuite.*

Team Review *sets up the who, what, and how to share any document to be edited.* ***TeamConsolidate*** *lets you combine multiple edited documents into one for review.*

SmartMasters *help you create professional looking documents, reports, presentations, and spreadsheets by providing a template so you can focus on content and not formatting.*

Lotus InfoBox *makes SmartSuite 96 faster and simpler to learn and use. It's a helpful, one-stop shopping tool that lets you change the attributes of any item you want to select.*

New Lotus SmartSuite 96 is the Windows 95 desktop solution with all new features to make you and your team more productive. Including Lotus Word Pro,™ 1-2-3,® Freelance Graphics,® Approach,® and Organizer.® With the highest level of integration, especially with Lotus Notes.® And it can be yours for as little as $199.* SmartSuite is also available for Windows 3.1 and OS/2. For more information, you can reach us at **1-800-TRADE-UP, ext. B224** or on the World Wide Web at **www.lotus.com.**

Lotus
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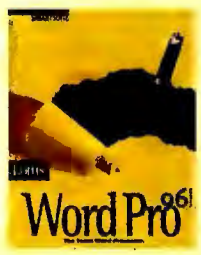

Lotus Word Pro 96 *makes it easier to create, review and edit collaborative documents. It's the only word processor that bridges the gap between individual and team productivity.*

Lotus 1-2-3. *This is the only spreadsheet that works for both you and your team. Lotus 1-2-3 makes it easier for individuals or groups to create, review, and edit spreadsheet models.*

Lotus Freelance Graphics 96 *gives both you and your team a faster, easier way to create and collaborate on business plans, reports and proposals that can double as presentations.*

Lotus Approach 96 *is the award-winning database that lets you and your team track, manage, and analyze information. And you're guaranteed to be productive within 2 hours of opening the box.*

Lotus Organizer *offers both you and your team the ability to track calls, manage tasks, share calendars, see other people's availability, and even book your conference rooms over a network.*

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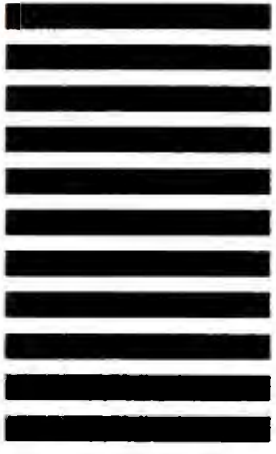

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RELIABILITY AND SERVICE MONITOR

Win a Vektron PCI P-75

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Vektron PCI P-75, a Pentium-75 PC in this month's Top 20.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE, DO NOT TEAR IT OUT. Fax your completed questionnaire to *PC World* at 415/974-7367. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 11-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by November 30.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact prize winners at the telephone and fax numbers they provide. If *PC World* is unable to do so within 30 days of the drawing, a substitute winner will be selected. No purchase necessary. Void where prohibited by law.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

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	○ Compudyne	○ Future Tech	○ MIS	○ Swan
○ Acma	○ Computrend	○ Gateway 2000	○ NEC	○ Tangent
○ ALR	○ Comtrade	○ Hewlett-Packard	○ Netis	○ Texas Instruments
○ Apple	○ Cornell	○ HiQ	○ Packard Bell	○ Toshiba
○ AST	○ CTX	○ Hyundai	○ Panasonic	○ Twinhead
○ AT&T (NCR)	○ Dell	○ IBM	○ PerComp	○ USA Flex
○ Austin (IPC)	○ Diamond	○ Insight	○ Pionex	○ VTech (Expotech, Laser)
○ Axik	○ Digital (DEC)	○ Intelesys	○ Polywell	○ WinBook
○ Blackship	○ DTK	○ Leading Edge	○ Quantex	○ Zenith (ZDS)
○ Canon	○ EPS	○ Micro Express	○ Robotech	○ Zenon
○ Compaq	○ Epson	○ Micron	○ Samsung	○ Zeos
○ CompuAdd	○ Everex	○ Midwest Micro	○ Sharp	○ Other

What size is this PC?

○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?

○ PowerPC
○ Pentium
○ 80486
○ 80386
○ 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

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 90	○ 92	○ 94
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 91	○ 93	○ 95

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	○ Three
○ One	○ Four
○ Two	○ 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

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 90	○ 92	○ 94
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 91	○ 93	○ 95

How long was this after you purchased your PC?

○ Less than 1 month ○ 4–6 months ○ More than 12 months
○ 1–3 months ○ 7–12 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	○ System swap	
○ On site	○ Component swap	
○ In store	○ Factory return	

If you received phone service, how long were you on hold?

○ Not at all ○ 1–2 minutes ○ 6–10 minutes ○ More than
○ Less than 1 minute ○ 3–5 minutes ○ 11–20 minutes 20 minutes

How long did it take before you talked to the person who finally helped you?

○ Less than 15 minutes ○ 2–5 hours ○ 11–24 hours ○ 3–5 days
○ 15 minutes–1 hour ○ 6–10 hours ○ 1½–2 days ○ 1 week or more

How long did it take to resolve the problem completely?

○ 1–2 days ○ More than 1 month
○ 3–7 days ○ Never resolved
○ 8–14 days ○ Awaiting resolution
○ 15–30 days

Was the problem 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

PLEASE FAX TO 415/974-7367. FOR BEST RESULTS, PHOTOCOPY THIS PAGE.

It Doesn't Make Sense to Protect Your Front Door...

FRONT

BACK

If Your Back Door is Left Wide Open!

With Windows 95, it will be easier than ever to access on-line services, especially the Internet. You need to prepare for new threats from the viruses that are out there, as well as new types of viruses designed for Windows 95.

In addition, did you know that more than 85% of the 6000 current file viruses are still active in Windows 95? Yet Windows 95 doesn't include even a basic virus scanner, and your old virus software simply won't work!

Don't move forward to the new world of Windows 95 or the Internet using outdated technology designed for disk-based viruses.

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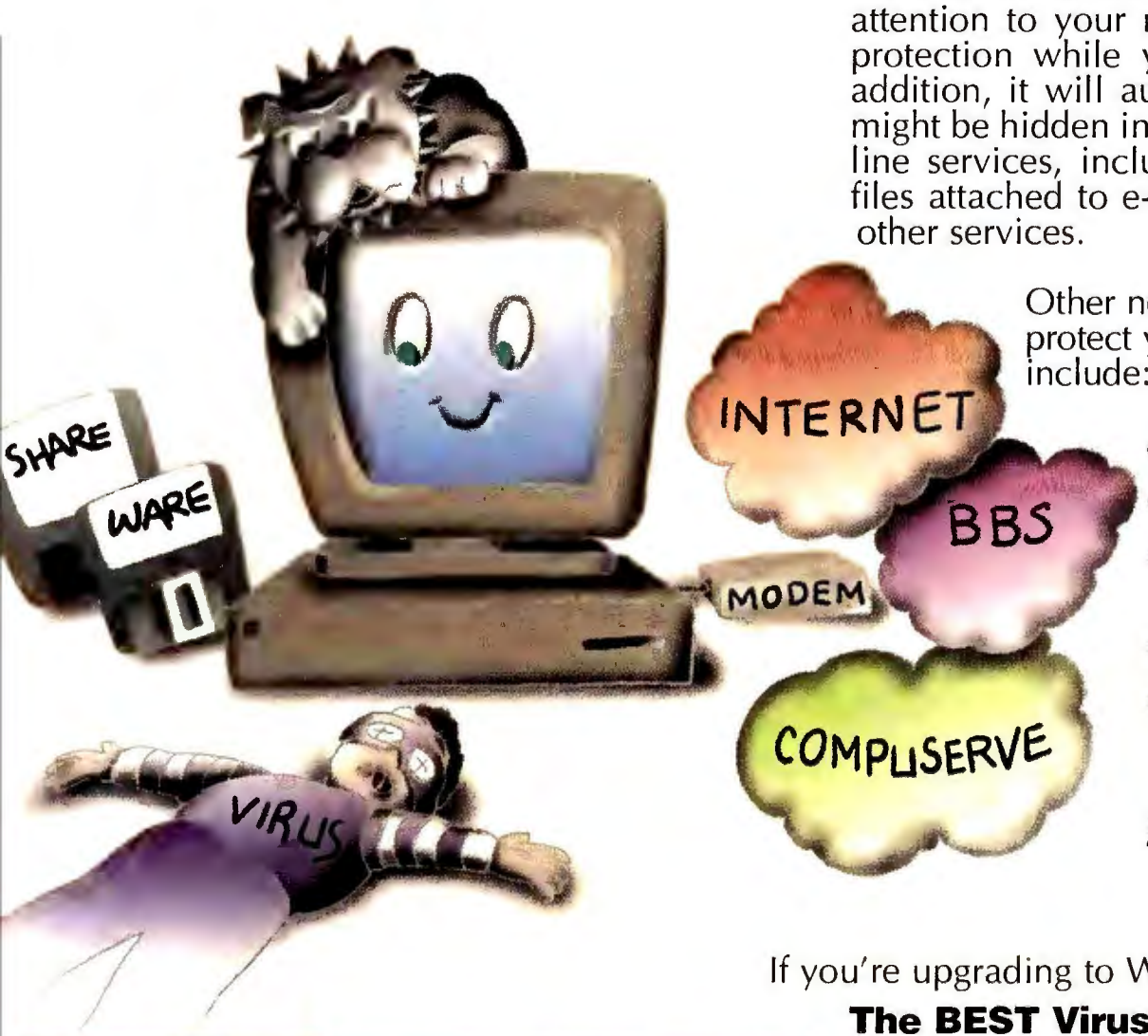
PC-cillin'95

The Only Complete Anti-Virus Solution For Windows® 95 & The Information Superhighway



PC-cillin'95 Protects You When the Others Don't.

PC-cillin'95 is the first anti-virus program that pays attention to your modem and increases your virus protection while you access on-line services. In addition, it will automatically scan for viruses that might be hidden in the special formats used with on-line services, including the World Wide Web and files attached to e-mail sent through the Internet or other services.

Other new features specially designed to protect your system under Windows 95 include:

- Self Adjusting Protection
- Easy One-Button Virus Updates
- Advanced Detection Technology
- Virus Cleanup Wizard
- Fast, New 32-bit Multi-Thread Scanner

BONUS: Includes Windows 3.1 Compatible Version

If you're upgrading to Windows 95, you need PC-cillin'95.

The BEST Virus Protection You Can Get!

Hot Features	PC-cillin'95	Norton Anti-Virus for Windows 95	McAfee Virus Scan for Windows 95
Scan Compressed Files	YES pkzip, lzexe, lzh, pklite, lha, MS compress	Only pkzip, lha	Only lzexe
Check Internet e-mail	YES	NO	NO
Protect Shared Folder	YES	NO	NO
Watch MODEM Activity	YES	NO	NO
Provide "Cleaner" for New Virus	YES	NO	NO

Coming This November to a Store Near You!

TouchStone® Software Corporation

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http:\\www.antivirus.com

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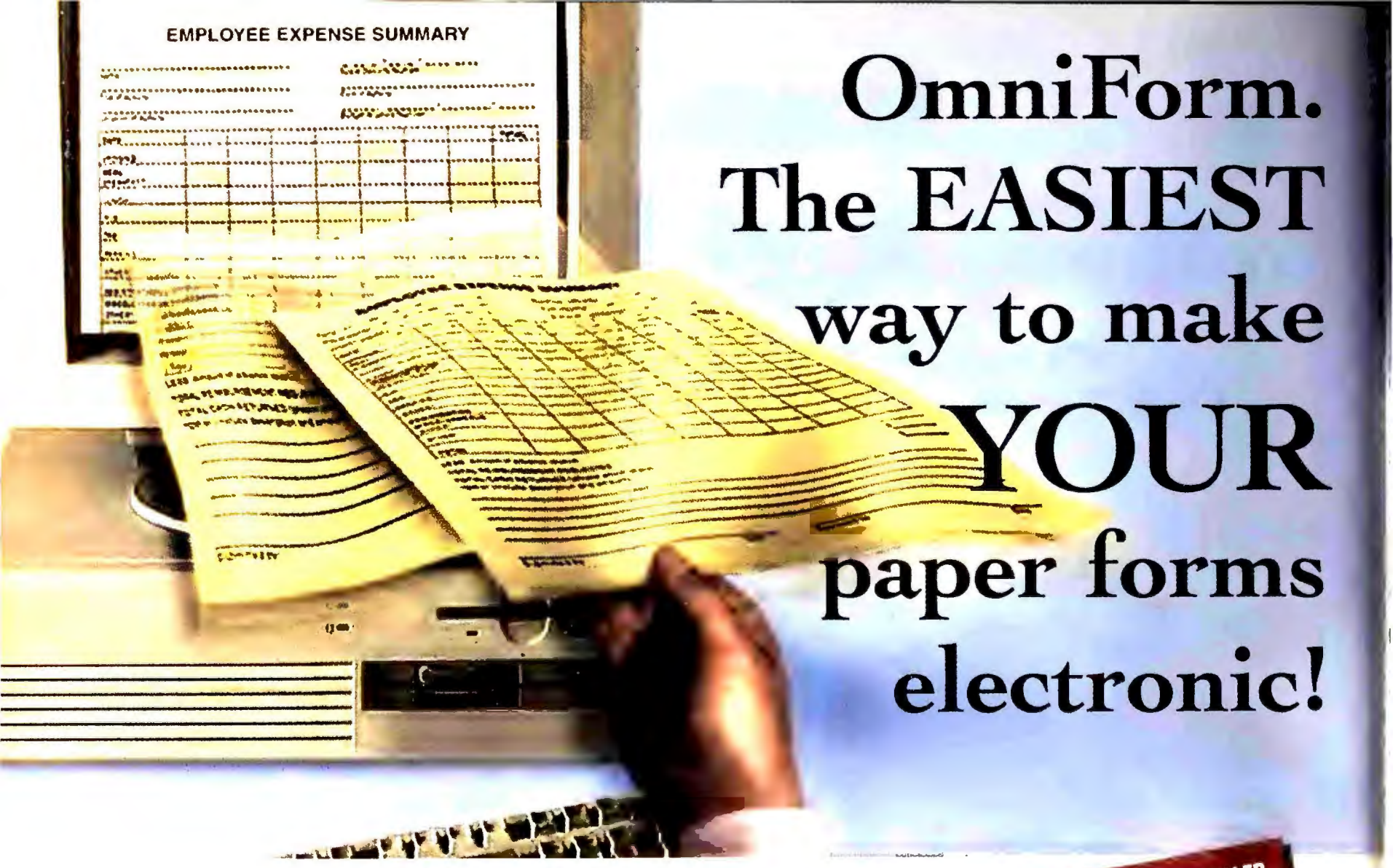

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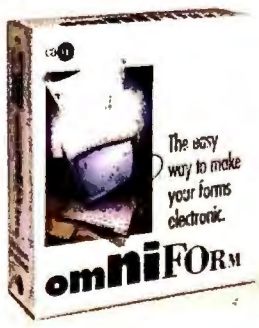

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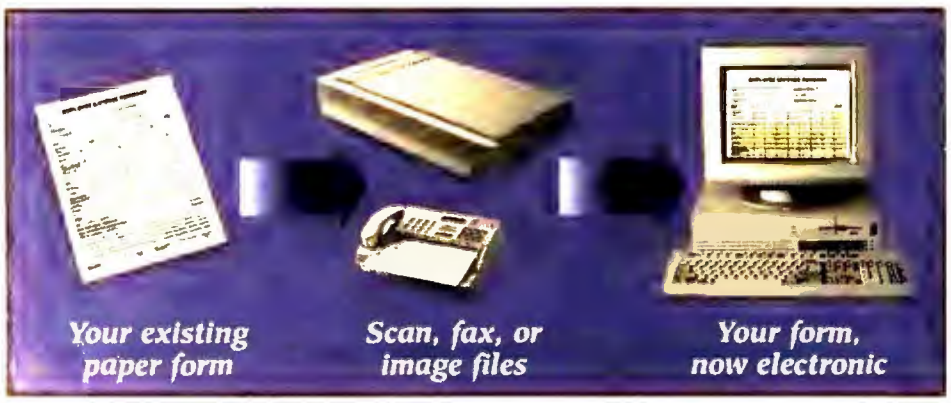
Entering information is easy too. OmniForm performs calculations, validates entries and stores everything—automatically. You can search and sort for easy information access and import and export your information with other popular databases. Now that your forms are electronic you can print, fax, print on pre-printed forms or e-mail them to others in your work group for quick review and approval.

OmniForm–the easy electronic forms solution.



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Fix Any PC...FAST!

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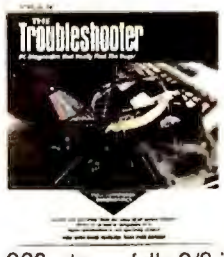

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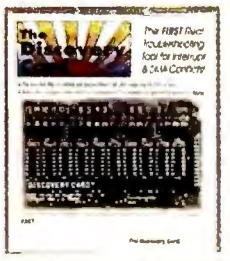

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Lexmark, Hewlett-Packard Take Best Buys

All-Around Quality
Lexmark's Optra R is our monochrome Best Buy, with solid performance and output quality plus superior ease-of-use features.

This month the Lexmark Optra R, an easy-to-use, 12-pages-per-minute (ppm) laser, bumps its more expensive sibling—the Optra Lx—from the number one spot on our monochrome workgroup printers chart. Meanwhile, the Hewlett-Packard DeskJet 1600CM takes the Best Buy on our new color chart; although it's slower and its output quality is not quite as good as that of a color laser, it's much cheaper, which makes it an terrific alternative.

This month's lineup differs considerably from our September debut chart. After that review went to press we discovered, to our chagrin, several miscalculations in the ratings sheet. We fixed those. We also separated the monochrome and color printers, the better to reflect how you'd shop for, and evaluate, a printer. The Comments column provides additional information on printers in the Top 10. And of course, with eight new printers evaluated this month, some of the previously reviewed printers have been jostled around (or off) the chart.

Lexmark Lasers Dominate the Monochrome Chart

With two Lexmark printers in the Top 10, quality seems to run in the family. Lexmark's Optra R and Optra Lx are both 600-dpi lasers, and they share high ease-of-use ratings for their clear control panels, elegant user interfaces, great documentation, and tool-free memory upgrades. The Optra R is a solid workgroup buy for both output quality and performance, and its $1487 price lies comfortably within the typical range for this kind of printer. The Optra Lx's 16-ppm engine makes it the fastest printer we've seen, with greater paper handling capabilities than the

TOP 10 WORKGROUP PRINTERS

		Last ranking	First reviewed	Type	Street price [1]	Overall rating	Output rating		Speed rating		Features, ease-of-use rating	Reader service number	Comments
							Monochrome	Color	Monochrome	Color			
MONOCHROME	1 **Lexmark Optra R** 800/891-0331	–	current	laser	$1487	85	78	–	75	–	82	741	Good speed, output, and price; 600 dpi, 12 ppm.
	2 **Texas Instruments microLaser PowerPro** 800/848-3927	–	current	laser	$1660	83	75	–	77	–	76	742	Apple LocalTalk, 600 dpi, 6MB of RAM.
	3 **Lexmark Optra Lx** 800/891-0331	1	Sep 95	laser	$2500	83	78	–	85	–	84	743	Has 16-ppm engine, more paper handling options.
	4 **Brother HL-960** 800/276-7746	–	current	laser	$999	82	73	–	49	–	72	744	Needs device for networks; 600 dpi, 12 ppm.
	5 **Okidata OL1200** 800/654-3282	–	current	laser	$1274	80	76	–	76	–	59	745	Cheap; lacks PostScript; 600 dpi, 12 ppm.
	6 **Brother HL-1260** 800/276-7746	5	Sep 95	laser	$1299	75	68	–	48	–	78	746	Slow, but decent output; 600 dpi, 12 ppm
	7 **QMS 1060E** 800/523-2696	3	Sep 95	laser	$2000	74	83	–	58	–	85	747	Sharp output from 600-dpi, 10-ppm printer.
COLOR	1 **HP DeskJet 1600CM** 800/752-0900	–	current	ink jet	$1999	76	63	57	29	81	75	748	Good plain-paper printing; an inexpensive winner.
	2 **Apple Color LaserWriter 12/600 PS** 800/538-9696	–	current	laser	$6499	73	85	85	23	47	82	749	Very slow, but best color output; easy to use.
	3 **Xerox 4900** 800/275-9376	9 [2]	Sep 95	laser	$5500	71	56	78	28	85	71	750	Strong color and gray scale; 1200 dpi.

[1] Prices based on vendor estimates and PC World research. [2] Xerox's rank is based on September's combined monochrome and color printer chart.

BEST BUY

Methodology Output quality and the features and ease-of-use score each count for 25 percent of the overall rating. Speed counts for 20 percent, support policies 13 percent, price 12 percent, and cost of consumables 5 percent. You'll note that the color printers' ratings for printing color are much higher than their ratings for printing monochrome. That's because these color printers are, for the most part, very slow printing Excel, Word, and CorelDraw monochrome and gray-scale documents when compared to the monochrome printers we tested. When we calculate color performance ratings, we include color printers only, and we base the relative rating on the time it takes to print a color CorelDraw image. For all ratings, higher is better, and the best rating possible is 85.

For more information about all products in this table, circle reader service no. 909.

Almost Like a Laser
The HP 1600CM's good price, admirable output quality, and standard Ethernet and AppleTalk interfaces, not to mention its small footprint, make this ink jet our color Best Buy.

Optra R has—but you'll pay about $1000 more for it.

The Texas Instruments microLaser PowerPro shoulders in between these formidable contenders to take the number two spot, just edging the Lexmark Optra Lx. It surpasses our Best Buy in speed, though not in output quality or price. Unlike most printers reviewed here, the PowerPro comes with Apple LocalTalk so you can share the printer with Macintoshes. It also has a small footprint and easy slide-in paper trays.

At $999 the new, fourth-place Brother HL-960 is either an inexpensive personal laser or a bare-bones workgroup model. It surpasses its sixth-place sibling, the HL-1260, in output and performance, but the latter comes with an MI/O slot for network connections. The HL-960 must be networked through a print server or third-party device—Brother recommends one from Digital Products that costs about $300; surprisingly, it makes the HL-960 more network ready than the HL-1260 for the same amount of money.

A Solid Printer if You Don't Need PostScript

Debuting at the number five spot, the Okidata OL1200 surpasses our Best Buy in performance, and at $1274 it costs a few hundred less. But unlike all the other workgroup printers we've reviewed, it can't handle PostScript files, so it's not for offices with sophisticated graphics needs.

These businesses might, however, want to take a second look at the Typhoon 8 and 16, a pair of high-priced printers from Dataproducts primarily intended for graphics proofing. The Typhoon 8, an 8-ppm printer, costs a staggering $4419 with 36MB of RAM—it works with as little as 2MB, but Dataproducts claims it sells most Typhoon 8s with 36. It produces true 1200 by 1200 dpi and full-bleed printing on paper sizes up to 11 by 17 inches. Output quality is very good, but the Typhoon 8 is slow, using most of the extra RAM for page processing. The Typhoon 16 is a 16-ppm machine that prints at 600 dpi with 12MB of RAM, costs $2804, and adds a fax module.

Color Ink Jet Makes the Top 10

Two new printers take the top spots on the color chart. For an estimated street price of $1999, the Hewlett-Packard DeskJet 1600CM ink jet is an economical alternative to a color laser—and it has a much smaller footprint. This machine's plain paper quality was almost as good as its coated paper quality. Ethernet and AppleTalk ports are standard.

Apple's long-delayed Color LaserWriter 12/600 PS, a PostScript-only printer, debuts at the number two spot. It's the second-slowest workgroup printer we've reviewed, but its superb color print quality was worth the wait. It's also the most elegantly designed color laser we've seen, with an innovative carousel housing that rotates for selecting and removing toner cartridges. Apple's version 1.0 Windows driver had some BIOS compatibility problems, but a fix (version 1.1) is now shipping and available for upgrades.

In September we mistakenly reported that the third-place Xerox 4900 color laser printed gray scale with a bluish tinge. *PC World* regrets the error.

—Bill Underwood

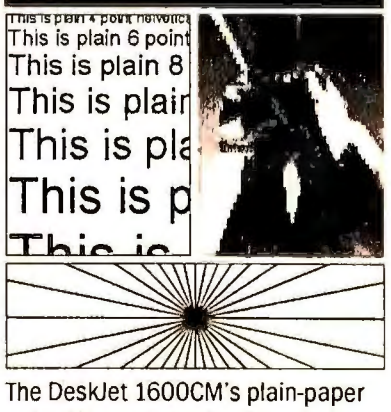
Bill Underwood specializes in printer design, testing, and manufacturing. Testing performed by Ulrike Diehlmann of the PC World Test Center.

AWESOME OUTPUT An Apple Laser Yields Best Color

Lexmark Optra R

The Optra R's output is very good, with finely drawn text characters and a strong gray-scale range—as good as that of the pricier Optra Lx.

Hewlett-Packard DeskJet 1600CM

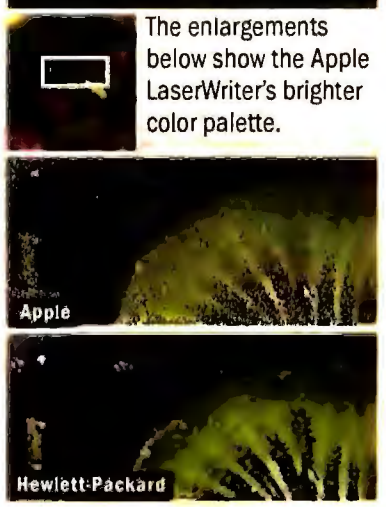


The DeskJet 1600CM's plain-paper output is nearly as good as what you'd get with premium coated stock—and for an ink jet, that's great.

Apple Color LaserWriter 12/600 PS

This LaserWriter prints good text—though like all color lasers, the toner has a subtle sheen—and the color (at right) can't be beat.

Color Tests



The enlargements below show the Apple LaserWriter's brighter color palette.

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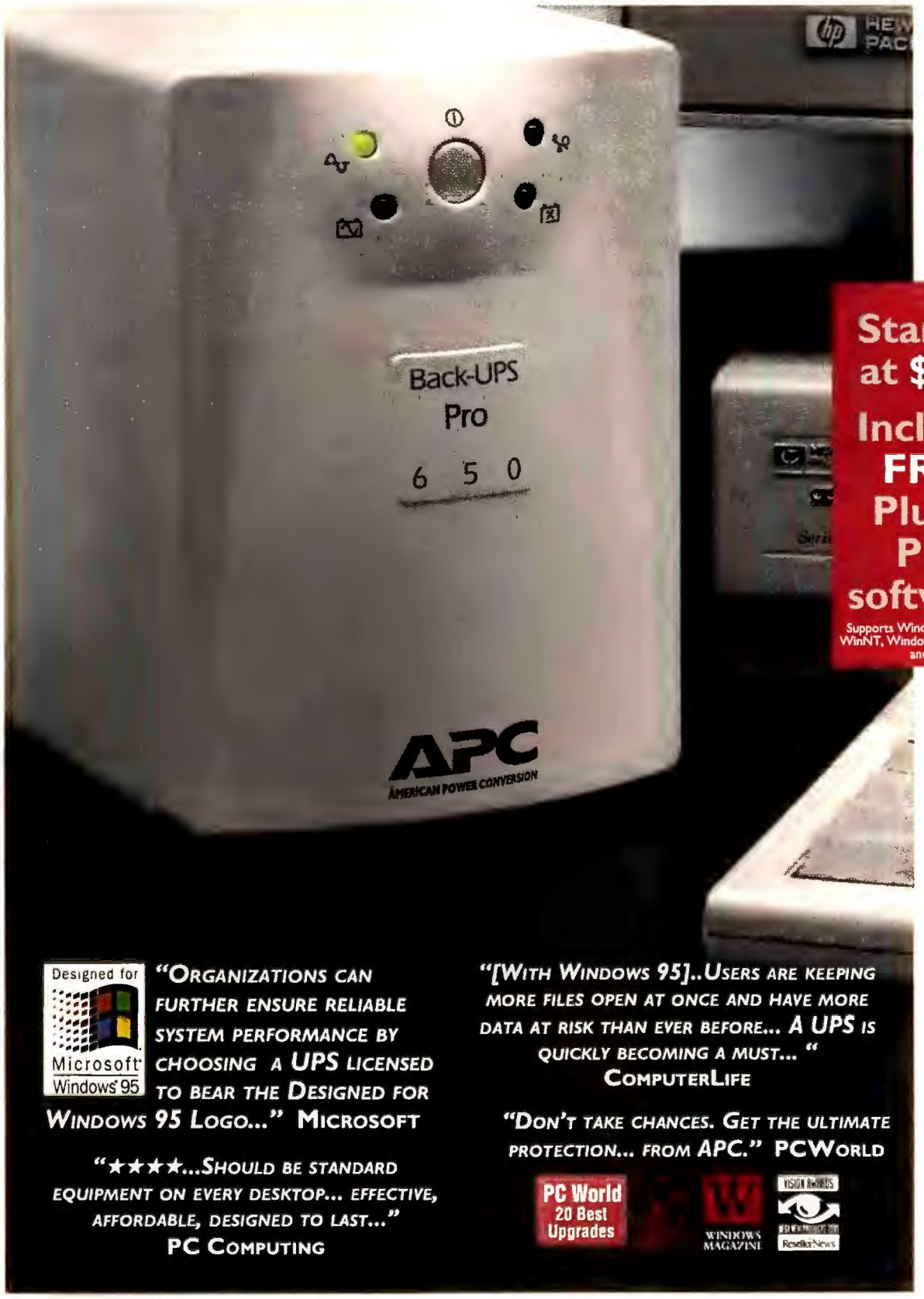

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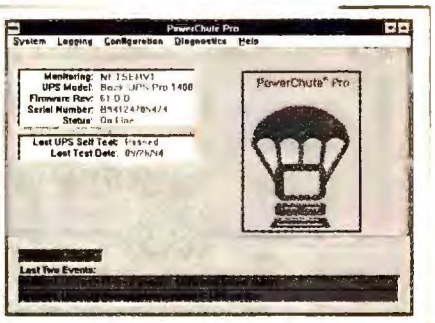

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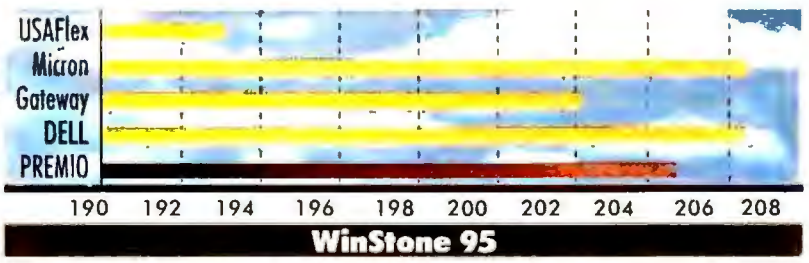

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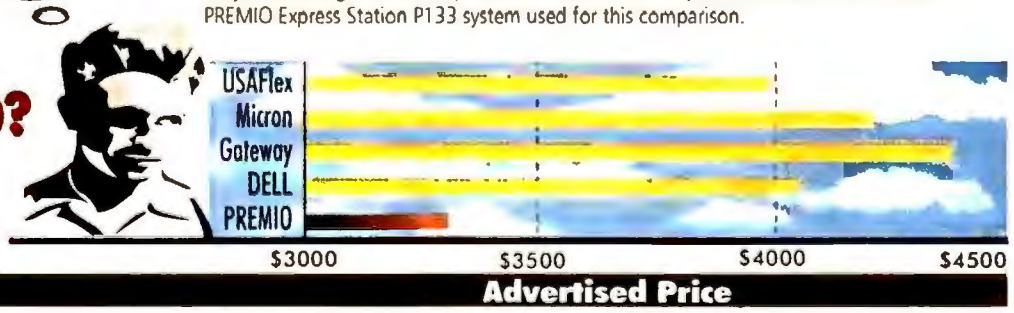

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Copyright 1995 STB Systems, Inc All rights reserved All names are trademarks of their respective companies. †For further information about end e copy of the terms of the limited lifetime warranty, contact STB Systems at (214) 234-8750 Scores based on tests run on Gateway 2000 (model P5-133XL) Pentium CPU at 133 MHz, PCI 2.0 bus, 256KB burst-mode cache, 16MB EDO DRAM, 540MB Maxtor IDE hard drive (model 7546AT), 1024 x 768 with 256 colors at 75 Hz refresh rate, Windows 95 (Retail release). Competitive products were tested using the embedded display drivers in Windows 95 for these adapters.

Circle 210 on reader service card

It's Nanao by a Nose Over NEC

It's What's Inside
Nanao's FlexScan F2-17 tops the chart with razor-sharp text and a bevy of sophisticated extras.

Use a big monitor once, and you will never want to return to a smaller one. Page layouts, spreadsheets, presentations, multiple windows—even plain old text—look better on a 17-inch screen. Not only are they bigger than 15-inchers, they also can run higher resolutions more comfortably. You can crank up the pixels to 1024 by 768, for example, and get almost *two-thirds* more workspace than from a 15-inch monitor that's set at 800 by 600.

For a roomier screen (17-inch monitors are like 15-inchers in most other respects), you can expect to pay from $100 to several hundred dollars more. But that additional outlay doesn't faze many users who are ready to splurge for comfier viewing. In a recent *PC World* reader poll, most respondents—regardless of the applications they used—said they planned to buy a 17-inch monitor.

Last month we identified the 10 best 15-inch monitors on the market. For this month's Top 10 list, we rated the displays of 16 17-inch monitors priced from $640 to just over $1100. Our Best Buys: Nanao's FlexScan F2-17 and NEC's MultiSync XV17.

Colorific Calibration

The pricey ($970) FlexScan is great for text and okay for graphics, but what distinguishes it is its software. For starters, it supports Kodak's Colorific color calibration system, so the colors you see on-screen match what you get in print. It's also one of the few monitors we've seen of any size that supplements readable on-screen control icons (which are often indecipherable on other monitors) with easy-to-understand Windows-based screen management software. The FlexScan's ScreenManager Pro utility lets you set power-down times and adjust screen controls like sizing, position, and distortion at various resolutions so the

TOP 10
17-INCH MONITORS

		Street price	Overall rating	Text quality rating	Graphics quality rating	Features, design, ease-of-use rating	Dot pitch or stripe (mm)	Max. refresh rate at 800 X 600 (Hz)	Max. refresh rate at 1024 X 768 (Hz)	Reader service number	Comments
1	**Nanao FlexScan F2-17** 800/800-5202	$970	85	81	71	83	0.28	110	87	707	Great text detail, Plug and Play[1] Level 2b, software for adjusting image and colors, on-screen controls.
2	**NEC MultiSync XV17** 800/632-4636	$799	85	79	74	71	0.28	76	76	708	Crisp text, good price, PnP Level 1, image and color adjusting software, on-screen controls; lower refresh rates.
3	**Mitsubishi Diamond Pro 17TX** 800/843-2515	$1073	83	76	72	85	0.25	120	100	709	PnP Level 2b, high refresh rates, software for adjusting image and colors, on-screen controls; expensive.
4	**MAG InnoVision MXP17F** 800/827-3998	$950	82	76	85	67	0.26	120	100	710	Top graphics, 16-inch viewable area, fast refresh rates at high resolutions; no PnP or on-screen controls.
5	**ViewSonic 17PS** 800/888-8583	$995	82	72	77	76	0.25	128	101	711	Good graphics, PnP Level 2b, high refresh rates, fine dot pitch, software for adjusting colors.
6	**Sony Multiscan 17sf** 800/352-7669	$889	82	85	84	53	0.25	90	76	712	Top text, excellent graphics; low refresh rates at high resolutions, no PnP or on-screen controls.
7	**Princeton Graphic Systems Ultra 17** 800/747-6249	$640	81	72	79	49	0.28	90	76	713	Low price, good graphics; low refresh rates at high resolutions, no PnP or on-screen controls.
8	**Nokia Multigraph 447X** 800/296-6542	$999	81	76	83	67	0.26	110	90	714	Excellent graphics, software for adjusting colors, on-screen controls; no PnP.
9	**Nokia Valuegraph 447L** 800/296-6542	$695	81	62	82	60	0.28	85	76	715	Good price, excellent graphics; low refresh rates, no PnP level or on-screen controls.
10	**Panasonic PanaMedia 17** 800/742-8086	$829	80	72	68	69	0.27	107	85	716	Built-in microphone, speakers, PnP Level 2b, on-screen controls, 16-inch viewable area; so-so image quality.

[1] Plug and Play Level 1 sends monitor settings to graphics card; Level 2b adds a bidirectional capability between graphics card and monitor.

BEST BUY

Methodology: Text and graphics quality ratings account for 25 percent each of the overall rating; price accounts for 20 percent; the features, design, and ease-of-use rating is 25 percent; and support is 5 percent. Overall ratings and rankings are not comparable between Top 10 charts for different sizes of monitors because test weightings differ. For all ratings, higher is better, and the best rating possible is 85.

For more information about all products in this table, circle reader service no. 908.

Ease of Use, Too
NEC's MultiSync XV17 has a great display, is easy to adjust, and is reasonably priced, all of which make it one of our Best Buys.

image is accurate both on the sides and at the corners.

Like the Mitsubishi Diamond Pro 17TX, ViewSonic 17PS, and Panasonic PanaMedia 17, the FlexScan also supports Level 2b of Plug and Play—which synchronizes your graphics card and monitor automatically. Thus far, most cards support the less-sophisticated Level 1, but Level 2b capability is rapidly becoming more prevalent. The FlexScan's refresh rates go as high as 110 Hz at 800 by 600—a nice perk if your card happens to offer that refresh rate.

NEC's MultiSync XV17 lacks the Nanao's higher-end features—it supports only Level 1 of Plug and Play, refreshes at 76 Hz (just above the standard rate), and has less-sophisticated color calibration. But it displays monitor settings on-screen; you adjust them by means of seven front-mounted buttons. In addition, you can choose from five color temperature settings, as well as fine-tune the red, green, and blue screen tint. Add to this a slightly better display than the FlexScan's and a lower price, and the MultiSync is a nice alternative.

Buyers of 17-inch and larger monitors care less about price and more about crisp text and vivid graphics than buyers of smaller displays.

Mitsubishi's Diamond Pro 17TX, in third place, combines an above-average display with top features—image and color adjusting software, Level 2b Plug and Play, high refresh rates at both 800 by 600 and 1024 by 768 resolutions, and easily decipherable on-screen controls—but you'll have to pay a costly $1073.

Features Versus Image

The MAG InnoVision MXP17F is a simpler monitor than the Mitsubishi in many ways, and it costs some $120 or so less. We like the MAG's unique LCD display, which handily shows power-down status, resolution, and refresh rates. Too bad this display isn't integrated with the control buttons next to it; then you could see the level of adjustments that you're making to contrast and brightness, for instance. Image quality is where this unit really shines. Its large 16-inch viewable area is sharp from corner to corner, and the accurate tonal detail and color saturation are ideal for all high-end graphics.

In the middle of our chart sits the ViewSonic 17PS, a tad less expensive than the Mitsubishi, with many of the same extra features. Both offer a good display: Text is crisp on the Mitsubishi, while graphics look more vibrant on the ViewSonic. The ViewSonic's controls are varied, but awkward: To adjust the screen vertically, we had to push front-panel buttons labeled with horizontal arrows.

Seeing Is Believing

Sony continues to pour resources into great screens, not into controls. If you like to adjust a monitor using on-screen menus, you may chafe at the Multiscan 17sf's older analog controls. That and lack of Plug and Play support keep this $889 unit in the bottom half of our chart. But nobody builds a display like Sony. Other monitors—such as the Mitsubishi Diamond Pro 17TX and ViewSonic 17PS—use different means to achieve the same tight 0.25-millimeter dot pitch as Sony, but they don't provide the same sharp display. Our judges gave Sony's crystalline text and reach-out-and-touch graphics near-perfect ratings. Price keeps the 17sf's sibling, the $1119 Multiscan 17se, off the list, but this model also displays razor-sharp text—a little better than our two Best Buys, even.

Starving artists will like Princeton Graphic Systems' seventh-place Ultra 17, the lowest-priced of the group at $640. This basic monitor has few extras but does a fine job with graphics. With better graphics quality plus built-in speakers, Nokia's ninth-place Valuegraph 447L is only $55 more; text quality disappoints, however. The other Nokia, the eighth-place Multigraph 447X, costs $300 more than the 447L but uses a finer 0.26-mm dot pitch for better text display. It also has nice software tools for adjusting colors, and basic, easy-to-use on-screen controls.

Panasonic's PanaMedia 17, last on the chart, comes with lots of extras—Level 2b Plug and Play support, on-screen controls, and even an integrated microphone and speakers—for a reasonable $829. But we like its display the least. Graphics are adequate but nothing close to the MAG's or Sony's. Text is a little better but still not as sharp as with most of the others.

We changed our monitor weightings slightly for this first Top 10 review of 17-inch units. Our surveys tell us buyers of larger monitors care more about display quality and less about price than buyers of 15-inchers do. So we've beefed up the text and graphics quality weightings while lowering the price weighting somewhat (see the methodology below the chart).

—Charles Seiter

Charles Seiter is a contributing editor for Macworld. *Testing performed by Susan Silvius of the PC World Test Center and John Goddard, staff editor.*

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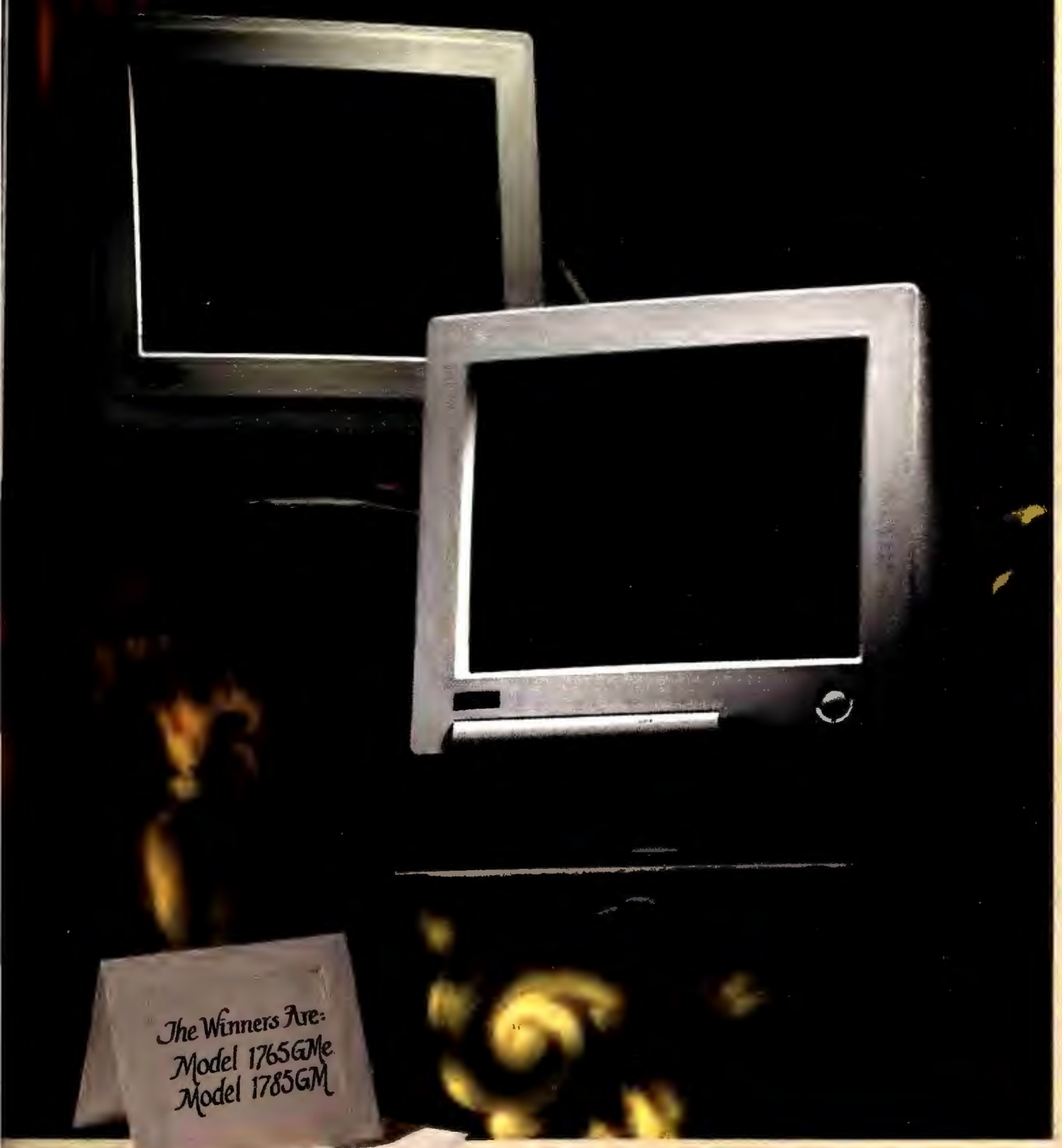

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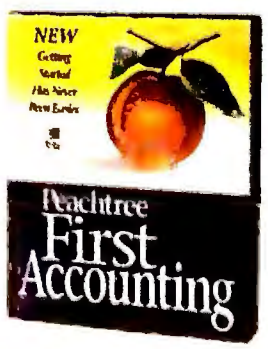

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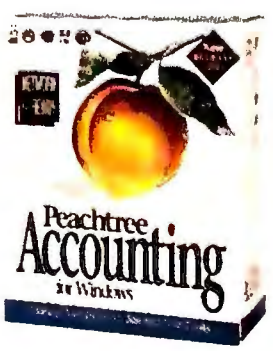

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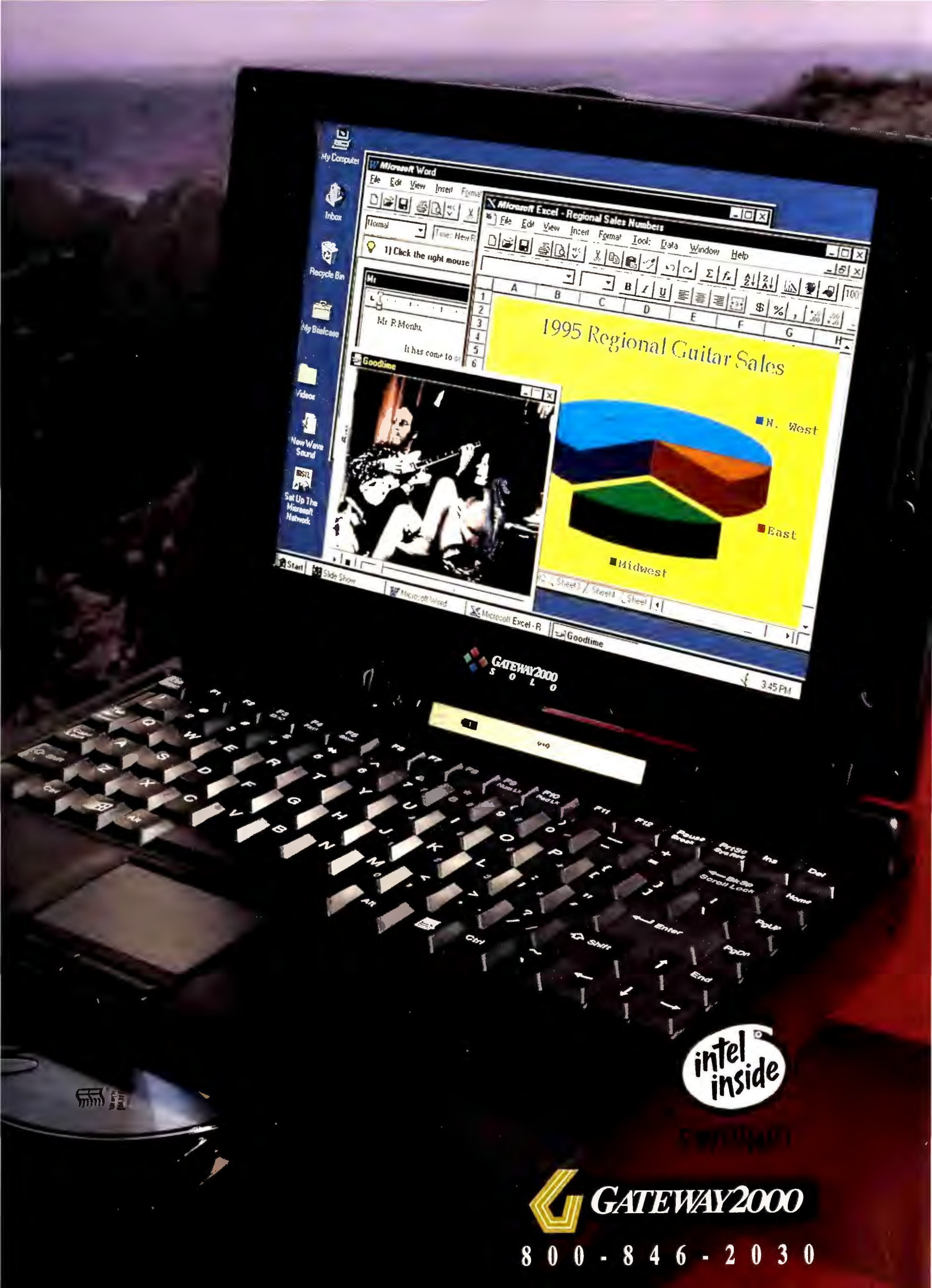
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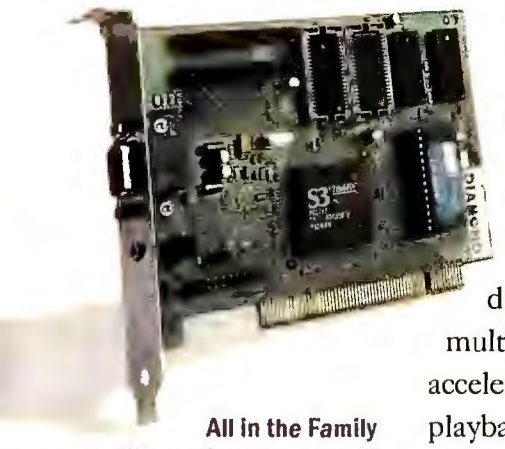
Diamond Wins With a One-Two Punch



All in the Family
Diamond grabs a second Best Buy with the Stealth64 Video 2201XL, a fast performer with built-in MPEG and TV tuner support.

Support for nifty add-in cards distinguishes the movers and shakers in this month's list of top graphics boards. Diamond Multimedia's Stealth64 Video 2201XL, the only one of four new cards we tested this month to break onto the chart, nabbed a Best Buy—in part due to its incorporation of S3's new Trio64V+ multimedia chip set. The Trio64V+ includes video acceleration, plus built-in support for low-cost MPEG playback and TV tuner cards (about $99 apiece). The chip is also fast. For a board that uses the slower DRAM, it blazed through our graphics applications suite. At just $233 on the street, it's also a good value.

Diamond isn't the only vendor to recognize the value of low-cost options for playing MPEG and using the monitor as a TV tuner. VideoLogic and Number Nine recently shipped cards that work with their GrafixStar and 9FX Motion lines, respectively, boosting the cards' value enough to pass STB's and ATI's graphics boards by mere tenths of a point. Also moving up is Matrox, which already offers add-in cards but also now bundles Asymetrix 3D F/X software, a $99 value, with its MGA Millennium.

Of the boards we tested this month that didn't make the Top 10, VideoLogic's $189 GrafixStar 300 impressed us most, with a graphics score of 79—the highest we've seen from a Trio64-based board. Had it run our business applications faster, it would have made the chart. We also looked at the pricey, $419 ELSA Winner 2000PRO/X, which is fast for graphics applications but slow in business applications.

The last board we tested, the $199 Alaris Matinee, turned in the slowest score we've seen in business applications and landed far from the Top 10.

TOP 10 GRAPHICS BOARDS

Last ranking	First reviewed	Street price	Performance ratings: Overall rating	Performance ratings: Business applications	Performance ratings: Graphics applications	Refresh rate at 1024 x 768 (Hz)	Chip/installed RAM (MB)/type	Reader service number	Comments
1 **Diamond Stealth64 Video 3200** 800/468-5846	1	Sept 95	$254	85	83	85	120	S3 Vision968/ 2/VRAM	601	Top performance, MPEG playback software, weekend tech support. ☑
2 **Diamond Stealth64 Video 2201XL** 800/468-5846	–	current	$233	81	72	85	100	S3 Trio64V+/ 2/DRAM	602	Fast graphics, weekend tech support, built-in MPEG and TV tuner support.
3 **STB Velocity 64V** 800/234-4334	2	July 95	$299	81	79	80	120	S3 Vision968/ 2/VRAM	603	MPEG playback software, lifetime warranty and toll-free support.
4 **Matrox MGA Millennium** 800/361-1408	5	July 95	$329	79	74	85	120	MGA-2064W/ 2/WRAM	604	3-D acceleration, MPEG playback and 3-D software; no VL version. ☑
5 **Western Digital Paradise Bahamas 64** 800/568-9272	3	Feb 95	$169	79	67	72	75	S3 Trio64/ 2/DRAM	605	Five-year warranty, toll-free and weekend support; no video acceleration.
6 **Diamond Stealth64 Video 2200XL** 800/468-5846	4	July 95	$233	78	71	80	100	S3 Vision868/ 2/DRAM	606	Good software bundle, MPEG playback software, weekend support. ☑
7 **VideoLogic GrafixStar 700** 800/578-5644	8	Oct 95	$349	77	78	79	100	S3 Vision968/ 2/VRAM	607	VESA Media Channel, MPEG playback, optional MPEG and TV tuner cards.
8 **Number Nine 9FX Motion 771** 800/438-6463	10	July 95	$349	77	80	82	120	S3 Vision968/ 2/VRAM	608	Good utilities, optional MPEG card; no toll-free phone support. ☑
9 **STB Powergraph 64** 800/234-4334	6	Feb 95	$180	77	66	76	100	S3 Trio64/ 2/DRAM	609	Good price, lifetime warranty and toll-free support; no video acceleration.
10 **ATI Graphics Xpression** 905/882-2600 ext. 1	7	Sept 94	$174	77	64	77	75	ATi Mach64/ 2/DRAM	610	Low price, good software, five-year warranty; slow in business apps.

Windows Integrated Test Suite was developed by Jon Peddie Associates, a PC graphics consulting firm.

☑ Windows 95–certified Plug and Play.

BEST BUY

Methodology Boards were tested at 1024 by 768 resolution at 256 colors and at 800 by 600 resolution at 16.8 million colors. The business applications rating consists of WITS scores for Word 2.0 for Windows, Excel 4.0 and Freelance Graphics 2.01 running in 8-bit mode, plus a score for Freelance running in 24-bit mode. The graphics applications rating consists of WITS scores for CorelDraw 3.0, PhotoStyler 1.1, and QuarkXPress 3.11 running in 8-bit and 24-bit modes. The overall rating balances performance, street price, features, and support policies. For all ratings, higher is better.

For more information about all products in this table, circle reader service no. 901.

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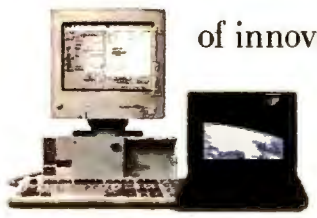

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PC MAGAZINE EDITORS' CHOICE August 1995 pcANYWHERE 2.0

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U.S. Robotics Stars in Top 10 Modems Debut

As Small as Its Price
U.S. Robotics' Sportster V.34 Faxmodem, our top Best Buy, not only has an ultracompact design but great performance and price.

Buying a modem is easy, right? All you have to do is pick a fast one—these days a V.34 28.8-kbps model—and not worry about anything else except price.

Guess again. Speed and connect reliability (the percent of calls resulting in connections) vary remarkably among modems, even those based on the same protocol. For this first Top 10 list of the best 28.8 fax-modems on the market, we tested 15 popular external units. We limited testing to V.34 models, because recent *PC World* surveys show that most readers plan to buy 28.8 modems rather than 14.4s.

Our Top Data-Slingers

Our top Best Buy this month is U.S. Robotics' Sportster V.34 Faxmodem, and it's easy to see why. This ultracompact unit is a very good performer, has user conveniences such as a manual volume control, and is backed by a highly reputable company. In short, USR has amply covered all the bases with a product that sells for only $219.

Practical Peripherals' PC288LCD V.34, the winner of our June modem roundup, is again one of our most highly recommended modems. Not only is it a great performer, it comes with a host of convenient features, including a large, informative LCD panel and manual volume control. The PC288LCD also comes with user-friendly documentation and a lifetime warranty; the company even provides weekend support hours. The only thing that keeps the PC288LCD from the top spot is its high $359 price.

In third place is the MaxTech/GVC XM288E. It's one of the few modems available with voice/data switching, and it's a good, solid performer at a near-unbeatable $174. For reliable connections, the Motorola ISG Power Class 28.8 Data/Fax Modem, in fourth place, beats the rest hands down. The Power 28.8 made a successful connection in every attempt—a distinction shared with only the Best Buy

TOP 10 MODEMS

		Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Design, ease-of-use rating	Data/fax speed (kbps)	Voice-data switching	Reader service number	Comments
1	BEST BUY U.S. Robotics Sportster V.34 Faxmodem 800/342-5877	$219/ $199	85	77	88	75	28.8/ 14.4	–	611	Super-small unit has all the basic features plus unbeatable combo of performance, low price.
2	BEST BUY Practical Peripherals PC288LCD V.34 404/840-9966	$359/ –	85	85	82	83	28.8/ 14.4	–	612	Great performance and features, excellent support make this a top all-around modem.
3	MaxTech XM288E 800/936-7629	$174/ $145	84	81	73	76	28.8/ 14.4	VoiceView	613	Below-average high-speed connects, but otherwise a solid unit at great price.
4	Motorola ISG Power Class 28.8 Data/ Fax Modem 800/568-3266	$300/ –	83	78	92	74	28.8/ 14.4	–	614	Basic features, but best-performing modem we tested, and backed by superb support.
5	AT&T DataPort Express 800/482-3333	$219/ $199	83	80	72	73	28.8/ 14.4	–	615	Decent performance makes this unit a worthy value.
6	Microcom DeskPorte Fast 28.8 800/822-8224	$391/ –	83	75	90	85	28.8/ 14.4	–	616	Very good overall performance, unique features such as parallel port connect.
7	Zoom Telephonics V.34X 800/631-3116	$199/ $149	82	79	70	72	28.8/ 14.4	–	617	The price is right, and you get long support hours, but connect reliability could be better.
8	Practical Peripherals PM288MT II V.34 404/840-9966	$229/ $209	81	81	66	72	28.8/ 14.4	–	618	Attractive price and well-supported, but had low connect reliability in our tests.
9	Boca Research V.34 28,800bps External BocaModem 407/997-6227	$249/ $199	81	75	80	75	28.8/ 14.4	–	619	Affordable; respectable performance and feature set.
10	U.S. Robotics Courier V. Everything with V.34 800/877-2677	$400/ $390	80	77	82	83	28.8/ 14.4	[1]	620	Nice all-around package, but expensive due to corporate features like security.

BEST BUY

[1] Switch on front panel.

For more information about all products in this table, circle reader service no. 902.

Fastest With the Mostest
Our other Best Buy this month, Practical Peripherals' PC288LCD V.34, is loaded with features and speed, and even has weekend support.

Practical Peripherals modem and the two U.S. Robotics modems—and over three-quarters of those connections were at 28.8 kbps. This is impressive when you consider that 9 of the 15 modems we tested achieved 28.8-kbps connections less than half the time. (Most modems drop to slower connect speeds if they fail to connect at their optimum rate. In our tests, 28.8 modems often connect at 26.4 or 24 kbps.)

Microcom's Deskporte Fast 28.8 deserves special mention. While it's the second most expensive modem in the chart at $391, it has the most complete feature set of any business-class modem now on the market. Like the PC288LCD, it has an English-language status readout panel and manual volume control, and it's one of the few modems that includes user-upgradable firmware and MNP-10 error control, which is designed to let you send files over a cellular phone. One very neat feature is the Deskporte's ability to connect to your PC's parallel port. This could save you from an upgrade if your serial port has an older (e.g., 8250 or 16450) UART.

Speed—as well as connect reliability—varies remarkably among 28.8-kbps modems.

Chewing Bits and Talking at the Same Time

Two features still in their infancy on V.34 modems are voice mail and voice/data sharing. Modems with voice-mail–enabled chips and the appropriate software let your PC act as a telephone answering machine. None of the modems here have voice-mail–enabled chips, but these will be on the scene soon. Voice/data sharing, just starting to catch on among V.34 modems, lets you alternately or even simultaneously use one phone line both for speaking and for sending files. MaxTech's XM288E uses Radish's VoiceView, which allows you to switch between voice and data modes without having to hang up and redial. U.S. Robotics' Courier achieves the same thing with a front-panel switch.

We'll continue to review external modems every month, retesting models whenever a vendor issues a major firmware upgrade. In February, we'll add PC Card (aka PCMCIA) modems to the list.

—Bryan Hastings

Bryan Hastings is a senior associate editor for PC World. *Testing performed by Susan Silvius and Dave Casini of the PC World Test Center.*

HOW WE EVALUATE MODEMS: Performance, Features Are Key

Whether you're a budding Net surfer or have bulky spreadsheet files to transmit, our new Top 10 chart will help you make the best buy in a V.34 modem.

We looked at these modems from all angles—price, performance, feature set, and support policies—to come up with our overall ratings. Performance, which includes throughput and connect reliability, and feature set, which includes ease-of-use, documentation, and design, together contributed the lion's share of the points to our overall rating, followed by price and support policies. However, we heavily dock modems that are especially pricey, because our research shows that most of you expect to pay no more than $300.

To test throughput (speed) and how reliably the modems made connections, we used a simulated public service telephone network from Telecom Analysis Systems. For maximum compatibility, we paired each modem with an identical model from the same vendor. We attempted to connect the modems using 55 different types of line conditions representing 95 percent of all domestic phone lines as defined in the modem industry's testing specification, TSB 37A. Each modem used a vendor-provided initialization string that meets TSB 38 requirements. We performed 220 transfers using graphics, text, executable, and precompressed files. To rate how reliably each modem connected, we looked at the percent of total connect attempts during testing that were successful regardless of speed, as well as the percent of connects made at 28.8 kbps.

We gave a modem extra points if its firmware is user-upgradable (if not, the modem must be returned to the manufacturer for the upgrade). In judging the quality of manuals, we looked for clearly written documentation with lots of useful diagrams, quick-start guides, troubleshooting guides, indexes, and glossaries. We judged the software based on how easy it was to install and use. We also gave bonuses for conveniences such as easy-to-understand status panels and manual volume controls. Ditto for security features such as passwords, callback, and Caller ID detection, as well as voice/data line sharing.

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SYSTEM REQUIREMENTS: 386 or higher PC, with 4MB available memory, running Windows® 3.1 or higher with fax capabilities, including a fax application such as WinFax™, FaxWorks™, etc., VGA display, 3.5 inch high density diskette drive, a minimum of 1.5MB of hard disk space for the software installation and about 10MB hard disk space for optimum operation. © 1995, InfoImaging Technologies, Inc. 3D FAX is a trademark of InfoImaging Technologies, Inc. 3D FAX is protected by U.S. patent. Windows and Windows 95 are registered trademarks of Microsoft Corporation. All other trademarks are property of their respective owners.

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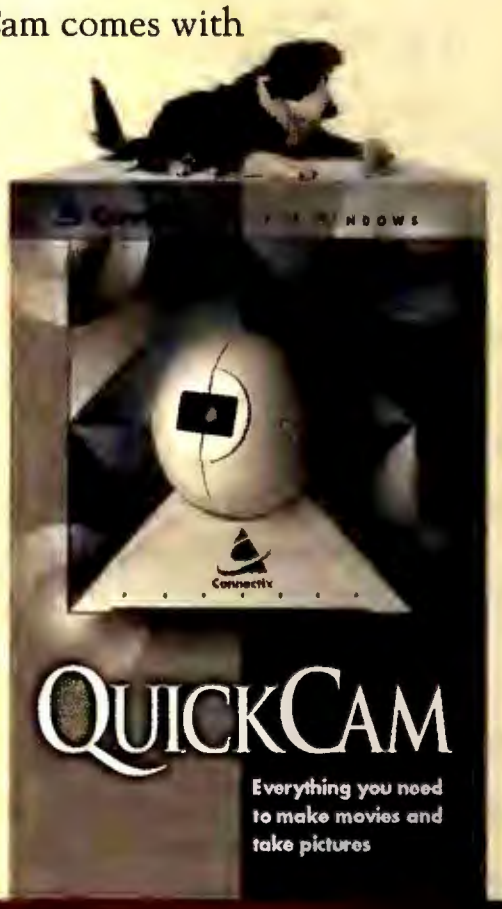

Connectix

System Requirements: A PC equipped with a 386, 486, Pentium or equivalent processor • Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11 • 4 MB RAM required

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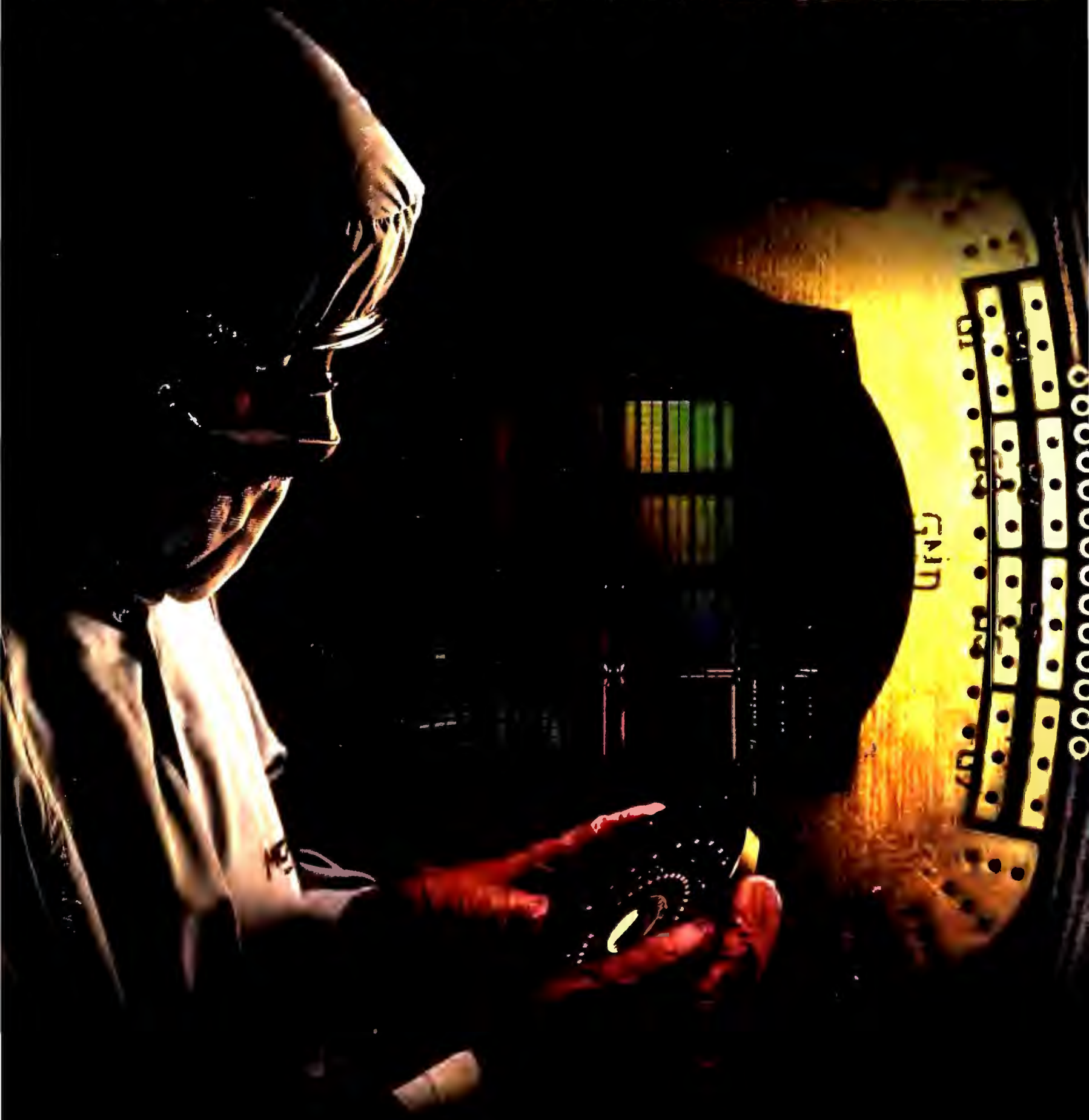

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June 28, 1994
P90PCI
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May 16, 1995
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...27, 1994
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PC Week, May, 1995

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PC MAGAZINE EDITORS' CHOICE
May 30, 1995
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Dell XPS P120	19.6	257	980
Gateway P5-120	17.5	256	1,237
HP VL 5/120	12.7	237	1,076

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*Option D not available in desktop

P75 PowerStation

- Intel 75MHz Pentium processor
- 256K write-back cache, Flash BIOS
- 8MB EDO RAM • 850MB EIDE hard drive
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- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit graphics accelerator (2MB)
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- *With 100MHz Pentium processor.....add $200*

PC MAGAZINE EDITORS' CHOICE
June 28, 1994
P90 POWERSTATION

PC WORLD BEST BUY
October 1994
P90 POWERSTATION

P90 PowerStation

- Intel 90MHz Pentium processor
- 256K write-back cache, Flash BIOS
- 16MB EDO RAM • 1.2GB EIDE hard drive
- 4X EIDE CD-ROM drive, 3.5" floppy
- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit graphics accelerator (2MB)
- 15" Micron 15FGx, 1280NI, .28mm
- *Tool-Free* mini-tower or desktop
- Microsoft Mouse, 101-key keyboard
- Microsoft Windows 95 CD
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DELL	8.4	8.0	8.1	7.8
IBM	8.2	7.6	7.4	6.8
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PC MAGAZINE EDITORS' CHOICE
May 16, 1995
P90 HOME MPC

PC WORLD WORLD CLASS 1995
July 1995
P90 HOME MPC

intel inside
pentium PROCESSOR

P75 HOME MPC

- Intel 75MHz Pentium processor
- 256K write-back cache, Flash BIOS
- 8MB EDO RAM, 850MB EIDE hard drive
- 4X EIDE CD-ROM drive, 3.5" floppy
- SoundBlaster 16 stereo sound & speakers
- 14.4 Fax/Modem, speakerphone, voice mail
- PCI 64-bit graphics accelerator (2MB)
- 15" Micron 15FGx, 1280NI, .28mm
- *Tool-Free* mini-tower or desktop
- Microsoft Mouse, 101-key keyboard
- Microsoft Windows 95 CD
- Microsoft Works 95 CD
- Microsoft Scenes: Sports Extremes; Microsoft Bob CD; Microsoft, Encarta 95 CD; Quicken Deluxe Edition CD; Microsoft Dangerous Creatures CD; Microsoft Golf Multimedia CD; Trial Subscriptions for CompuServe, America OnLine & Prodigy.

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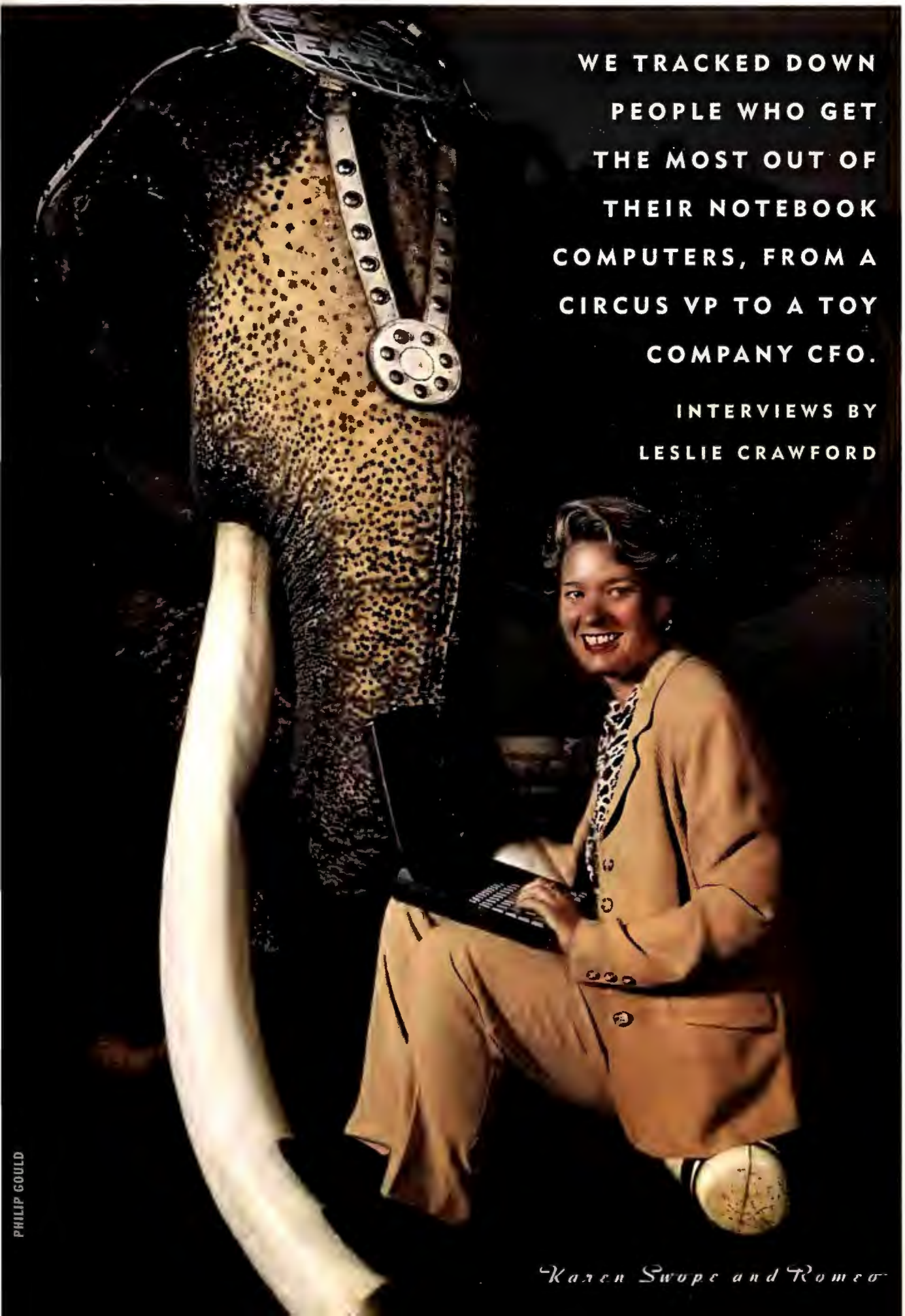
MICRON ELECTRONICS, INC.

Circle 217 on reader service card

EDITED BY ERIC BENDER

TAKE YOUR ACT *on the Road*



PHILIP GOULD

Karen Swope and Romeo

WE TRACKED DOWN PEOPLE WHO GET THE MOST OUT OF THEIR NOTEBOOK COMPUTERS, FROM A CIRCUS VP TO A TOY COMPANY CFO.

INTERVIEWS BY LESLIE CRAWFORD

NAME: Karen Swope
JOB: Regional vice president and senior marketing manager, Ringling Bros. and Barnum & Bailey Circus
LOCATION: Atlanta
AGE: 36
NOTEBOOK: Compaq Contura 4/25CX
WHAT'S ON IT: Windows, WordPerfect, Excel, the company's engagement files (one for each city), proposals, directions to her house for a party, and invitations.
HOW SHE USES IT: "Our jobs as promoters include ticket pricing and scaling; we can even get online with TicketMaster. When I first started nine years ago, everything was done by hand; we carried with us 50 pounds' worth of sample case forms and program books. Through the years, it's become much more automated."
BEST ROAD STORY: "I can't imagine us doing our jobs without laptops. We have about 30 people on the road who take their office with them wherever they go. The amount of paperwork has almost doubled since I started. To track it manually would be impossible."
WORST ROAD STORY: "My laptop completely died on me during a settlement."
WISH LIST: "I'd like a smaller printer. And no matter how light they make computers, they're never light enough."

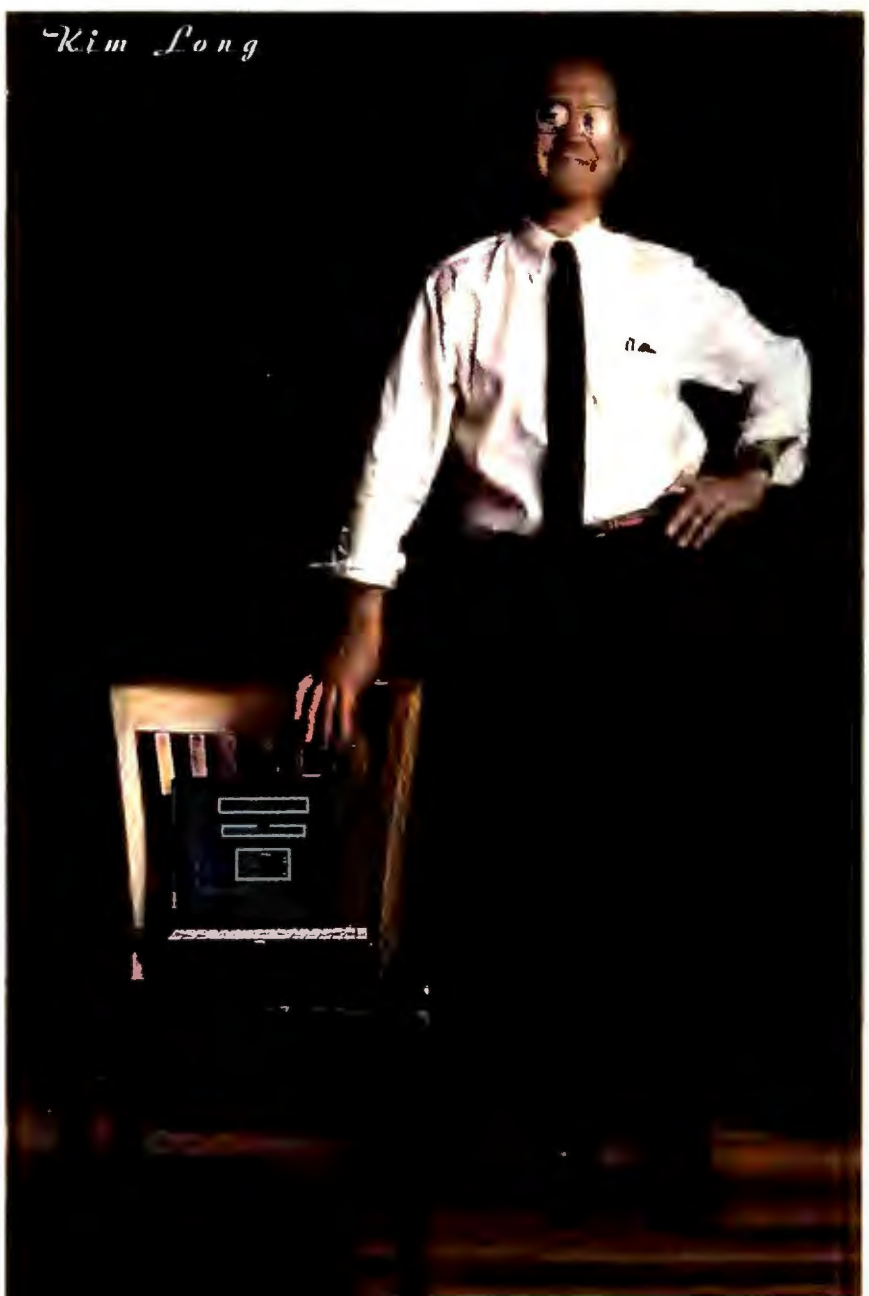
NAME: Brian Strong
JOB: Options trader, Strong-Hold Enterprises
LOCATION: Westport, Connecticut
AGE: 54
NOTEBOOK: Toshiba 4850
WHAT'S ON IT: Microsoft Word ["which I never use"], Write, NotePad, Excel, Fidelity Fox online service, CompuServe, OptionView 4, and The Captain (a navigational tool package).
HOW HE USES IT: "I go sailing for a month at a time. I can use the laptop for navigation, which is a great application for sailors as electronic charts become widely available at low cost. The National Oceanic and Atmospheric Administration, the federal agency that creates navigational charts, is making these available on CD-ROM. It will change the way that people navigate their craft."
BEST SEA STORY: "Having a satellite location receiver tied into my laptop so that I can get a precise latitude and longitude. In that sense, the laptop is a lifesaver."
WORST SEA STORY: "Nothing worse than spilling a cup of coffee on it."
WISH LIST: "All the power that Intel can give us, to help with the zoom-and-pan capabilities for charts. Moving a 4-by-5-foot chart to an 8-by-10-inch screen is a big adjustment."

Brian Strong

NAME: Teri Fields
JOB: Retired
LOCATION: West Palm Beach, Florida
AGE: 66
NOTEBOOK: Toshiba 1910 CS
WHAT'S ON IT: Microsoft Word, Bridge Baron, Grand Slam, America Online, Quicken, a cookbook she's writing for her children, and her family tree.
HOW SHE USES IT: Writing, playing bridge, and staying in touch.
BEST ROAD STORY: "Being able to communicate with my family through America Online. I spend half the year in West Palm Beach and the other in Boston, so I can take my laptop with me and exchange e-mail with them every day."
WORST ROAD STORY: "Haven't had any, really."
WISH LIST: "My laptop could still be a little more user-friendly. I'm used to the mouse and the keyboard—my problems are usually with the software."

Teri Fields

NAME: Kim Long
JOB: President, The American Forecaster, and author of *The American Forecaster Almanac*
LOCATION: Denver, Colorado
AGE: 46
NOTEBOOK: Acer 486
WHAT'S ON IT: Microsoft Word, generic fax software, Prodigy, America Online, CompuServe, Distant Suns astronomy program, a Web browser, copies of *The American Forecaster Almanac* and notes for the next edition, and a manuscript for a book on squirrels.
HOW HE USES IT: "For business trips, I use my laptop to give demonstrations. Instead of telling somebody something that you want to do in an electronic environment, you say, Here, this is what it is."
BEST ROAD STORY: "At the American Booksellers Convention, which gave us a disk so we could find our way around. But it was a bit awkward carrying my laptop around."
WORST ROAD STORY: "When my batteries give out. I don't like carrying an extra battery pack as well as an adapter."
WISH LIST: None. "My laptop's close to being indispensable for my work. In a hotel, it's great for getting things done."


Kim Long

PHOTOS, CLOCKWISE FROM TOP: RAY NG, RAY NG, BRIAN SMALE

NAME: Jonathan Zavin
JOB: Intellectual property lawyer, Richards & O'Neill
LOCATION: New York
AGE: 48
NOTEBOOK: IBM ThinkPad 350C
WHAT'S ON IT: WordPerfect, Paintbox, Solitaire, and e-mail.
HOW HE USES IT: "For business trips and traveling with my kids. That's why I have Paintbox. It's great for plane rides."
BEST ROAD STORY: "I can get confidential documents from a client without having to worry about documents being faxed to the hotel."
WORST ROAD STORY: "Getting a hotel room where the modem doesn't work."
WISH LIST: "I'd like the laptop to be lighter—a slim, 3-pound job with a full-size keyboard I can slip into my briefcase. They don't yet make laptops for people like me who don't need a lot of computing power. I'm using mine for e-mail, not for quadratic equations."

NAME: Hillary Carlip
JOB: Writer
LOCATION: Los Angeles
AGE: "In the thirties"
NOTEBOOK: Toshiba Satellite T1910
WHAT'S ON IT: Microsoft Word, Solitaire, a copy of her book *Girl Power*, screenplays in progress, correspondence, notes about her book, and letters to teenage girls.
HOW SHE USES IT: Writing on the road.
BEST ROAD STORY: "A very large plaster statue of St. Francis of Assisi fell on my computer during the Los Angeles earthquake [in 1994]. St. Francis broke in half but only dented the computer."
WORST ROAD STORY: "I was working on the book by a duck pond and got attacked by a duck. And a duck started pecking on the keys and altered the document."
WISH LIST: "I would like to have a color computer at a cheaper price."

NAME: Mike Irwin
JOB: Chief financial officer, Wild Planet Toys
LOCATION: San Francisco
AGE: 52
NOTEBOOK: Toshiba 1960 CS
WHAT'S ON IT: Ami Pro, Delrina WinFax, NetWare, America Online, 1-2-3, Solitaire, Yahtzee, Taipai, Hearts, Lotus Organizer, Tetris, TurboTax, AccPac accounting, client files, letters, family history, and personal financial information.
HOW HE USES IT: "I don't even have a desktop machine. I go strictly with a laptop and take it with me all over the world. I hook it up with a fax-modem card and a network card, pop those in and then plug into the network at work. At my office, I have simply an additional keyboard and an additional monitor."
BEST ROAD STORY: "My laptop is my toy and my work. I just love it. My office is wherever my computer is."
WORST ROAD STORY: "Blowing up my fax-modem the first time I tried to use it in a hotel overseas."
WISH LIST: "Larger hard drives and more memory should be standard. I'd also like to see laptops with built-in diagnostics. If you're on the road and something goes wrong, you've got to be able to fix it quickly."

PHOTOS, CLOCKWISE FROM TOP: AMY ETRA, RICHARD MORGENSTEIN, BRIAN SMALE

A

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COM port and configures your modem. Plus Carbon Copy doesn't replace drivers in your system.ini file for complete compatibility with peripherals.

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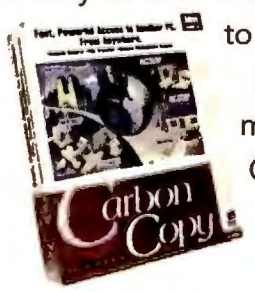

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OUR 15 FAVORITE PRODUCTS FOR LIFE on the Road

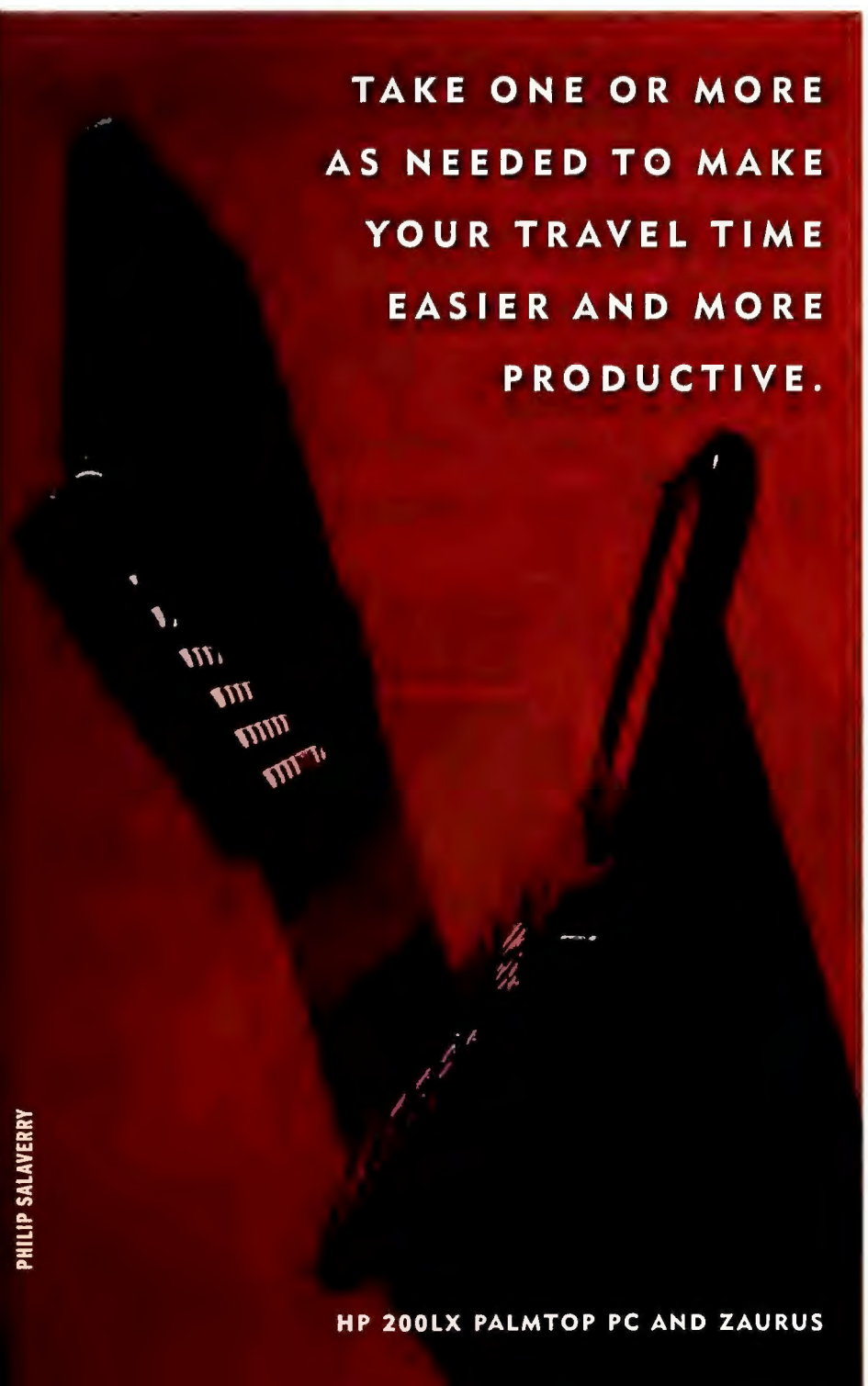
BY MIKE HOGAN

A business trip is no vacation—unless you enjoy stressing out over a crucial meeting while lugging everything from clean socks to empty floppies. Nor is there much pleasure in crowded airports, inhospitable lodgings, treacherous meals, and unfriendly corporate gatekeepers.

Fifteen million of us live this way, spending more than half our working hours on the road, by Dataquest estimates. And it gets worse: When you're gone, you're not forgotten. The work doesn't stop piling up just because you're out of the office.

By itself, a notebook PC doesn't necessarily overcome your roadside detractions. In some ways, it makes them worse because it raises expectations that you will somehow keep up with everything: "Don't you check your e-mail? You have a portable, don't you? Just work up those budgets on the plane. Fax those reports from the hotel. And *call me!*"

Not to worry. We've found a bevy of hardware and software that can help you stay in touch, keep your dates straight, do your expenses, and generally make life on the road worth living. Everything's under $600 on the street—most of them *way* under. One of them will save your hide somewhere down the pike. Have a nice trip!



I Wanna Fold in Your Hand

How often do you stare at your suitcase and wonder if you can leave your portable at home just this one time?

If you need to polish a presentation or streamline a spreadsheet while you're on the road, you should pack that 6-pound brick and its weighty little fellow travelers. But if you just need to write and send a couple of memos, take a few meeting notes, and keep on top of your messages, then a personal digital assistant like an HP 200LX Palmtop or a Sharp Zaurus is a better choice.

Both weigh well under a pound, fit in a purse or a jacket pocket, and run just about forever on a pair of AA alkaline batteries. Both accept a range of PC Cards—including fax-modems—and are more convenient than a portable for maintaining appointments, to-do lists, and phone numbers. And both pack built-in facilities to let you transfer your road work to your desktop rather easily.

The HP 200LX bundles several useful DOS applications, including 1-2-3, cc:Mail, and best of all, Intuit's Pocket Quicken. But the Zaurus offers a larger display and bigger typing keyboard and is far better for taking notes, whether you use its pen or keyboard (it's the only PDA that gives you both).

HP 200LX Palmtop PC, *list $699; Hewlett-Packard; 800/443-1254, 503/715-2004.*

Reader service no. 810

Zaurus, *list $749; Sharp Electronics; 800/237-4277.*

Reader service no. 811

Getting There and Back Again

How many business meetings do you sneak into late because you got lost? You can get from here to there—and there and there—more efficiently with Microsoft's Automap travel planning duo.

If you're driving any distance, Microsoft's Automap Road Atlas will plot the quickest route over major highways and byways. Version 4.0's Route Wizard swiftly calculates the fastest way to get between two of nearly 150,000 points in the United States, Canada, and Mexico. Once in town, you can use Microsoft's Automap Streets to home in on any address in all major U.S. metropolitan areas,

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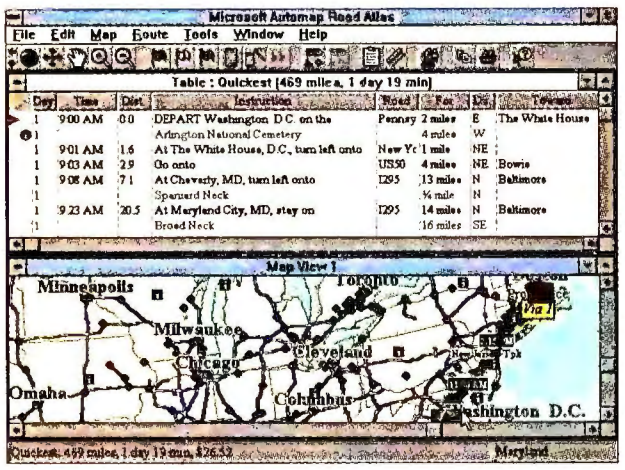
Circle 102 on reader service card

complete with distance and travel time estimates and turn-by-turn routing instructions. You can access Automap Streets directly from Automap Road Atlas. **Microsoft Automap Road Atlas,** *list $39.95 on disk and CD-ROM;* **Microsoft Automap Streets,** *list $69.95 on CD-ROM; Microsoft Corp.; 800/426-9400, 206/882-8080.*

Reader service no. 812



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Any PC Card fax-modem will let you stay in touch on the road—but to really travel in style, you'll want a NovaPak. The NovaPak 288 is the Cadillac of fax-modems, providing data transmissions at 28.8 kilobits per second, a sophisticated voice messaging system, and even an alphanumeric pager—all on a single Type II card. And you can do business over cellular or landline connections.

The NovaPak has 128K of memory for your messages. Once you slide it into a Type II slot, stored messages are automatically downloaded to your portable's hard drive, freeing up memory on the NovaPak. Because it also packs its own AA battery, the NovaPak doesn't need to be plugged into your portable to receive pages. At 4 ounces, it can be slipped into pocket or purse when you don't want to drag along your portable. **NovaPak 288,** *list $599; NovaLink Technologies; 800/668-2546, 510/249-9777.*

Reader service no. 813

Turning to a New Pager

So you're on the road. Maybe you can plug in your portable today; maybe you can't. When you can't, join 25 million Americans who know that today's pagers do a lot more than just beep at you. The Seiko MessageWatch captures your callers' phone numbers, delivering them via surplus bandwidth on local FM radio stations. You also can download weather forecasts, stock prices, local sports scores, lottery winners, voiee mail notifications—even reports on skiing conditions.

The MessageWatch comes in 10 styles and is available in many large metropolitan areas. Unlike rechargeable pagers, it runs 24 hours a day for 18 months on a single watch battery. (It also tells time.) **Seiko MessageWatch,** *list $79.95 to $119.95; Seiko; 800/456-5600, 503/531-3450.*

Reader service no. 814

Put It in Print

The Boy Scouts are taught to take only memories and leave only footprints, but you just might want to leave a business proposal, contract, or sales catalog on your next outing. Take Citizen's PN60 printer, which is as rugged as it is slender—it's a mere 10 by 2 by 2 inches. You won't even feel the extra pound and a half in your briefcase. But this thermal printer delivers laser-quality text and color graphics at about two pages per minute. The PN60 runs on an AC adapter or its own external battery, which is good for about 50 pages. **Citizen PN60,** *list $399; Citizen America; 800/477-4637.*

Reader service no. 815

Taking Remote Control

You don't have to be at your desk to hook your portable up to your desktop PC. LapLink for Windows lets you transfer files over phone lines or even run applications on your desktop from your remote portable. LapLink picks up speed by transferring only the bytes that have changed between versions rather than the whole file. And in a world where remote access connections are choked with complexities, LapLink's drag-and-drop interface is a breath of fresh air. **LapLink 6.0b for Windows,** *list $199.95; Traveling Software; 800/343-8080, 206/483-8088.*

Reader service no. 816

Painless Expense Tracking

It's no thrill to come home with a pile of barely legible receipts that must be transcribed into your company's arcane expense reports. QuickXpense for Windows 95 lightens that load. If you have a Quicken or CompuServe Visa, or an American Express Card plus a subscription to America Online, you can dial up the appropriate service and download a record of your credit card expenditures right into QuickXpense. Even better, if you buy three copies of the soft-

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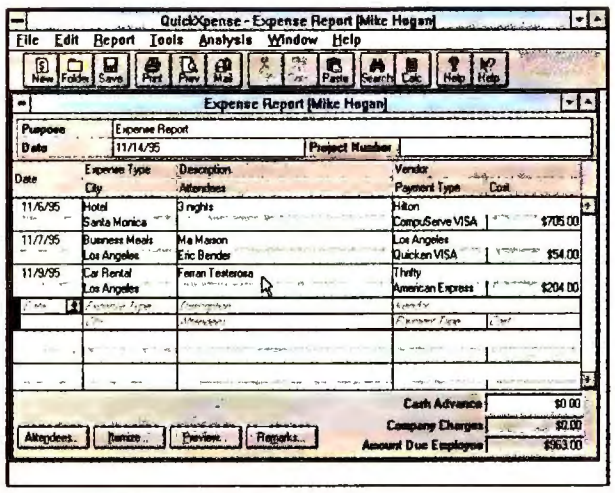
ware (or pay $99), Portable Software will customize your copy of the program so that your printed expense reports look just like your company's form.



QUICKXPENSE 1.6

You can kill two birds with one stone by also downloading your expense information to your personal finance program. Once you've done a couple of downloads and QuickXpense has learned which categories you prefer for Bob's Big Boy and Ma Maison, the whole process is a snap. **QuickXpense 1.6 for Windows 95,** *list $99.95; Portable Software Corp.; 800/478-7411, 206/637-8808.*

Reader service no. 817

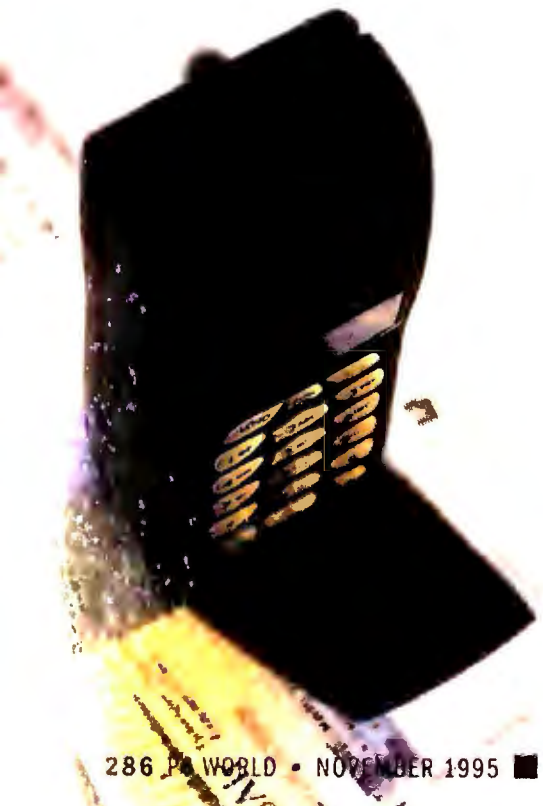
Look Up in the Sky: It's a Phone! It's a Modem!

Actually, it's more—a cellular data/fax/voice phone that sends and receives faxes, e-mail, or voice mail messages even when it isn't hooked up to your portable's modem. The AirCommunicator Lite weighs under 9 ounces and uses an error correction/compression protocol to overcome much of the line noise and break-ups typical of cellular phones. It transfers data at 14.4 kbps in native mode or at speeds up to 57.6 kbps compressed.

Plug the AirCommunicator Lite into your serial port, and it talks to popular communications programs so you can transfer stored phone numbers, e-mail, and faxes into memory for transmission immediately or later. The AirCommunicator's nickel-cadmium batteries last 1½ hours in talk mode and 10 hours in standby on a single charge. **AirCommunicator Lite,** *estimated street prices $500–$700; Air Communications; 800/247-3282.*

Reader service no. 818

AIRCOMMUNICATOR LITE



Don't Crush That Jack, Hand Me the Pliers

You never know what kind of phone system you'll find on the road, and hotels *really don't* want you to perform surgery on their phone lines. If you lack a cellular phone, you can still dial up with Konexx Konnector Model 111. This adapter plugs into a telephone handset to create an RJ-11 phone jack for your modem at data transfer rates up to 28.8 kbps—and keeps the hotel phone switch from frying your modem. The Model 111 is under 5 ounces, 1 inch thick, and the size of a credit card.

An alternative approach for phone systems that refuse to be disabled is the Model 204, a slightly larger and heavier acoustic coupler with rubber cups that quickly snap over a phone handset to accommodate data transfers at up to 19.2 kbps. **Konexx Konnector Model 111,** *list $159;* **Konexx Koupler Model 204,** *list $149; Unlimited Systems; 800/275-6354.*

Reader service no. 819

Power to Spare

Short battery life has been the bane of portable users. But you need look no further than the AER Energy PowerPro. This zinc-air battery roughly triples your run times to give you up to 15 hours of continuous use.

The PowerPro replaces your current battery. Its platform adds about 3 pounds in weight, three quarters of an inch in height, and a palm rest. Zinc-air batteries have no memory effect, so you don't need to worry if you plug into an AC outlet before you've run down the battery. The PowerPro uses your portable's current AC adapter to recharge. **AER Energy PowerPro,** *list $399; AER Energy; 800/769-3720.*

Reader service no. 820

LANLocked On

The two most popular portable peripherals are a modem and a local area network adapter. If you need both, try Xircom's CreditCard Ethernet+Modem II. You get a 28.8-kbps fax-modem and your choice of a 10BaseT or a combination 10-BaseT/10Base2 LAN adapter—all in one slot. **CreditCard Ethernet+Modem II,** *list $429 (10-BaseT), $499 (10BaseT/10Base-2); Xircom, Inc.; 800/438-4526, 805/376-9300.*

Reader service no. 821

Go Fore It

Where is it written that a business trip must be all business? If you've got time between meals and the in-flight movie, boot up Microsoft Golf 2.0 and play the front or back nines at Firestone Country Club, or try the add-on packs for Pinehurst, Mauna Kea, or Banff Springs. **Microsoft Golf 2.0,** *list $49.95; $24.95 for add-ons; Microsoft Corp.; 800/426-9400.*

Reader service no. 822

MICROSOFT GOLF 2.0

Leslie Crawford is a San Francisco–based freelance writer. Mike Hogan sells guacamole and writes about PC products throughout Southern California.

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HELP LINE Q&A

Getting the Picture

Q I recently bought a library of images on CD-ROM. The same images were repeated several times in three subdirectories, all in the same format but with different file sizes. Why?

Also, what are the strengths and weaknesses of the different graphics file formats, including .gif, .tif, .bmp, .tga, .jpg, and .pcx?

Cliff Steenhoff, Miami, Florida

A Many CD-ROM image libraries provide images that have been scanned or scaled to different resolutions. This lets you use high-resolution images for printouts and lower-resolution images for on-screen graphics without having to scale the image yourself—a lengthy process. CD-ROM libraries often include gray-scale versions of the images as well.

Graphics file formats are generally categorized by the way files are compressed: *uncompressed* (.bmp, .tga, and some .tif), *lossless compression* (.pcx, .gif, and other .tif), and *lossy compression* (JPEG).

Uncompressed files are large because they contain the entire image, making it easy for these graphics files to be read by different programs. For example, Windows' Paintbrush accessory defaults to the .bmp format, which can be read by most Windows, OS/2, Macintosh, and DOS programs.

Lossless compression is another cross-platform standard. Graphics files compressed in this manner yield exactly the same images as the original uncompressed files, but they're smaller—which makes them easier to store or share over e-mail. The compression schemes vary greatly in their efficiency; .pcx uses a quick but very inefficient compression scheme, while .gif can compress files much more.

JPEG is a lossy compression scheme, which means that some detail is lost in exchange for a smaller file size. Compression ratios of 10:1 and 20:1 often result in an unnoticeable loss of resolution but a considerable space saving to your hard disk.

You will also encounter another class of graphics formats called *metafile formats*. These include EPS (Encapsulated PostScript) and WMF (Windows Metafile). Metafile formats are used for precise drawings that may need to be resized. You're more likely to find them in clip art collections than on stock photo discs.

Sound Card Incompatibility?

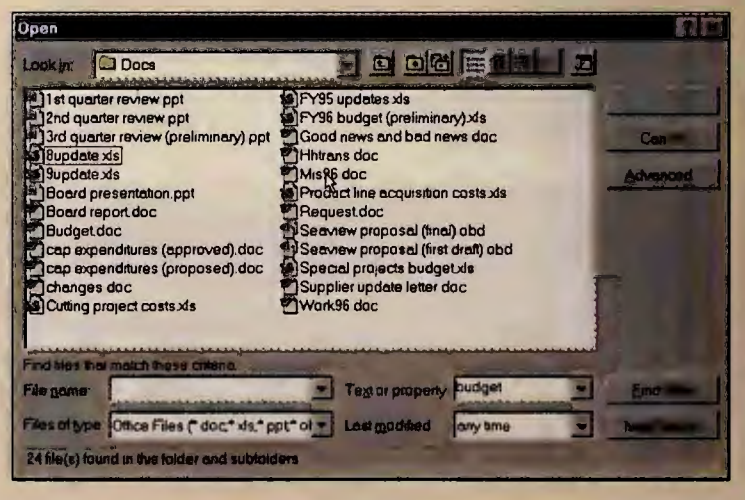
Q I am buying a Pentium system that normally comes equipped with an Orchid 32-bit sound card and a SCSI-2 host adapter. I'm thinking of asking the vendor to add a Creative Labs Sound Blaster card instead, to make sure that all of my software will run. Is this necessary for compatibility?

T. C. Chao, Internet

A In general, if you are running software written for a graphical operating environment such as Windows, NT, or OS/2 Warp, you need not worry about sound card compatibility problems; the operating system and its drivers will hide any differences between sound cards. DOS software is more

Find Anything in the Office

Locate what you need with Microsoft Office for Windows 95's File Open dialog box, which you reach by clicking the Open a Document icon on the Office's Shortcut Bar. This dialog box makes it easy to find all files created in any Office application—Excel, Word, Access, or PowerPoint. You can search for files that contain a specific text string, and create more complex, conditional searches that you can save and recall. Office automatically builds text indexes for the files in the background.



THOM SEVALRUD

likely to run into compatibility problems with certain cards—mainly lesser-known and less expensive brands. But even if you're running DOS software, don't worry about the Orchid card, since Orchid has a very good track record when it comes to compatibility.

Windows Extinguishes Dinosaur 3D

Q I've just upgraded my Packard Bell 2002 Elite computer so that it has 8MB of RAM and a 1GB hard drive. When I try to run Dinosaur 3D from Windows, I get a message saying that the computer doesn't have enough memory. Running MemMaker doesn't help. I have no trouble running Dinosaur 3D from DOS, however. Why?
John Campbell, Arlington, Massachusetts

A In general, it's not a good idea to run DOS multimedia software—including the wonderful Dinosaur 3D—in a Windows DOS session. Besides slowing the program, Windows can rob it of valuable memory, perhaps so much that it will crash or fail to run at all. As you've discovered, the answer is to run the program directly under DOS.

Clobbered CMOS

Q I recently tried to install a system password via my system's CMOS setup menu. Something went wrong: A password was installed, but I didn't know what it was. I took the battery out of my computer, hoping it would erase the CMOS settings. It did, but I learned that I must reenter my hard drive parameters to get the machine working again. What should I do?
Mark McCoid, Internet

A Some of the latest PC BIOSes can read an IDE drive's parameters directly, so that you don't need to know them. But if there's no autodetect option in your BIOS, you will have to enter the parameters yourself.

The best thing to do is get them from your system vendor. (If the vendor kept records of what was sent to you, this information should be right at hand.) Alternatively, you can call the maker of the disk drive and get the parameters from the company's technical support department.

Clobbered CMOS Redux

Q When I start my computer, it gives me the message 'Press <F1> to resume; <F2> Setup' before it boots up. Is there a way to bypass this?
Ken Williams, Atlanta

A This message usually indicates an error in the CMOS setup information. Press **<F2>** and make sure that all the setup information is correct—particularly the amount of RAM installed and the number and types of drives. Normally, this will eliminate the message. If you still see the message after restarting the computer, your CMOS battery may be dead; try replacing it with a fresh one.

OS/2 Driver Needed?

Q My PC uses a DTC VL-Bus IDE card to run its 428MB and 130MB Seagate hard drives. The card came with a DOS device driver to make it work with Windows for Workgroups' 32-bit File Access, but I'm using OS/2. Do I need a different device driver to maximize performance under that operating system?
Michael Rezsutek, Houston, Texas

A OS/2 will work without a driver if you use any VL-Bus IDE card from DTC Technology, but it will work even faster if you add a device driver that activates the full 32-bit VESA local bus interface. To get this driver, call DTC's BBS at 408/942-4010, join Conference 7 (VESA), and download **ideos2.zip** from file directory 2. To get the complete set of drivers for all operating systems, download the file **eidev13.zip**. You may also be able to find these drivers in the OS/2 section of your favorite online service.

Changing the Default Boot Drive

Q If I accidentally leave a floppy disk in my PS/1's A: drive and turn the computer on, the system ignores the floppy and boots from the hard disk if

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the floppy isn't bootable. How do I configure my other PCs to do the same?
Joshua J. Campbell, CompuServe

A The PS/1, designed for consumers instead of computer professionals, has an especially smart BIOS that can detect a bootable disk. To my knowledge, no other manufacturer has implemented this feature—which *must* be part of the BIOS to work—so you probably can't add it to your other PCs.

On the other hand, chances are that your other machines can be configured to try booting from the hard disk first, then from the floppy. To find out if this is possible, enter your BIOS's setup program (often accessed by pressing <Delete>, <F2>, or some other key at boot time), and look for an option that changes the default boot drive. All current Award BIOSes and Mr. BIOS have this feature, as do many others.

A Change of Identity

When you install Windows 3.*x*, it brands itself with the name and company name you enter in the initial dialog box. Then, selecting Help•About Program Manager shows that the product is licensed to you.

This is fine unless you sell your computer or give it to someone else. In that case, you'll want to update the licensing information, or at least remove your name from the machine. Here's how: Select *File•Run* from Program Manager's menu, enter **setup /f** on the Command Line (make sure to include a space between setup and /f), and click *OK*. In the Windows Setup dialog box, enter a new user name and company name, and then click *Continue*. Verify that the name is correct, and click *Continue* again.

When the program asks which components to install, make sure that the check box *Set Up Only Windows Components You Select* is selected, and deselect the other check boxes. Then keep clicking *Continue* until you are prompted to put a disk into drive A:. At this prompt, click *Exit Setup*. At the prompt 'Windows is not correctly set up. Are you sure you want to quit Setup?', click *Yes*. When you reload Windows, the name and company name are updated.

If you're using Windows for Workgroups 3.11, you can't run Windows' setup program this way. However, you can accomplish the same thing by editing the serialno.ini file (in the windows directory) with Notepad. Go to the [mswindows] section and change the user and company names.
Kevin Davis, Melbourne, Florida

Editor's note: The setup /f command is also useful for restoring registration information when you upgrade from Windows 3.1 to a newer version. The upgrade sometimes deletes it.

Since Davis's procedure shuts down Windows, make sure you save your open files before running setup /f. After running the program, check your win.ini file in the windows directory and make sure the old user name and company name are no longer there. (Depending on which version of Windows you're running, and whether you've ever upgraded, the names could remain in the [MS User Info] section or other places.)

Also, check the .ini files of all Windows applications, since they may have been branded as well. Some vendors hide this information so well, you may need to reinstall their applications to update the names.

Long-Distance MIDI

When I tried to hook my computer up to a MIDI keyboard to enter music for a multimedia presentation, I discovered that the MIDI cable I purchased with the keyboard was too short to reach the computer. I was about to purchase an entire new MIDI cable when I found a better solution that cost me nothing: the keyboard extension cord that came with my PC. These extension cords, which come with most tower PCs and are available for a few dollars from any computer store, use exactly the same connectors as MIDI. —Alex Lieber, New York

Editor's note: Sure enough, a PC keyboard extension cord will add several feet to a MIDI cable. The extension cord won't serve as a MIDI cable by itself, since MIDI cables have male connectors at both ends while the extension cord has a male and a female end. But this solution works perfectly if you just need to extend your MIDI connection those last couple of yards. And because the extension cord is coiled, it helps you move the keyboard without tangling cables.

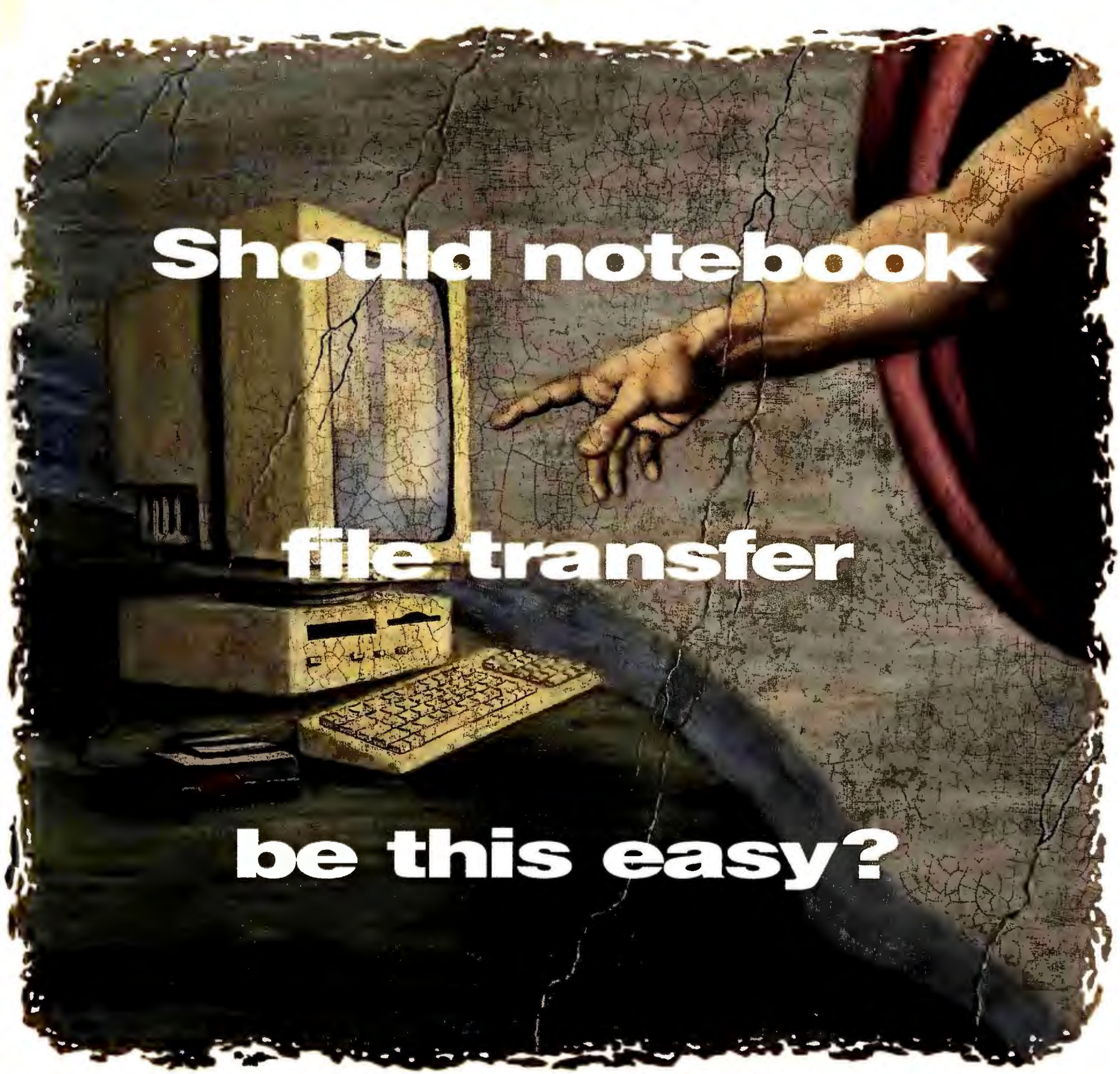
Portable Power on Wheels

I found a special adapter that would let me run my laptop from a car's cigarette lighter, but was disappointed to discover that it cost more than $100. Luckily, I found a general-purpose adapter at Radio Shack for only $17, and it works just as well. Radio Shack's model 270-1562 connects with almost any small, battery-powered item that runs on 3, 6, 9, or 12 volts. It can provide a maximum current of 3 amps at 12 volts or 400 mA (four-tenths of an amp) at each of the lower voltages. This is enough to power most laptops.
Kevin Brugel, Bristol, Tennessee

Editor's note: Radio Shack actually sells two adapters: the one you found and a smaller one that's less expensive ($12.99). However, the smaller one has such a low current-carrying capacity that it's likely to blow a fuse when powering a laptop. It's worth the extra $4 to get the more powerful unit. The adapter comes with a set of universal power connectors to fit the power socket of almost any computer; all you need to do is make sure that the polarity and voltage are correct.

By Brett Glass

Brett Glass is a contributing editor for PC World. Help Line *welcomes your tips and questions and pays $50 for published items. See page 12 for information.*



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SPREADSHEETS Q&A

Multiline Column Head in Any Spreadsheet

Q I often want to put a multiline heading at the top of a column in Excel 5.0. Is it possible to include more than one line of text in a single cell?
Andrew Kelleher, Boston

A Certainly. Let's assume that you've entered your column headings in row 1. Click the row number to select the entire row, select *Format•Cells*, and click the *Alignment* tab at the top of the dialog box. Select the alignment you want in the Horizontal and Vertical boxes, select the *Wrap Text* check box, and then click *OK*. You will end up with multiline column headings, as shown in the small figure at the right.

	A	B
1		January Sales
2	Clothes	
3	Appliances	

You can use the same trick in the other Windows spreadsheets. In 1-2-3 for Windows, the command is *Style•Alignment*. In Quattro Pro, right-click on the row number, then select *Block Properties*, and click *Alignment* in the resulting dialog box.

In Excel only, you can force a new line in a cell entry by pressing **<Alt>-<Enter>** where you want the break.

Filter Unique Values From 1-2-3 Database

Q I'm trying to create price lists in 1-2-3 release 5.0. Our accounting package lets me produce a report that shows the quantity and amount we purchased from one company for each inventory item, as in the figure below.

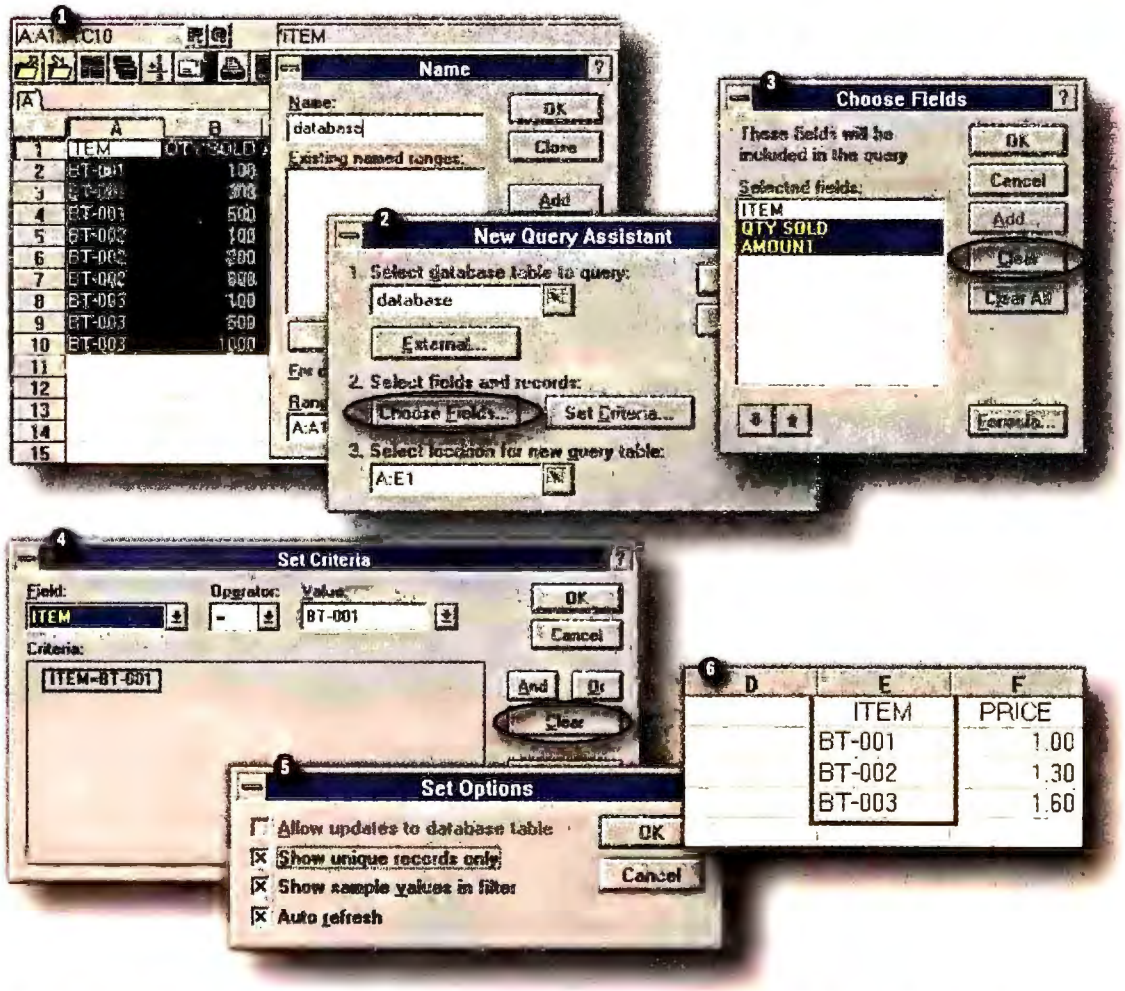
	ITEM	QTY	AMOUNT
2	BT-001	100	100.00
3	BT-001	300	300.00
4	BT-001	500	500.00
5	BT-002	100	130.00
6	BT-002	200	260.00
7	BT-002	800	1,040.00
8	BT-003	100	160.00
9	BT-003	500	800.00
10	BT-003	1000	1,600.00

Note that the price (amount divided by quantity) is constant for each of the items. I need to shrink this list so that it contains just those prices, as it does in the figure below:

	A	B
1	ITEM	PRICE
2	BT-001	1.00
3	BT-002	1.30
4	BT-003	1.60

Writing formulas to calculate prices is not a problem, but is there a quick and easy way to remove the duplicate items from the list?
Ken Hsu, Irvine, California

A Instead of assuming you must remove data from the original table, think of your table as a database, and use a Query Table to extract a list of unique items. Then build formulas to calculate the prices. Just follow the steps illustrated in **FIGURE 1.**



❶ Select Range • Name, and assign the name database to the table that contains your data.

❷ Select cell E1 and choose Tools • Database • New Query. Specify database as the table to query, and click Choose Fields.

❸ Clear Qty Sold and Amount from the Selected Fields list, and click OK.

❹ Click the Set Criteria button, click Clear in the Set Criteria dialog box, then click OK twice.

❺ Select Query • Set Options, click the Show Unique Records Only check box, and click OK.

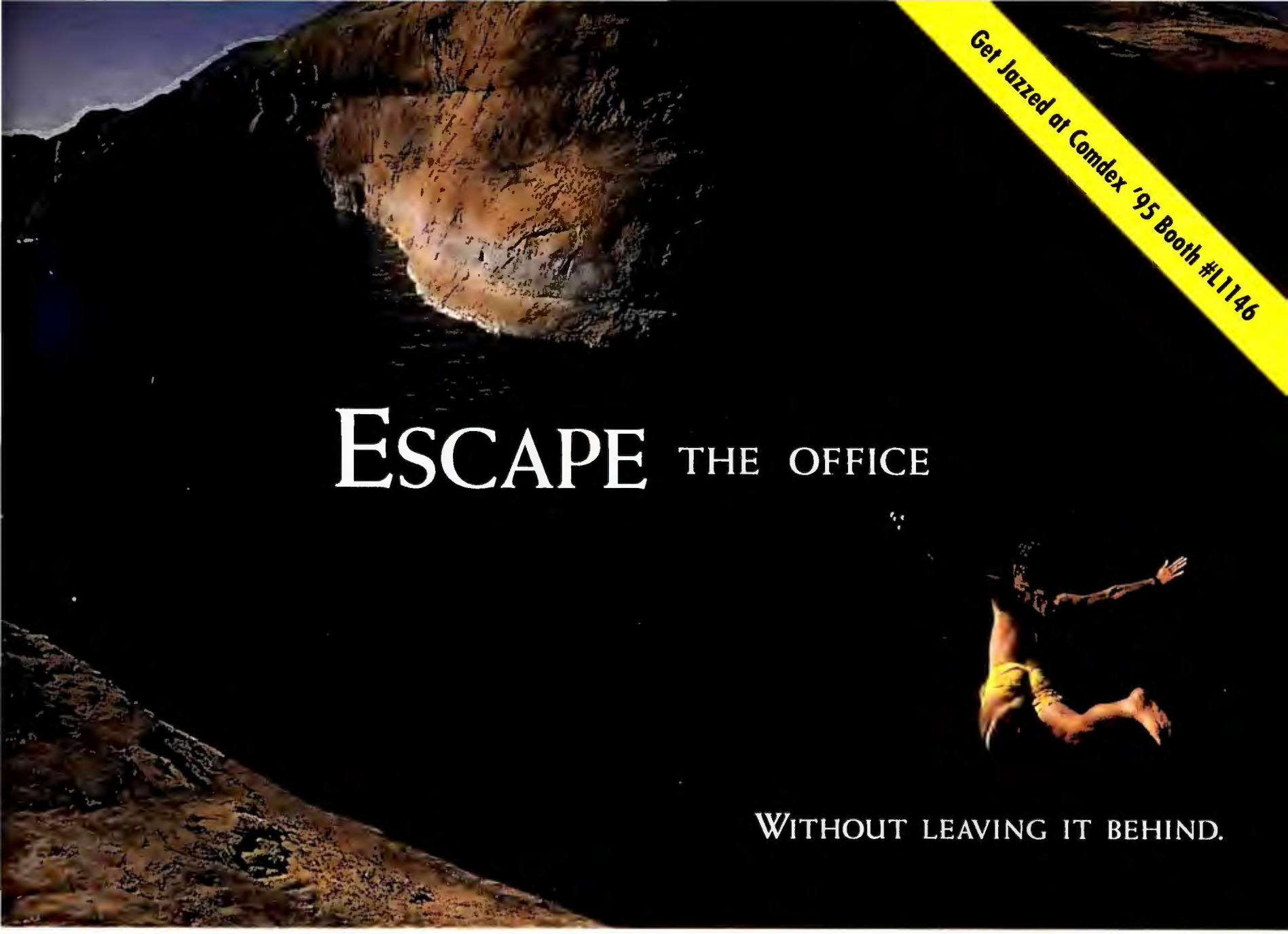
❻ Drag the handle at the bottom of the table to shorten the list to three items. Enter the label PRICE in cell F1 and center it, make it bold, then enter the following formula in cell F2 and copy it to range F3..F4:
@vlookup(E2,$database,2)/@vlookup(E2,$database,1)
Assign the Fixed 2 format to range F2..F4.

FIGURE 1: EXTRACT UNIQUE VALUES from a database by using the Query command.

Convert Formulas to Values and Number Lists in Excel

Q My colleagues and I track work orders in Excel 5.0. I routinely number the work orders by entering one number in cell A2, for example, then copying the formula =A2+1 down the column [as in range A2..A6 of **FIGURE 2** on the next page]. Some of my coworkers, however, enter the order numbers by hand [as in range A8..A12].

When all our workbooks are combined into one and sorted, the results are unpredictable [range D2..D11]. My formulas are sorted according to their current numeric values, but when they are interspersed with the manually entered numbers, their values change because of their relative cell references.



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	A	B	C	D	E
1	Order Number	Name		Order Number	Name
2	1	Tomasetti		1	Anderson
3	2	Valdez		1	Tomasetti
4	3	Campbell		2	Humphrey
5	4	Berkowitz		3	Valdez
6	5	Walsh		4	Campbell
7				3	Chang
8	1	Anderson		4	Berkowitz
9	2	Humphrey		4	Rao
10	3	Chang		5	O'Brien
11	4	Rao		6	Walsh
12	5	O'Brien			

FIGURE 2: SORTING A RANGE of formulas yields unpredictable results. Fix this by converting formulas to values.

Is there any way to convert the formulas into regular numbers without doing it by hand?
Rob Yale, Bellingham, Washington

A To convert the formulas in the combined worksheet to values, click the letter of the column that contains the order numbers, select *Edit•Copy*, then select *Edit•Paste Special*, click the *Values* button in the Paste Special dialog box, and click *OK*.

Alternatively, you could include the macro shown in **FIGURE 3** in your workbook to number the work orders automatically. This approach lets you eliminate items from the list merely by deleting their rows, and the spreadsheet doesn't renumber the work orders.

To try the example, enter the label **Order Number** into cell A1 and a **1** into cell A2 to start off the list. Select cell A2, and issue *Insert•Name•Define* to assign the name **OrderNumbers** to cell A2. Select *Insert•Macro•Module*, then enter the commands shown in Figure 3 (you can omit the comment lines, which begin with apostrophes). Go back to the worksheet, click the button tool to create a macro button, select *ItemNumber* in the Assign Macro dialog box, and then click *OK*. With the button selected, highlight the label *Button 1* and replace it with **Item Number**. Click this button to number each item.

```
Sub ItemNumber()
    Dim List As Object                                          '1)
    'Identify the range that contains the numbers
    Set List = Range("OrderNumbers")                            '2)

    'Select the last number and the next blank cell
    List.Offset(List.Rows.Count - 1, 0).Resize(2, 1).Select     '3)
    'Fill the blank cell with the next number
    Selection.DataSeries Rowcol:=xlColumns, Type:=xlLinear, Step:=1   '4)
    'Extend the name to cover the new number
    List.Resize(List.Rows.Count + 1, 1).Name = "OrderNumbers"   '5)
End Sub
```

FIGURE 3: THIS ITEM-NUMBERING MACRO numbers work orders automatically, ensuring that they're sorted correctly.

Out, Damned Zero!

Q I have a 1-2-3 version 4.0 for DOS worksheet that contains many zeros, and I want to get rid of them. How can I make them disappear?
Sanjay Shah, Internet

A It depends on what you mean by "disappear." Let's say you've got a simple cosmetic need: Your formulas are limited to simple sums and other calculations that need not distinguish zeros from empty cells (as opposed to counts, averages, and so on). Then all you need to do is format the cells to make the zero values invisible.

In 1-2-3 for DOS, select */Worksheet•Global•Zero•Yes*. In 1-2-3 for Windows, select *Style•Worksheet Defaults*, and deselect the *Display zeros as* check box.

In Quattro Pro 6.*x* for Windows, right-click the sheet tab at the bottom of the window, choose *Display* in the Active Page dialog box, and click *No* under Display Zeros (in Quattro Pro 5.0, look for Display Zeros when you right-click on the page tab).

In Excel, select the columns that contain the values you want to format, choose *Format•Cells*, and click the *Number* tab. In the Category section, select *Number*, and in the Format Codes section, choose the format in which you want to display the nonzero values—for example, #,##0_);(#,##0) displays commas between thousands and hundreds, no decimal places, and negatives in parentheses. Then click in the Code box, where the format code appears, and add the characters ;"" to the end of the code—for example, #,##0_);(#,##0);"". Click *OK*, and you are finished.

These commands hide the zeros already in your worksheet, and they hide unwanted zeros that may creep in later.

If, on the other hand, your formulas utilize functions like @count or @avg that count the number of cell entries, you must do more than just disguise the zeros. Because these functions include cells that contain hidden zeros in their calculations, you have to get rid of the zeros altogether.

In Quattro Pro and Excel, you can easily eliminate hidden zeros with the Find and Replace command. If you're working in Quattro Pro for Windows version 5.0 or 6.0, select the columns or rows that contain the data, and choose *Edit•Find and Replace*. Enter **0** in the Find field, and don't enter anything in the Replace field. Click the *Replace All* button, and the zeros in your worksheet will be banished for good.

The procedure is virtually identical in Excel, where the command is *Edit•Replace* instead.

Unfortunately, getting rid of zeros in a 1-2-3 worksheet isn't as straightforward as in Excel and Quattro Pro, because 1-2-3's Find and Replace command doesn't recognize numeric cell entries— only text strings and characters in formulas. You need to write a macro to remove the zeros. Try this one in any version of 1-2-3:

```
{if @cellpointer("type")="b"}{quit}
{if @cellpointer("contents")=0}{blank
   @cellpointer("address")}
{down}{branch \Z}
```

Enter the macro into three convenient cells, select the first cell, and use the command *Range•Name* to name it **\Z**. Then select the top cell in the column that contains your data, and press **<Ctrl>-Z**. The macro moves down the column, erasing each cell that contains a zero, and stops whenever it encounters a blank cell. Use this macro on each column that contains zeros you want to eliminate.

By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions and pays $50 for published items. See page 12 for contact information.*

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WORD PROCESSING Q&A

Make WinWord 6.0 Repeat Like WordPerfect

Q I just switched from WordPerfect 5.1 for DOS to Word 6.0 for Windows. I like the new program, but I miss my old WordPerfect Repeat function, which let me insert several characters at once with just a couple of keystrokes. I can't seem to find an equivalent command in WinWord. Is there such an animal?

Dundee Pham, Toronto

A Microsoft Word has never offered an exact equivalent to WordPerfect's Repeat function, which lets you press <Esc>, enter the number of times you want to repeat the next keystroke, then press that key once to insert the specified number of characters.

But all is not lost. If you turn on Word for Windows' Help for WordPerfect Users function, it will make the <Esc> key act the way it does in WordPerfect 5.1. To do this, select *Tools•Options*, then click the *General* tab. Select the *Help for WordPerfect Users* check box, click *OK*, and you're done. This setting will become the new default for Word for Windows. You'll also be able to use most of your WordPerfect keystroke commands with this option turned on.

The drawback to this technique is that it converts a number of other keystrokes from their normal Word for Windows functions into a simulation of WordPerfect 5.1. To revert to standard WinWord commands, select *Tools•Options•General* again, and turn off *Help for WordPerfect Users*.

Open WinWord Summary Info Automatically

Q I would like to see the Summary Info dialog box automatically every time I open an existing Word for Windows 6.0 document. I believe WinWord can do this, but I cannot find the feature in the program's manual or help screens. Can you tell me how to make it the default?

Glenn E. MacRill, Houston

A Word for Windows doesn't have an automatic way to view the summary when you load a file. You can, however, create a macro that will do the job for you. Here are the steps:

1. After starting WinWord with no document loaded, select *Tools•Macro*.
2. Type **AutoOpen** in the Macro Name field of the Macro dialog box. Make certain that *All Active Templates* appears in the *Macros Available In* drop-down list.
3. Click *Create* to open the macro editing window.
4. Edit the text on screen so that it appears as follows:

```
Sub MAIN
Dim GetSummary As FileSummaryInfo
If Dialog(GetSummary) Then
 FileSummaryInfo GetSummary
End If
End Sub
```

5. Select *File•Save All*, and click *Yes* when prompted to save the changes to the Global:AutoOpen macro.
6. Select *File•Close* to close the macro editing window.
7. Open any WinWord Document to test your new macro.

After you create this macro, the Summary Info dialog box will appear whenever you open a document. Any changes you make in the Summary Info data will be saved automatically with the document.

Save Creation Dates of Old WordPerfect Files

Q I have a lot of old files created in WordPerfect 5.1 for DOS that I need to import into WordPerfect 6.0 for Windows. The trouble is, when I save them in the new format, the date stamp on the file is changed to the current date. Is there a way to save the file in 6.0 format but retain the original creation date?

Ronald B. Anderson, Wallingford, Pennsylvania

A Unfortunately, DOS itself prevents you from doing this, but there's an easy way to work around the problem, using WordPerfect 6.0's Document Summary command in the File menu. Before you load an old WordPerfect for DOS document, check the DOS file date in the Windows File Manager or from the DOS prompt, and make a note of it.

Then, open the document in WordPerfect 6.0. Immediately after opening the file, select *File•Document Summary*. In the dialog box, you'll see today's system date in the Creation Date field (see **FIGURE 1**). Highlight this date and replace it with the date you noted earlier. Enter any other information you want to store in the remaining fields, then click *OK*. This information will always be saved with the document, and you'll be able to refer to the Document Summary dialog box whenever you need to refresh your memory.

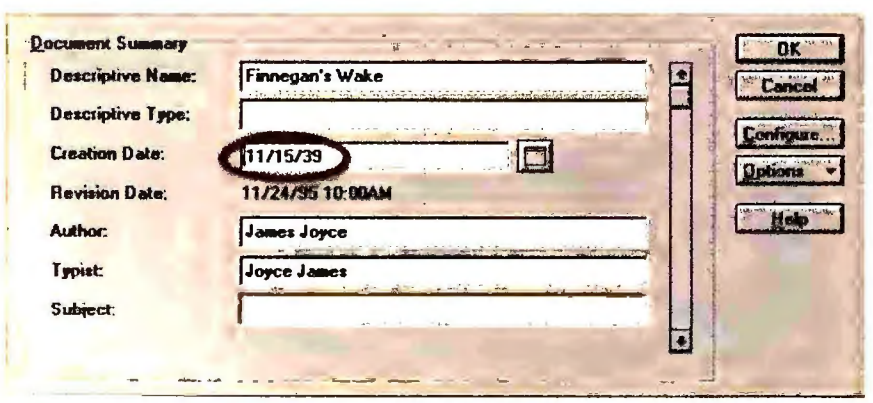

FIGURE 1: SAVE CREATION DATES with WordPerfect 6.0 for Windows' Document Summary tool when importing DOS WordPerfect files.

Opening Write Files in WordPerfect 6.0

Q I have many invoices I created in Windows Write. When I open them in WordPerfect 6.0 for Windows, that

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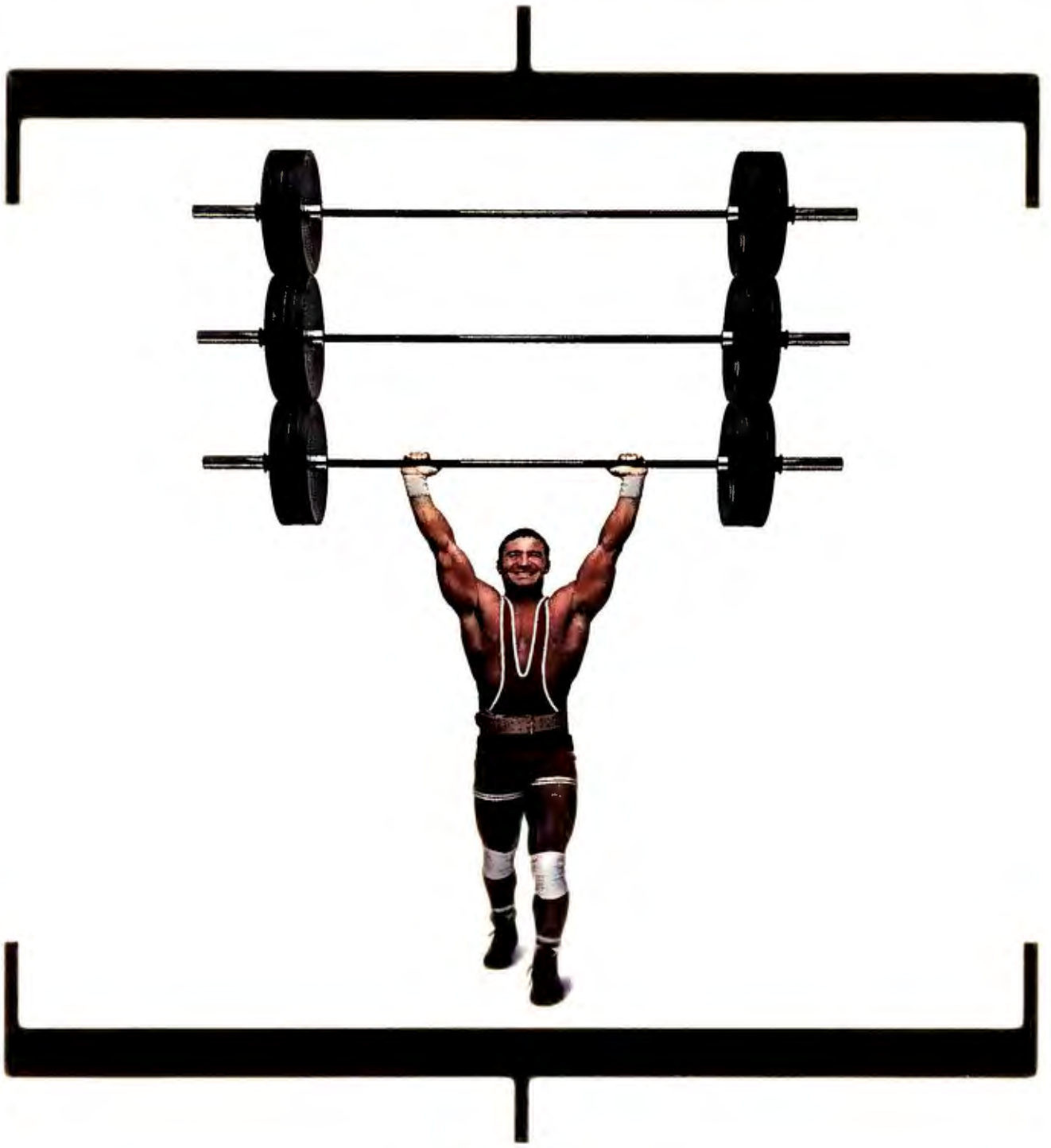

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program treats them as ASCII files. Strange characters appear, and text is shifted around in the document. What can I do to fix this problem?
Sam Miller, Lakewood, New Jersey

A WordPerfect 6.0 for Windows includes filters for Windows Write files. If the program is identifying those files as ASCII files, then you need to use WordPerfect's Installation program to reinstall the appropriate filters.

To do this, exit WordPerfect 6.0 and return to the Windows Program Manager. Insert the Install 1 disk from your original WordPerfect disks, select *File•Run*, type **a:install.exe** (substituting the correct drive letter), and click *OK*. If you're reinstalling version 6.0a, type **a:setup.exe** instead.

When the Installation program starts, skip the Registration Information dialog box by clicking *Continue*. Click *Custom* in the Installation Type dialog box, then click *Files* in the Custom Installation Options dialog box. Click *Unmark All* in the Select Files dialog box, then select the *Utility Files* check box (called the *Additional Conversions/ Printer Docs* check box in version 6.0a), and click *OK*. Finally, click *Start Installation* and insert the disks as they are requested by the installation program. Once you've finished this installation, you'll be able to open your Windows Write files properly.

Avoid Blank Lines in Ami-to-ASCII Saves

Q I own a small newspaper, and some of my reporters use Ami Pro 3.1 on their laptops. When they save their documents in ASCII format, Ami Pro inserts blank lines after each paragraph, causing additional work for our editors. Is there a way to avoid this?
Paul DiModica, Norwood, Massachusetts

A Ami Pro offers two ways to save files in ASCII format, and your reporters are using the wrong one for your purposes. Here's what they can do to avoid the problem of extra blank lines between paragraphs.

Select *File•Save As* in Ami Pro, and choose *ASCII* in the List Files of Type list. Then click *Options*. In the ASCII File Options section, select *CR/LF at paragraph ends only*, then click *OK*. At that point, the reporters can save their files with whatever names they wish, just as they did before. This setting becomes the new default in Ami Pro, so these steps need to be done only once.

Another benefit of using this option: Because it prevents a carriage return from being added to the end of each line of the document as it appears on the screen, it makes the files even easier to import into other programs.

Create Numbered Lists in an Ami Pro Table

Q I use Ami Pro 3.1's Table feature to present text in a matrix. Frequently, I need to create a numbered list that extends down into additional cells in the same column. I can't find a way to do this with the Table feature. I've tried using the Number List style, but as soon as I move into a new cell, the numbering restarts at 1 [as in the figure below]. Do you have any suggestions on how I might handle the problem?
John Russo, North Huntingdon, Pennsylvania

	A	B	C
1	Common Name	Locomotor Category	Distinguishing Traits
2	Ring-tailed lemur	Quadrupedal	1. Fox-like muzzle
3			1. Long, furry tail with rings
4			1. Soft, wooly fur
5	Slender loris	Quadrupedal	
6	Sooty mangabey	Quadrupedal	

A This is a tough job, and I'm afraid that Ami Pro's Table feature isn't set up to do it. If you think of each cell in an Ami Pro table as a separate document, you will understand why the normal Number List style doesn't carry across cell boundaries. Every time you enter a new cell, you're starting a new, miniature document, causing numbering to restart.

One way to keep this from happening is to create your table as you've done in the past. But before entering text in the column where you want the numbered list to appear, switch to Layout Mode, highlight all the cells in that column, then select *Table•Connect Cells*. This will convert all the cells in that column into a single cell. Your numbered list, based on the Number List style, will maintain its sequence when entered in this cell, as in the figure below.

	A	B	C
1	Common Name	Locomotor Category	Distinguishing Traits
2	Ring-tailed lemur	Quadrupedal	1. Fox-like muzzle 2. Long, furry tail with rings 3. Soft, wooly fur
3			
4			
5	Slender loris	Quadrupedal	
6	Sooty mangabey	Quadrupedal	

Keep in mind, however, that the text you enter in that new, oversized cell may not line up with the text in the rest of the table, especially if cell heights vary. To solve this problem, press **<Ctrl>-<Enter>** after each item in your numbered list, then press **<Enter>** to create the next numbered item. This creates a blank line following each item in the numbered list. You can then select the blank line following the numbered line to manipulate its font size, thus adjusting the position of the next numbered line.

This procedure may seem inconvenient, but it's the only way you can accomplish this task, short of numbering your text manually—which may be easier in some cases, especially if you'll be editing these tables heavily.

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444.).* Word Processing *welcomes your questions and pays $50 for published items. See page 12 for contact information.*

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WINDOWS Q&A

Bring Back the Wild Cards

Q I like Windows 95, but I miss using wild cards for copying and renaming many files at once. It was great how I could select a whole bunch of files in File Manager and then choose *File•Copy*. Is there any way I can do this in Windows 95?
Sharon Wilkins, Paris, Idaho

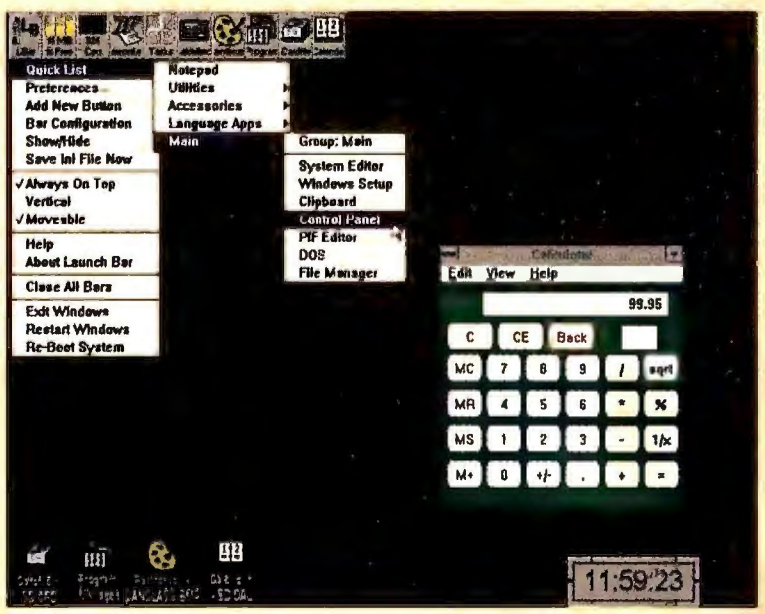
A You could keep a DOS window running all the time, but that would be a waste of memory. Instead, try the Run command—it can take any external DOS command (that is, one that corresponds to a separate DOS executable file). So to copy multiple files with this technique, just choose *Start•Run* (or press **<Ctrl>-<Esc>-R**) and type **xcopy** followed by any parameters you want—for example, **xcopy c:*.bat a:\.**

DOS doesn't have an external file for renaming files. To do that you have to create a batch file, which can consist of two lines:

```
rename %1 %2
cls
```

Save the file with a name like **ren.bat.** Now, to rename groups of files, choose *Start•Run* and type **ren**, followed by your parameters for wild cards (for example, **ren c:\doc*.txt *.wri**).

Windows Toolbox: A Free Launch



You've heard amazing amounts of hype about Windows 95. But if you're not sure you want to upgrade just yet, check out Launch Bar. Like many toolbars, this one lets you drag and drop from File Manager to add buttons that launch individual programs. But you can add entire Program Manager groups as buttons too. You can even do all your launching from Launch Bar's main toolbar and use the toolbar buttons as task switchers. Still want more? Launch Bar gives you four virtual desktops for easy switching between apps, plus buttons that show free resources and CPU activity. You can even configure the start-up size and position of each application and make any program stay on top of others. Best of all, you won't find a cheaper utility—Launch Bar's free. The brainchild of Lance Klein, Launch Bar is available as klein.zip on PC World Online.

Learning to Share CD-ROM Drives

Q My Windows for Workgroups network generally performs well, but when I try to share my CD-ROM drive I get the message 'You can only share resources that are on your computer. If you are trying to share a printer, make sure that it is a local printer and that the temp directory is on a local drive'. What's happening?
Dana Simison, Internet

A Windows for Workgroups gives you this message when you try to share a CD-ROM drive that has the same drive letter as another drive on the network. You can solve this problem in one of three ways.

First, you can disable the conflicting drive letter. To do so, open a DOS window from within Windows for Workgroups. At the DOS prompt, type **net use** *x:* **/d** where *x:* is the drive letter of the conflicting drive. Press **<Enter>**. You may see an error message like 'Error 3: The specified path was not found', but the command should work anyway.

A second and more drastic solution is to disconnect all persistent connections. Start by exiting Windows completely. Then, from the DOS prompt, type **del c:\windows\connect.dat** (adjusting path information as necessary). The next time you start Windows for Workgroups, you must manually reestablish all connections that don't conflict.

But my favorite solution is to choose a different drive letter for the CD-ROM drive by adjusting the command line that loads its driver. To do this, make a copy of your autoexec.bat file for safekeeping. Then open autoexec.bat in a text editor and look for the line that loads mscdex.exe. At the end of the line, add **/l:***x* **/s**, where *x* is the letter you want the CD-ROM drive to have (just make sure none of your remote computers use this letter). Save the file and restart your computer, and you should be able to share your CD-ROM drive without problems.

Quick Fix for Screen-Saving Slowdowns

Q I use one of the screen savers that's built into Windows 3.1, and sometimes I want to disable it. But it's a real hassle to go to the Control Panel, open the Desktop section, and then change Screen Saver to None every time I want to turn it off briefly.

Isn't there a faster way to turn off the screen saver temporarily and then enable it again?
Stan Bauerlein, Trenton

A Indeed there is, Stan. You can quickly disable a screen saver temporarily by selecting a command on any Windows menu bar. The screen saver will stay on hold until the menu

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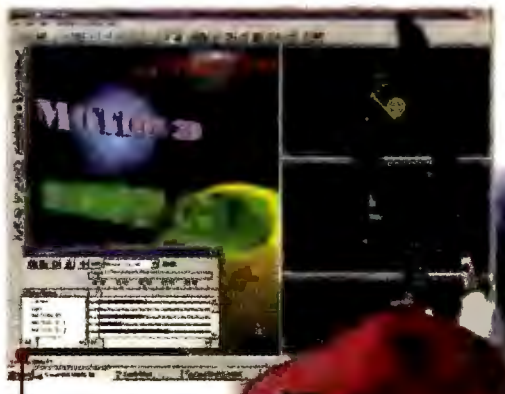

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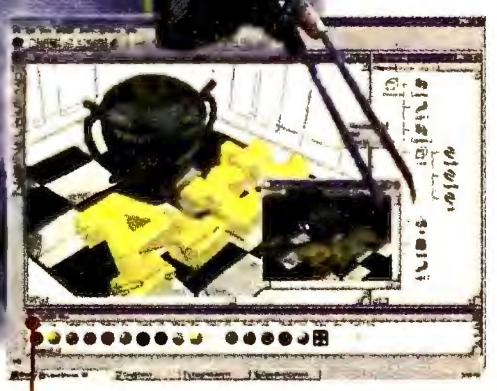

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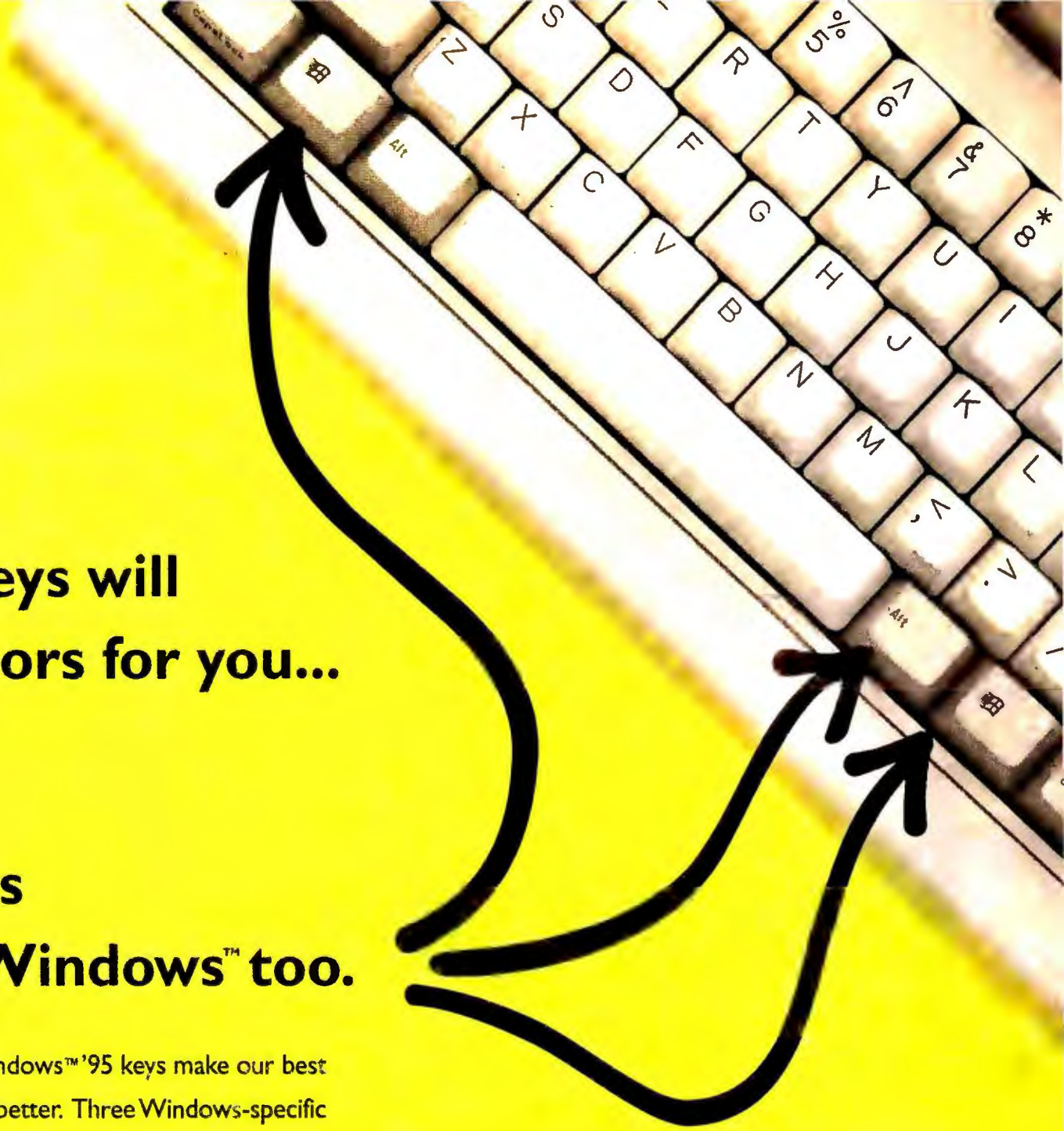

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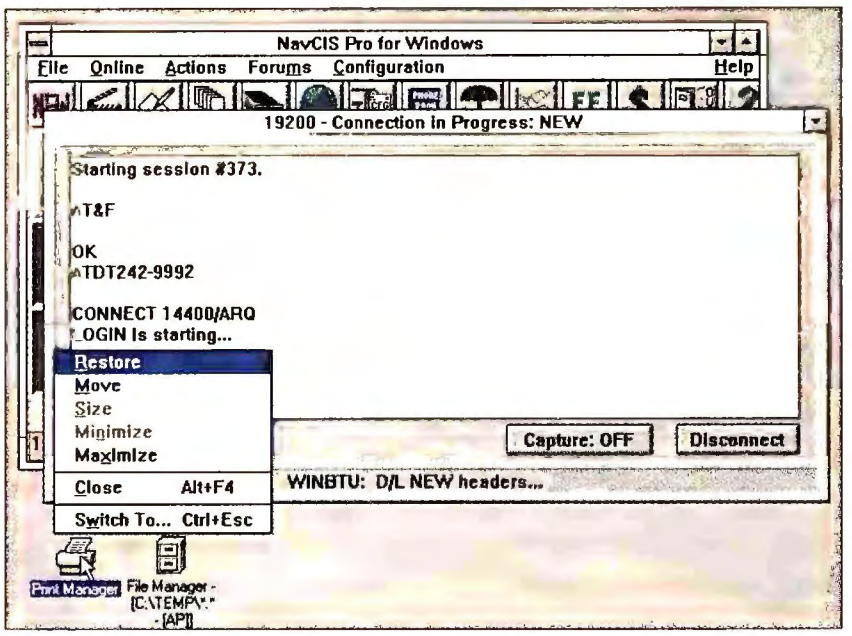

TO DISABLE THE SCREEN SAVER TEMPORARILY, just click any application's menu bar or minimized icon to make it active.

bar is no longer selected. Most of the time, you can make a menu bar active just by pressing **<Alt>** or **<F10>**. You could also click a minimized icon once to show its pop-up menu. Incidentally, for a little extra printing speed, try using this trick immediately after sending a file off to your printer.

Unfortunately, this technique can disrupt some communications software, so test its compatibility with your communications packages.

P.S. I Print You

Q I designed some business cards with my Windows word processor, and now I need to print them. The folks at my print shop told me to print a PostScript file to a disk. However, neither I nor they know how to save my document in a PostScript format. Can you help?
Alexander Taub, Internet

A Printing to disk using a PostScript format merely means setting up Windows with a PostScript printer driver and then "printing" to a file rather than to a printer. This procedure will work fine for most business publishing, as long as you don't try doing complex full-color work.

First, start Control Panel and double-click the *Printers* icon to make sure a PostScript driver is available. If you don't see a PostScript printer on the list, or if you're not sure, you should add one. If possible, install the same model of PostScript printer or imagesetter that your print shop uses. To do so, click *Add* and find that printer in the list. Select it, and click *Install*. Windows will request one of your original Windows disks and prompt you through the installation.

Once the printer is installed, select the PostScript printer in the list of Installed Printers (in the same Control Panel dialog box), and click *Set as Default Printer*. Click *Connect*, select *File:* in the Ports list, then click *OK* and *Close*.

Finally, turn to your word processor. Use the program's print setup command (usually found on the File menu) to make sure the application is set for the PostScript printer. (If it isn't, select that printer and click *OK*.) Then print as you normally would. Windows will prompt you for a file name; type the complete path so you can later find the file—for example: **c:\temp\buscard.ps**. Click *OK*. Then copy the file to a floppy and take it to your print shop. Don't forget to switch back to your regular printer when you're done.

Blowing Your Stacks

Q Sometimes after I exit and reenter Windows for Workgroups 3.11 four or five times, I get the error message 'Internal stack overflow. System halted' when I type 'win' at the DOS prompt. Can you tell me what's going on? I currently have my config.sys file set for stacks=9,256, buffers=15,0 and files=50. Do any of these settings need to be changed?
Teddy Cokro, New York

A Stacks are small areas in memory where applications store information temporarily when they're interrupted by a hardware event, such as when you press a key on the keyboard. Information on each such hardware event is stored in the stack.

Because applications often do not have enough stack space to store all these events, DOS does a little dance called *stack switching* to give the applications more stack space.

The number of stacks and their size are indicated, respectively, in the 'stacks=' line of your config.sys file (in this case, 9 stacks of 256 bytes each). When you install Windows, it normally increases the default stack size from 128 bytes to 256.

Windows itself doesn't benefit from the larger stack size, but other DOS software that it uses might—for example, your mouse driver, the SmartDrive cache, and the emm386.exe memory manager.

Oddly, you can often solve these problems by preventing DOS from doing any task switching (at least for versions of DOS later than 3.3).

First make a backup copy of config.sys, and be sure you have a copy of your system files on a floppy disk in case you need to reboot with it.

Then open config.sys in a text editor such as Notepad, and edit the 'stacks=9,256' line to read **stacks=0,0**. Save the file and restart your computer.

Although this change should clear up your Windows problem, it could cause trouble for some DOS programs.

If you have problems with any of your DOS applications or you see the error message again, try increasing the number of stacks. The maximum number of stacks is 64, and the maximum size is 512.

By Scott Dunn

PC WORLD online *The files mentioned in this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of the* PC Bible, *second edition (Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items. See page 12 for contact information.*

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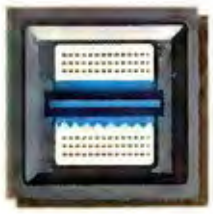

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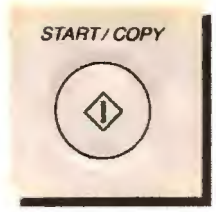

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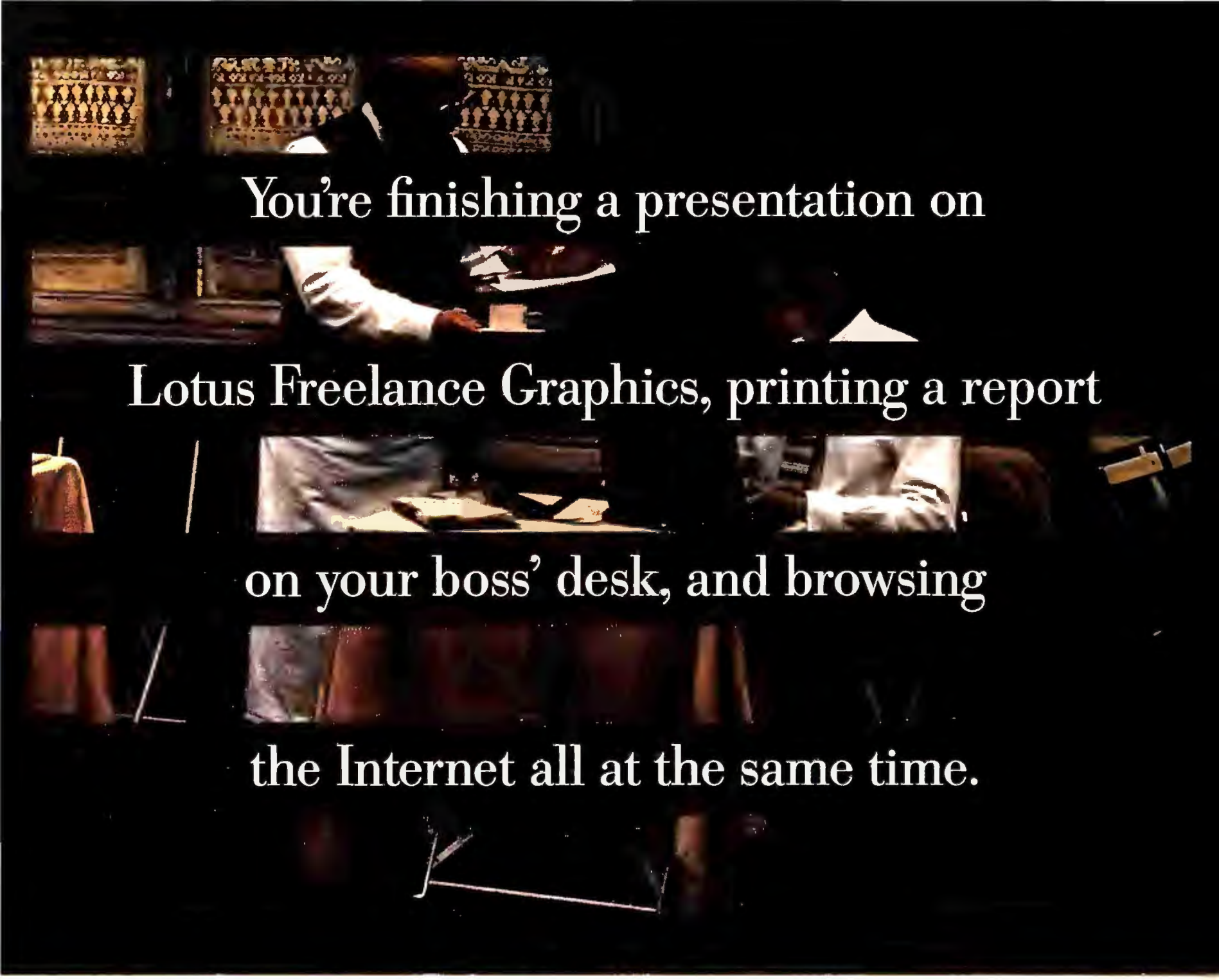

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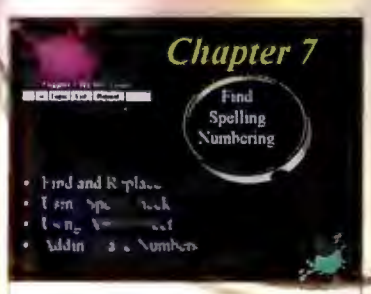

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WINDOWS 95 ADVISER

Find All Your Online Help Fast

Believe it or not, Windows 95 makes on-screen help so useful that you may never crack open your manual again.

This claim sounds preposterous, but it's true. Instead of hunting through indexes for topics that don't exist, check out full text search—a hidden gem on the Find tab that will show up on most help screens.

Suppose, for example, you want to get that little speaker icon off the Taskbar. It can be done, but don't bother looking in either the Contents or the Index tabs of Win 95's help—the answer isn't there.

However, help's Find tab makes the search simple, using keywords that you enter.

Find works by building an index of words in a given help file—an approach that makes for flexible and extremely fast searching.

When you click the Find tab in an application for the first time, you have a choice of building a minimum-size, maximum-size, or custom index (called 'word list' or 'database' in Windows 95).

The minimum-size index is typically half as large as the underlying help files, although this ratio varies widely. For example, the nine core Windows 95 help files comprise about 1MB, and the minimum-size index for them is about 500K.

The maximum-size index provides more options, such as searching for words in a specific order. But it can be two or three times the size of the help files—so take the default, which is the minimum size and still offers plenty of searching power.

If you're frustrated by online help, try Find's full text searching, which can open many roads to the answer that you need.

You can build help indexes for all 32-bit Windows applications as well as for many older 16-bit ones. With 16-bit applications, selecting 'Search' or 'Search for help on' usually exposes the Find tab, but not always. If you don't see a Find tab, you're out of luck; the application can't find what you want.

Some applications combine multiple files into one unified help system—for example, the nine core files for the Windows 95 help system. The Find tab simply builds one index for all of them. In any case, Find offers help just for the application you're in.

After building the index, you're ready to search. So let's get that speaker icon off the Taskbar.

A logical word to start with is *taskbar*. As you type this word in box 1 (see figure at left), box 2 dynamically lists every possible matching word, and box 3 lists every help topic that contains at least one of the words highlighted in box 2. By default, every word in box 2 is highlighted.

It turns out, though, that no fewer than 28 help topics contain the word *taskbar*. So you must add another word to narrow your search.

And the help system here lets you do that: As shown in the figure, once you press the <Space> bar, help knows that you've finished typing the first word, so it changes the list in box 2. It now displays every unique word in those 28 topics; the ellipsis (...) before each word in box 2 means "taskbar and."

To reduce the number of choices, you now have to think up a second word and enter it.

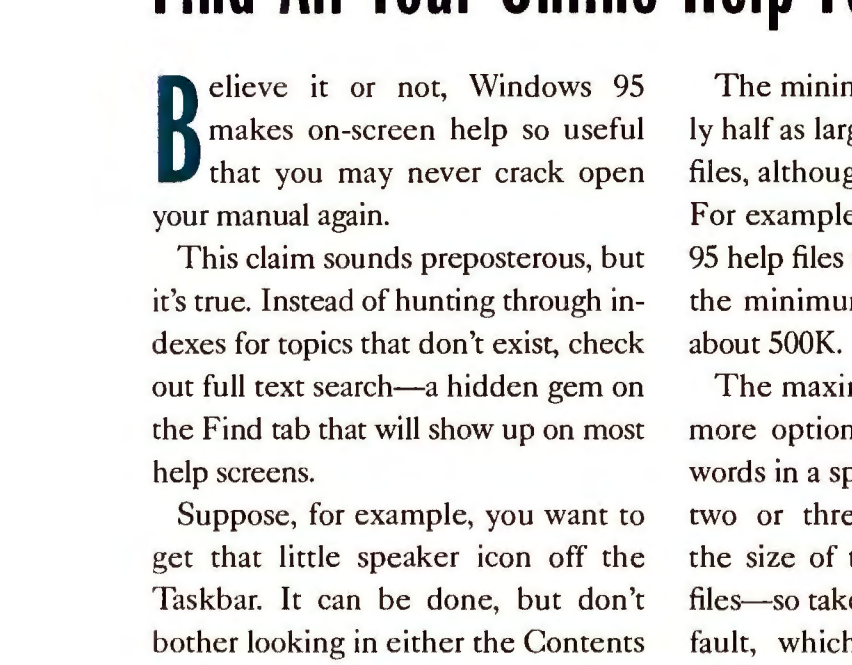
In this case, if you type in the word **volume**, there's only one help topic that contains both *taskbar* and *volume*—and indeed our answer is in that topic.

But you don't have to come up with the particular combination *taskbar volume* to find the topic; others, such as *speaker icon*, *taskbar speaker*, *volume icon*, or *taskbar sound*, would work also.

And that's the beauty of full text searching: It opens many roads to the same answer, and you're bound to be driving on one of them.

By Richard Freedman

Richard Freedman, a former group manager on the Windows 95 team at Microsoft, is now a vice president at Garden Homes Management Corporation, a real-estate investment firm in Stamford, Connecticut.



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DATA MANAGEMENT Q&A

Customizing How Access Opens Forms

Q Some forms in my Microsoft Access database contain macros attached to push buttons that open other forms. Sometimes I want the forms to fill the screen; other times I'd like them to be smaller. Can I customize the macros to set the size of a form as it opens?
Jay Ginsberg, East Lyme, Connecticut

A You can add the MoveSize action to a push-button macro to tell Access how big to make the form and where to place it. Just follow these steps:

1. Open your form in design mode. Right-click the push button that has the macro you want to edit, and choose *Properties* from the resulting menu. Scroll down to the 'On Click' line. If you created your push button using the Command Button Wizard, you'll see '[Event Procedure]' on that line. Highlight it and press **<Delete>**. We'll replace the event procedure with a macro.

2. Click the ... button at the end of the same line, and double-click *Macro Builder* in the Choose Builder dialog box. Enter something like **Open form with set size** for the new macro's name.

3. In the Macro Builder dialog box, you need to enter two actions. On the first line in the Action column, enter **OpenForm**, or select it from the drop-down menu. Then open the Form Name drop-down menu in the Action Arguments section of the dialog box, and select the form you want to open.

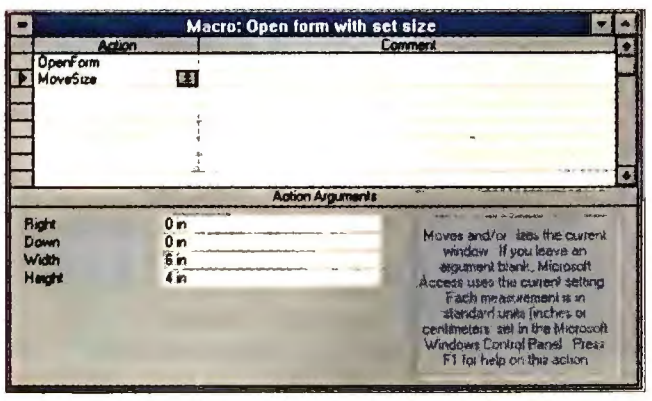

FIGURE 1: TO OPEN AN ACCESS FORM in a specific size and place on the screen, add a MoveSize action to a push-button macro.

4. On the line after the OpenForm action, enter **MoveSize**, and specify your form's size and position in the Action Arguments section, as in **FIGURE 1**. The numbers you enter are in either inches or centimeters, depending on the International settings in the Windows Control Panel. For example, to place your form's upper left corner just under the Access toolbar, enter **0** after 'Right' and 'Down'. Specify the form's width and height, then close the dialog box.

If you already have a macro attached to your push button, click the ... button at the end of the 'On Click' line to open the Macro Builder dialog box. Add a MoveSize action after the OpenForm action, as described in step 4, then close the dialog box.

To test this, click the *Form View* button on the toolbar, then click the push button you customized.

Calculate on Joined Approach Files

Q I work for a nonprofit organization that holds a number of workshops each year. In Lotus Approach, I created a file called WORKSHOP to hold information about each workshop, and a file called PARTICIP that lists all the participants in each workshop. These files are linked via a field called Workshop Number. A third file, MEMBER, contains information about participants in all the workshops and includes a Member? field that's left blank for nonmembers. This file is linked to PARTICIP via a field called Member Number.

The fee we charge for a workshop depends on whether the participant is a member of our organization. I need Approach to display the appropriate fee from one of two fields in WORKSHOP, Mem_Fee and Non_Mem_Fee, which depends on whether the Member? field in the MEMBER file is blank or contains an entry. What's the best way to do this?
Nick Caruso, Bloomfield, Connecticut

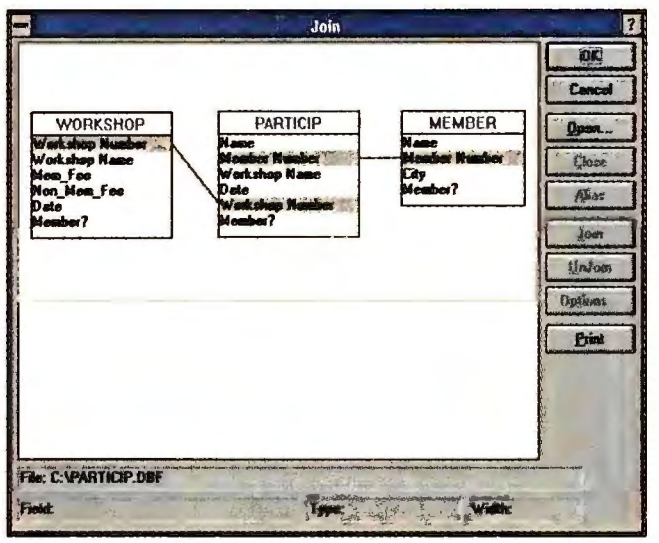

FIGURE 2: TO CALCULATE A FIELD from fields in other databases, all the databases must be joined.

A You can add a calculated field to the PARTICIP file. For this to work, your files must be joined, as in **FIGURE 2**. Since your files are already joined, I won't discuss how to do that.

First, open PARTICIP and choose *Create•Field Definition* from the menu. On the first blank line at the end of the Field Name column, enter **Fee** or some other name for the new calculated field. Then change the Data Type to *Calculated*. In the Formula box that appears at the bottom of the screen, enter the following formula:

```
If(IsBlank(MEMBER.Member?),WORKSHOP.
Non_Mem_Fee,WORKSHOP.Mem_Fee)
```

When you're finished, click *OK* to go back to viewing PARTICIP. The new Fee field can be added to any form or report that includes PARTICIP.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 5.0 for Windows Handbook *(Random House Electronic Publishing, 1994, 800/793-2665).* Data Management *welcomes your questions and pays $50 for published items.* *See page 12 for contact information.*

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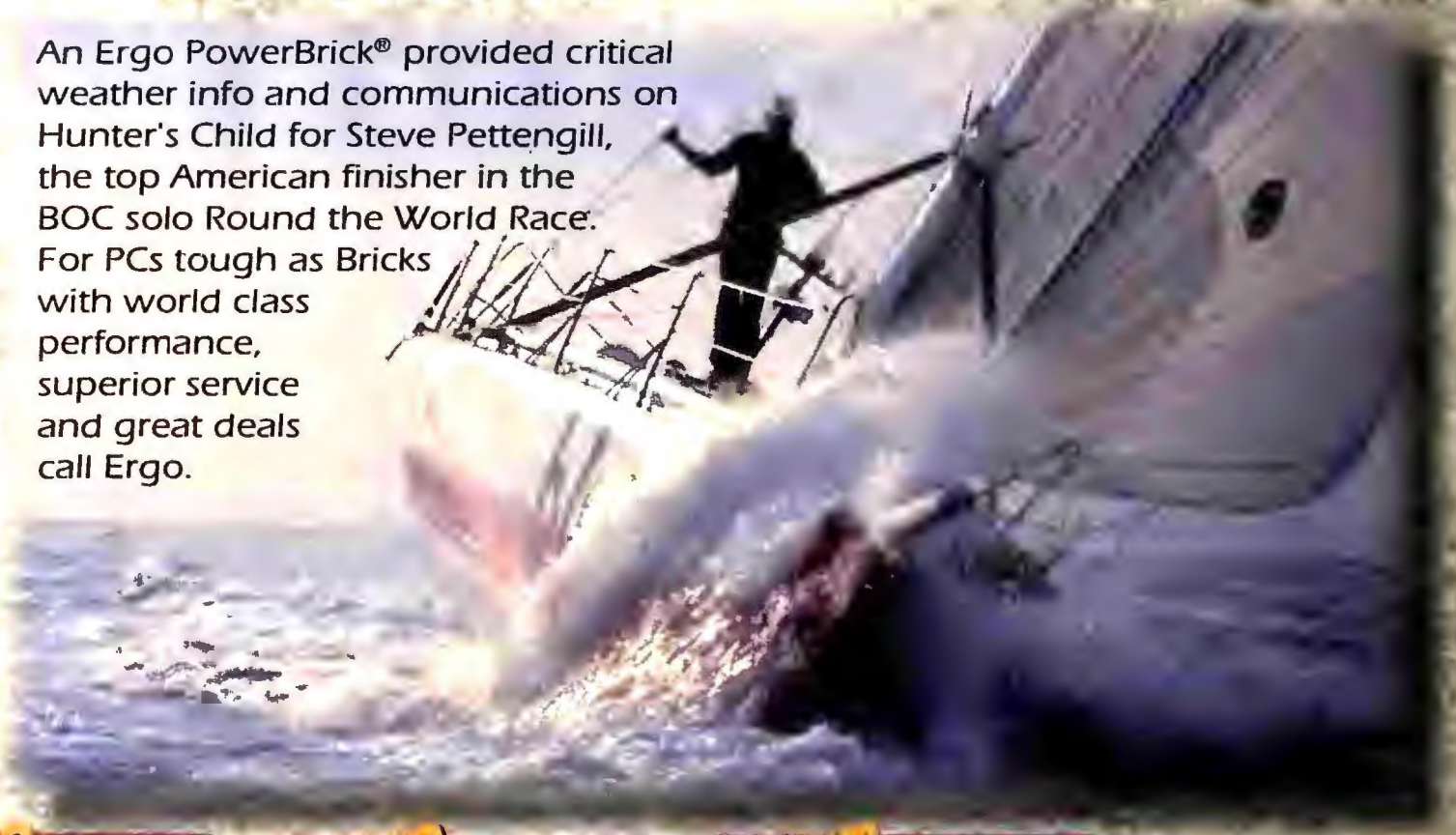

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PUBLISHING & PRESENTATIONS MAKEOVER

Stationery That Shows Who You Are

The point of design is to get your point across, not just to decorate. The more specific you are about what you want a printed piece to accomplish, the more likely you are to get the right results.

When Janis Mackmiller, president of software consulting firm Pinnacle Solutions, asked me to redesign her stationery, she provided one clear directive: "If I drop a business card on the floor of the mall, I want the person who happens to pick it up to know immediately what my company does." That made my job a lot easier.

Take a Card, but not Any Card

A good place to start your business card design is with a logo, and a good place to start the logo is within the tight confines of the card, a 2-by-3½-inch space.

People see so many dull business cards every day that they tend to forget how powerful these little items can be. A business card should express the same image its bearer would convey in person—modern or traditional, dynamic or calm, serious or fun. Once again, Mackmiller was specific: She wanted hers to look modern but also friendly.

The name *Pinnacle* conjures up the image of mountain peaks, but that doesn't reflect what Mackmiller's firm does. Instead, I looked for artwork that would say "software" and for typefaces that would convey the company's focus on planning processes.

The best logos are simple and bold, so I chose a floppy disk image from clip art that comes with CorelDraw 5, which I used to design all these materials. I simplified the image by removing extraneous details, then rotated it 45 degrees so that the disk looked like a pinnacle, or peak. I added the company name to the disk image in Eumundi, a new typeface available from Monotype that has a high-tech but not overly serious look and condensed proportions that are great for small spaces.

Since the floppy disk by itself was too generic, I designed a logotype—a symbol made of type. I used Image Club's new QuickSans Accurate typeface to create the letters *PS*, which looked like they were drawn with a compass, and QuickSans Fast for the squiggly fill. The colors are black and Pantone 32 red. Tip: If you use only black and one or two other colors, make sure to specify a spot color, not a process color. You can choose the exact color from a Pantone swatch book, which your printer should have.

Because Mackmiller wanted her card to convey so much, I made it a folding card to give her four times the space. (A folding card costs about twice as much as a regular card.) The address and contact information went on the back on the disk's "label" and was set in the same typeface I used on the front, Eumundi.

Inside the card I put a veritable minibrochure describing Pinnacle's services, with quotes from satisfied customers displayed on images of Post-it notes. Anybody who picks this baby up at the mall will have no doubt what Mackmiller's company does.

Spinning Off Other Stationery

Creating the letterhead and fax form was just a matter of reinterpreting the design we already had. As on the card, I placed the logotype in the upper right corner of the letterhead, and I put the floppy disk at the bottom. Since you can't fill half a letterhead page with art, I changed the black parts of the disk to a fill of 10 percent gray to create a subtle graphic background. Choose the lightest shade that prints on your printer—probably 10 percent for LaserJet and compatible printers, and 5 percent for PostScript printers.

I put the company's address in the lower right corner of the page. For the body of the letter, I used Eurocrat, a modern but personable sans serif font.

Finally, I set to work on the fax cover sheet. One rule for designing a fax form is to avoid gray fills; they transmit slowly and look awful on the receiving end. So I replaced the logotype's gray with black and white reversed for a dramatic electric look.

I put the company name prominently and vertically under the logo on the left, because the fax should convey the company's identity at a glance.

If you drop your business card at the mall, you want the person who finds it to know immediately what your company does.

To work around potential transmission problems, the "From" information comes first: The receiver gets the sender's name and number even if only the first inch or so comes through.

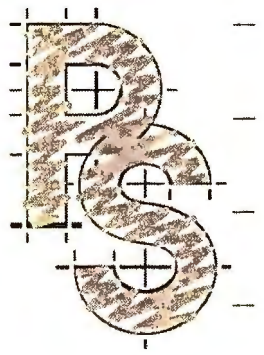
All the type is 18 point. (Avoid type smaller than 14 point.) Even the address on the floppy disk graphic is 16 point—large enough to be clear even in a bad transmission. Like the letterhead, the body of the fax cover page is set in Eurocrat; sans serif typefaces usually fax more clearly than serif ones.

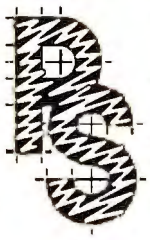
- **Image Club Graphics**, 800/661-9410, 403/262-8008,
  http://www.adobe.com/imageclub
  Reader service no. 734
- **Monotype**, 800/666-6897, 312/939-0378
  Reader service no. 735

By Daniel Will-Harris

Daniel Will-Harris is a designer and author in Marin County, California. He offers help for the graphically impaired with Esperfonto, a typeface selection system in his magazine Typofile, at **http://www.will-harris.com**. PC World *pays $50 for published questions about presentations.* *See page 12 for contact information.*

Start by choosing typefaces that express the image of your company you want to convey—modern or traditional, dynamic or calm, serious or fun.





Pinnacle Solutions

From: Janis Mackmiller, ✆ 612/924-1078, 🖷 612/924-1095

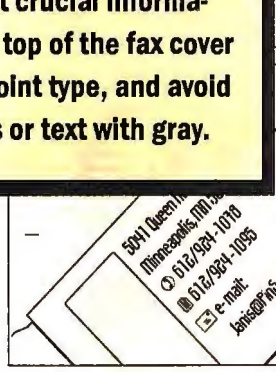
To: Emily & Dave

Re: Fax Form Design

Date: 11-21-95

Pages: 2, including this one

Put the most crucial information at the top of the fax cover sheet in 18-point type, and avoid filling objects or text with gray.



t you don't know won't hurt you. I'll believe it when I see it.
me everyone gives to their mistakes. The only thing one can
e is to pass it on. It is never of any use to oneself. In this
y two tragedies. One is not getting what one wants, and the
man cannot be too careful in the choice of his enemies.
r enemies; nothing annoys them so much. With enemies like
ends?

rything but a misprint. Stop the presses! Don't believe
r or anything you read. The truth is rarely pure and never
y one thing in the world worse than being talked about, and
ked about. If you can't say anything good about someone,
. Art should never try to be popular. The public should try to
It is through art, and through art only, that we can realize
ugh art and art only that we can shield ourselves from the
al existence. The public takes no interest in a work of art
he work in question is immoral.

oring from an upheaval in the author's soul—If that upheaval
it must come from the works of any other author which
ly and easily adapted. The only way to get rid
ld to it. A good many young writers make the
d, self-addressed envelope, big enough for the
s too much of a temptation to the editor. I can
emptation.

d we will tell you what you are afraid of. There
t. Industry and all the virtues are of no avail.

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Janis Mackmiller

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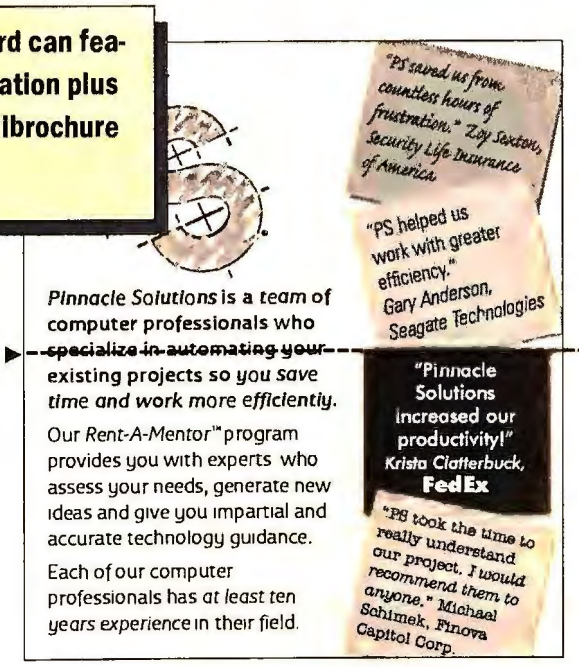
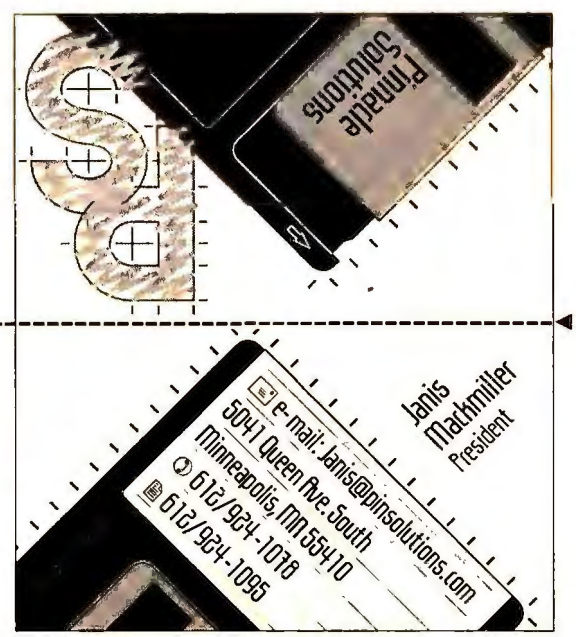
A folding business card can feature contact information plus enough room for a minibrochure about your company.





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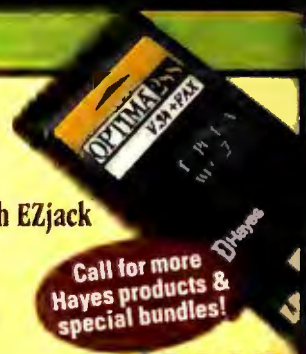

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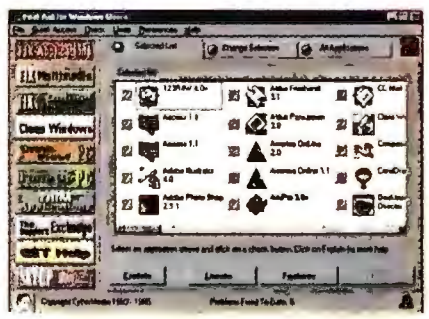
The surprise is that most Windows problems are not caused by hardware failures, but by software and configuration conflicts such as misplaced drivers or DLLs, or incorrect parameter settings. And it only gets worse as you add more applications, games, and cards to your PC. Regardless of the cause, the result is the same: you waste time figuring out how to fix the problem.



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ONLINE Q&A

How to Buy an Internet Book

Q Can you recommend a book on the Internet for someone who knows nothing about it?
Charles Younggren, Denver

A My favorite book is *The Whole Internet User's Guide* by Ed Krol (O'Reilly & Associates, 1994, 800/998-9938). But if you're heading out on the Internet for the first time, the best book for you may be no book at all. The Internet is really much easier to use than those phone-book–size Internet guides might lead you to believe. Once you get online and start exploring, it's easy to find lots of information about navigating the Internet.

Get yourself a starter disk for America Online, CompuServe, or Prodigy. These services are a bit pricier than Internet-only services, but their software is *so* much easier to set up and use that the small difference in cost is worth it.

Should you still want a book, shop for one that shows you how to use Internet search tools like the WebCrawler and the Yahoo list. You'll also want one that fills you in on buzzwords you may run across, like *FTP*. Pass up tutorials that are not specific to your software or online service. Avoid humongous lists of, say, the thousands of Usenet newsgroups; they're useless. Similarly, be skeptical of Internet directories: The Net changes so fast that they're often out of date by the time they finally get to bookstores. Directories also tend to be superficial

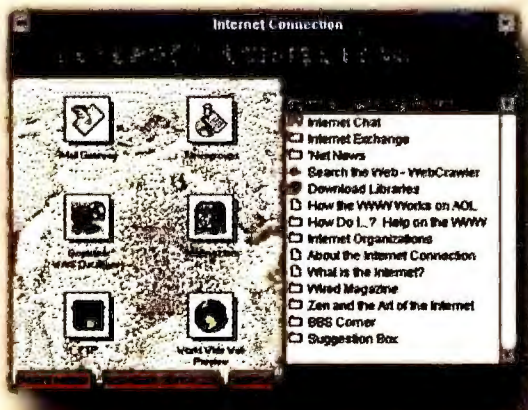
Recipe for Getting on the Internet for the First Time and Finding Stuff

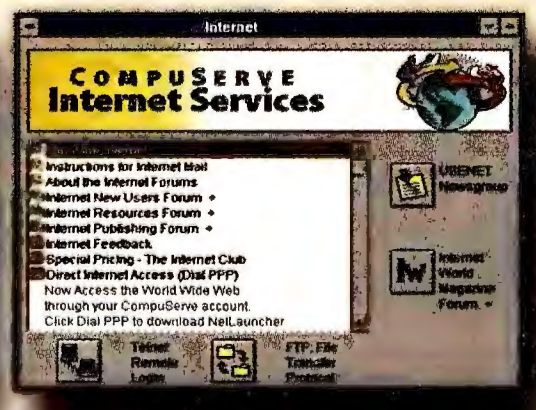
1. Head to the Internet menu of your online service by issuing a Go to, Go, or Jump command.

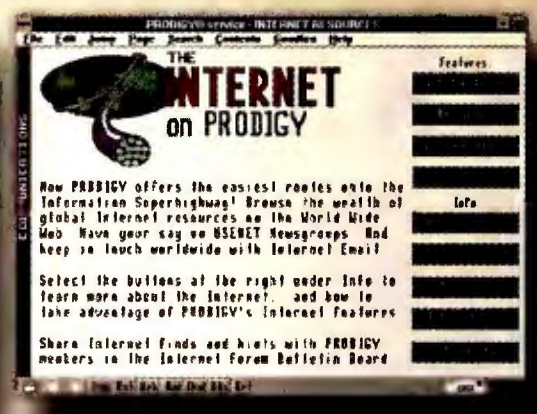
America Online: Click the Go to Main Menu button, and in the next dialog box, click the Internet Connection button.

CompuServe: Click the Internet button on the Basic Services menu.

Prodigy: Click the Jump bar, then select Jump (or press <Ctrl>-J) and type Internet.





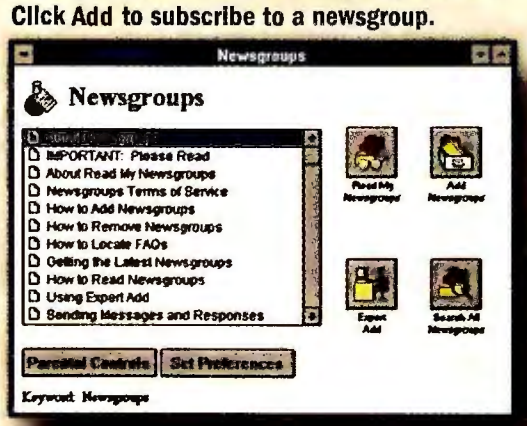


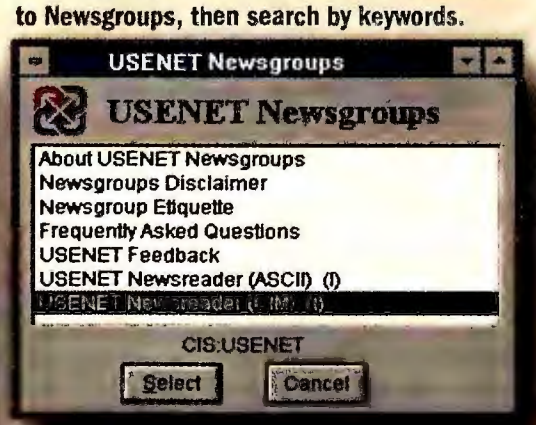
2. To find others who are talking about things you're interested in, head for the Usenet newsgroups. Use the search feature to look for newsgroups in your interests. You'll need to subscribe to each group in order to read the messages and articles.

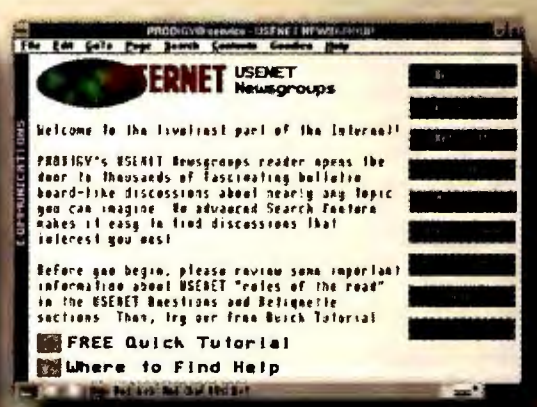
America Online: Click the Newsgroups button in the Internet Connection dialog box, then click the Search All Newsgroups button. Click Add to subscribe to a newsgroup.

CompuServe: Click the Usenet Newsgroups button in the Internet dialog box, then select a Newsreader (CIM or ASCII). Select Subscribe to Newsgroups, then search by keywords.

Prodigy: Select Jump (or press <Ctrl>-J), click Prodigy, then type usenet. Click the Newsgroups button to begin your search.







3. Associated with every newsgroup are one or more FAQ files of frequently asked questions. FAQs catalog much of the worthwhile information imparted in the newsgroup over the years and also list other relevant Internet resources. FAQs for each newsgroup are posted in the news.answers newsgroup.

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in their coverage of any particular subject.

Look carefully at the book to see if it offers information that you can understand. Does the table of contents make sense? Try looking up something you know, then look up something you don't know to see how well the book covers it. Make sure there's a good index; you'll probably use the book primarily as a reference tool.

Don't judge a book by its weight. Publishers like to bulk up books with lots of screen shots, big headings, and heavy paper, to make shoppers think they're getting more for their money. Another trick is to assemble books by throwing together Internet frequently asked question files, and even plagiarizing online help files and software manuals. It's a sad fact that many of these books are written in a few months, or even weeks, and barely edited for coherence or accuracy.

What about a book that includes disks? If you're a newcomer to the Net, you'll find the poorly documented assemblage of "Internet tools" on disk off-putting, not to mention troublesome to set up.

Remember that the Internet is not that hard to use. In short, you don't need to read a 600-page tutorial before you go online. As Nike says, Just do it.

Tracking Stocks With WinCIM

Q Is there a way to download stock quotes from CompuServe into a spreadsheet so that I can track them?

Dan Gabbard, Fresno, California

A StockTracker is a nifty $59.95 Windows shareware utility that works in conjunction with WinCIM to automate retrieval and tracking of stock prices from CompuServe. The program (**st.exe**) is also available on PC World Online.

You can use StockTracker in conjunction with Excel to chart price histories or create price/volume charts. StockTracker will also retrieve company news and earnings reports. You can even set it up to alert you of price movements.

- **StockTracker** $59.95; Virgil Corp.; 415/433-9025, CompuServe: 71333,3667

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Web Definitions—Oh, No! More Acronyms!

URL: Uniform Resource Locator. URL refers to the location of home pages and other files on the World Wide Web; for example, http://www.ambook.org/bookweb is a URL. Think of it as an e-mail address. It's what you type into a browser to get to a Web page.

HTTP: Hypertext Transport Protocol. This is the language used by the computer that hosts a Web page when it talks to your Internet service to transmit the page to your PC. You'll see 'http' prefacing any page's address.

HTML: Hypertext Markup Language. This is the scripting language used to create Web pages. It allows you to combine text with graphics and display them on the Net.

PC WORLD online *The file from this article is available on PC World Online. Judy Heim is a* PC World *contributing editor and author of* I Lost My Baby, My Pickup and My Guitar on the Information Highway *(No Starch Press, 1995, 800/420-7240).* Online *welcomes questions and pays $50 for published items.* *See page 12 for information.* ■

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Circle 176 on reader service card

HARDWARE Q&A

Socket to Me

Q I like *PC World*'s Features Comparison charts for systems, but one thing I don't have a clue about is the meaning of different pin numbers for the ZIF (zero insertion force) sockets. What's the difference between CPU sockets with 235, 237, 238, 273, and 320 pins? Which is the most desirable? Will any let you upgrade to the P6?
Robert Webster, Worcester, Massachusetts

A The five sockets you mention fall into two basic groups. Sockets with 235, 237, and 238 pins are Pentium OverDrive sockets—most often found in 486 SX2, DX2, and DX4 systems—that can also hold DX2 and DX4 OverDrives as well as 486 upgrade products from Kingston, Evergreen, and other upgrade manufacturers. You'll find 273, 320-, and also 321-pin sockets in Pentium systems, and Intel plans to release OverDrives for these three sockets. Older 486s have either a 167- or 168-pin upgrade socket—or a 169-pin socket, which wasn't designed for upgrades but generally works.

Check out the chart to see what the sockets look like, along with a list of potential upgrade chips for each one.

Note that the chart shows socket numbers that correspond to each socket I've described. In newer systems, you'll probably see the socket number printed clearly on the socket itself, which provides an easier way to identify the thing than counting pins.

Newer models will also have the ZIF sockets you mention, which make installing a new CPU as easy as flipping a lever, removing the old chip, dropping in the new one, and flipping the lever again. Older systems lack these sockets, which means you should probably use a chip puller (available at electronics stores and often bundled with upgrades) to remove the old chip—you have to yank pretty hard. And the older the PC, the less likely you are to see a socket number, so you're back to counting pins.

The best 486 socket to have is the 237-pin socket, since it will hold any OverDrive processor currently available. In addition, unlike the 238-pin socket, it should accommodate a *future* Pentium OverDrive promised for next year, which may be a better deal than the current Pentium OverDrive-63 and -83 upgrades (for more information, see "Best Upgrades for your 486").

No P6 upgrade chips are planned for any current Pentium socket. However, if your system has a 320- or 321-pin socket, then you have a 75-MHz Pentium system or better, and whatever OverDrives Intel releases for Pentium systems will increase your performance that much further.

Not all systems can be upgraded with their respective Intel OverDrives, regardless of the socket. To find out if your system has been tested and passed by Intel to use the upgrade chip you want, call Intel's fax-back line at 800/525-3019. Also note that Cyrix has a Pentium-class 486 upgrade, called the 5x86, that will plug into 486-based Pentium OverDrive sockets.

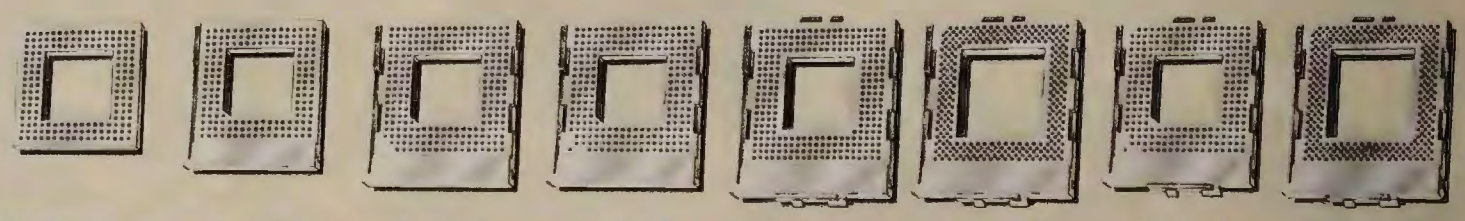
Fdisk to the Rescue

Q I just received this message when I tried to boot my PC: 'Error reading MBR on drive 81h'. What does MBR mean? Is my hard disk going down the drain? I have some important files on that drive—can I retrieve them?
Bryan Chan, Toronto, Ontario

A The MBR is your hard disk's *master boot record*, stored in the very first sector of your hard disk. It contains

Match Your Socket to Its Upgrade CPU

The number of pinholes in your CPU socket determines the type of upgrade chips you can install. If you're lucky, the socket may have the socket number printed on it, so you don't have to count pinholes.



	Old 486 socket	Socket 1	Socket 2	Socket 3	Socket 4	Socket 5	Socket 6	Socket 7
Number of pinholes	168	169	238	237	273	320	235	321
Voltage	5V	5V	5V	3V/5V	5V	3V	3V	3V
Possible original CPUs	486DX	486SX, 486DX	DX2, 486SX, 486DX	DX2, 486SX, 486DX, DX4	Pentium 60 and 66	Pentium 75 to 120	DX4	Pentium 75 to 133
Possible upgrade CPUs	DX2, DX4	DX2, DX4	DX2, DX4, Pentium OverDrive	DX2, DX4, Pentium OverDrive	Future upgrade chips	Future upgrade chips	Future upgrade chips	Future upgrade chips

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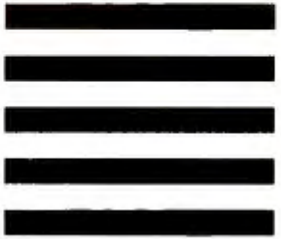

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vital information—namely, the data that describes the partition or partitions on your disk (C:, D:, and so on). Apparently, your MBR has become corrupted, and you can't boot your hard disk without it.

But don't panic! Boot from a floppy, change to your DOS directory, and enter the undocumented DOS command **fdisk /mbr**. This should make your hard disk bootable again, but you should reboot to make sure. Next, enter **scandisk** at the DOS prompt to run DOS's disk diagnostics routine and make sure your hard disk is free of other errors.

As an alternative, you can try booting from a special emergency disk prepared with a disk recovery utility, such as those contained in The Norton Utilities or PC Tools disk utility libraries. The diagnostic and recovery tools in these packages are better than DOS's, but you have to prepare your emergency disk *before* disaster strikes.

If your MBR gets corrupted again, or if you keep experiencing other hard disk errors, you should run a *surface scan* of your hard disk using DOS's ScanDisk—or better, a disk utility bundled with Norton Utilities or PC Tools. These routines check for physical problems with the surface of the disk and lock out suspect areas so data won't be stored there. Third-party utilities generally do a better job than ScanDisk.

SCSI users should check their SCSI card manuals and see if the card's BIOS, or a bundled utility, offers a low-level format routine. You have to back up your entire hard disk before running it, however, because in the process of realigning your sectors and tracks it will destroy all your data. Restore your data, and with luck the errors will abate.

If these extreme measures fail, and your hard disk is still flaky, then go ahead and exercise the warranty.

Recycling Memory

Q I have SIMMs I no longer use because I've upgraded. I know that a lot of companies are trying to be environmentally friendly these days. Is there a company out there that buys old memory?
Richard Wong, San Francisco

A In the back of any computer tabloid you can find advertisements from companies and individuals promising to pay top dollar for old memory. (Prices fluctuate too much to quote here.) If you're looking for a toll-free number, you might try Memory Traders (800/315-7807). The firm claims that it will mail you a check within five business days of receiving your SIMMs.

A company called Autotime (503/452-8577) takes your old 30-pin SIMMs, unsolders the chips, and remounts them on extra-tall, 72-pin-SIMM circuit boards, making them compatible with newer systems. Then Autotime sells you back the SIMMs for a fraction of the 72-pin-SIMM market price. Now *that's* recycling—if your system accommodates the taller SIMMs.

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible, *now in its second edition (Peachpit Press, Berkeley, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items. See page 12 for contact information.* ■

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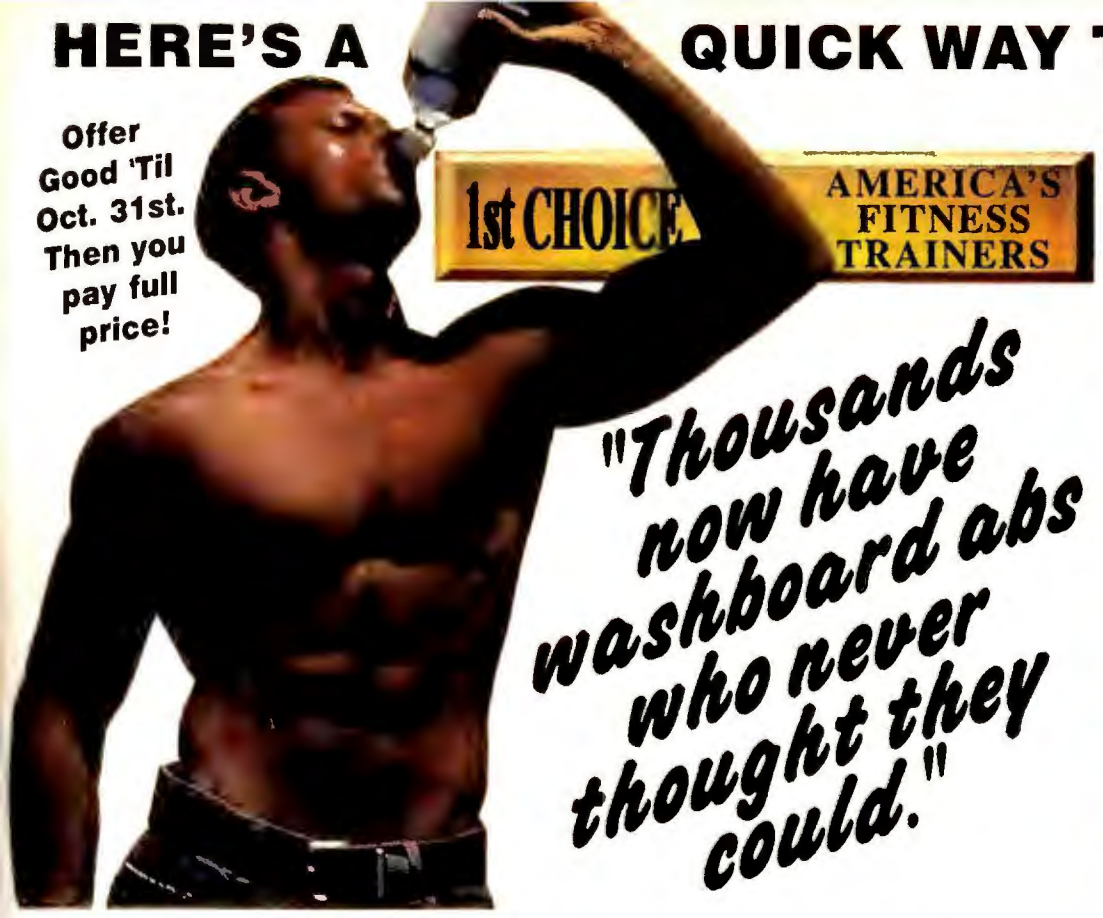

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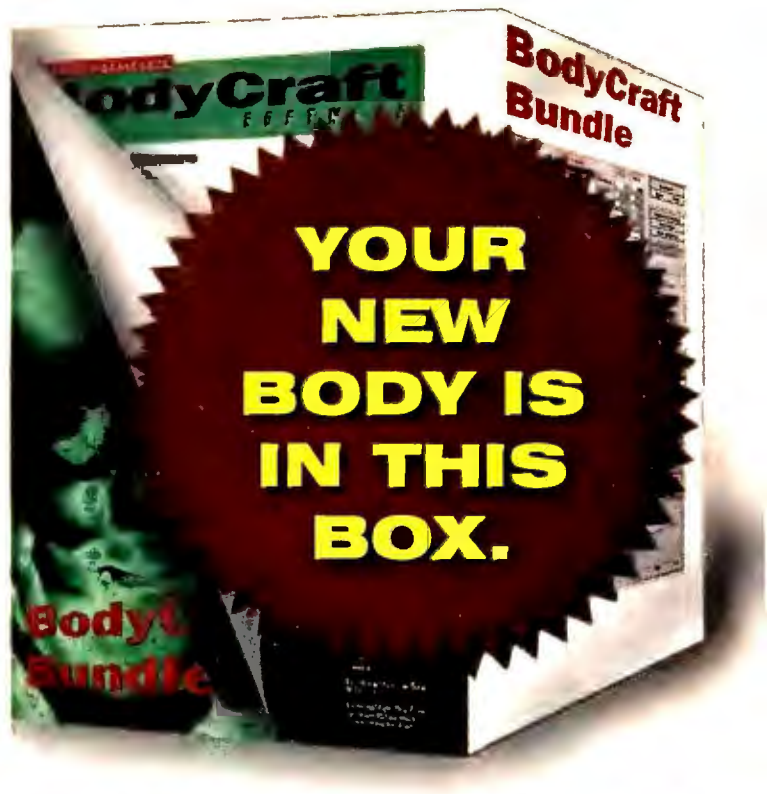

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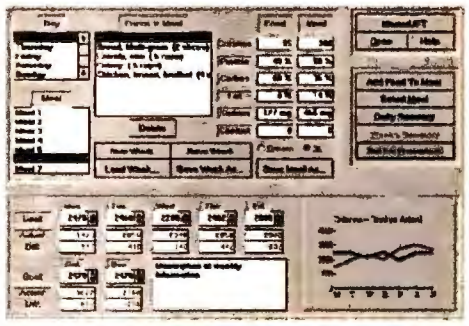

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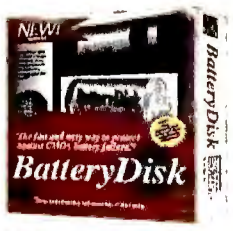

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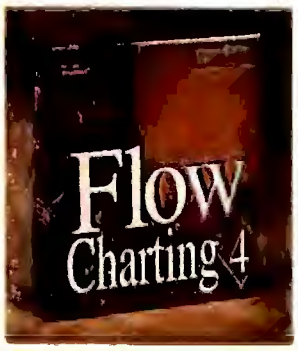

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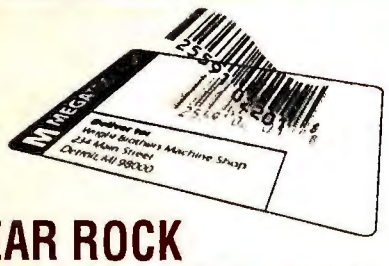

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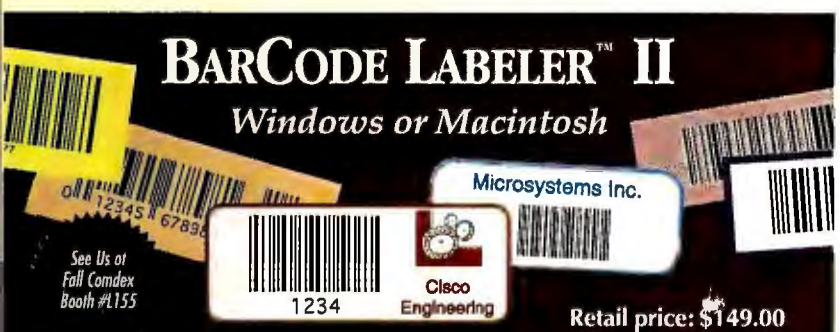

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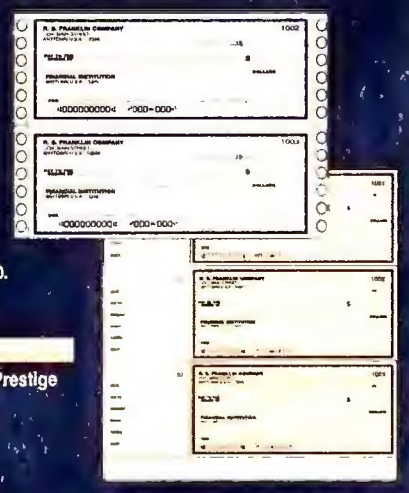

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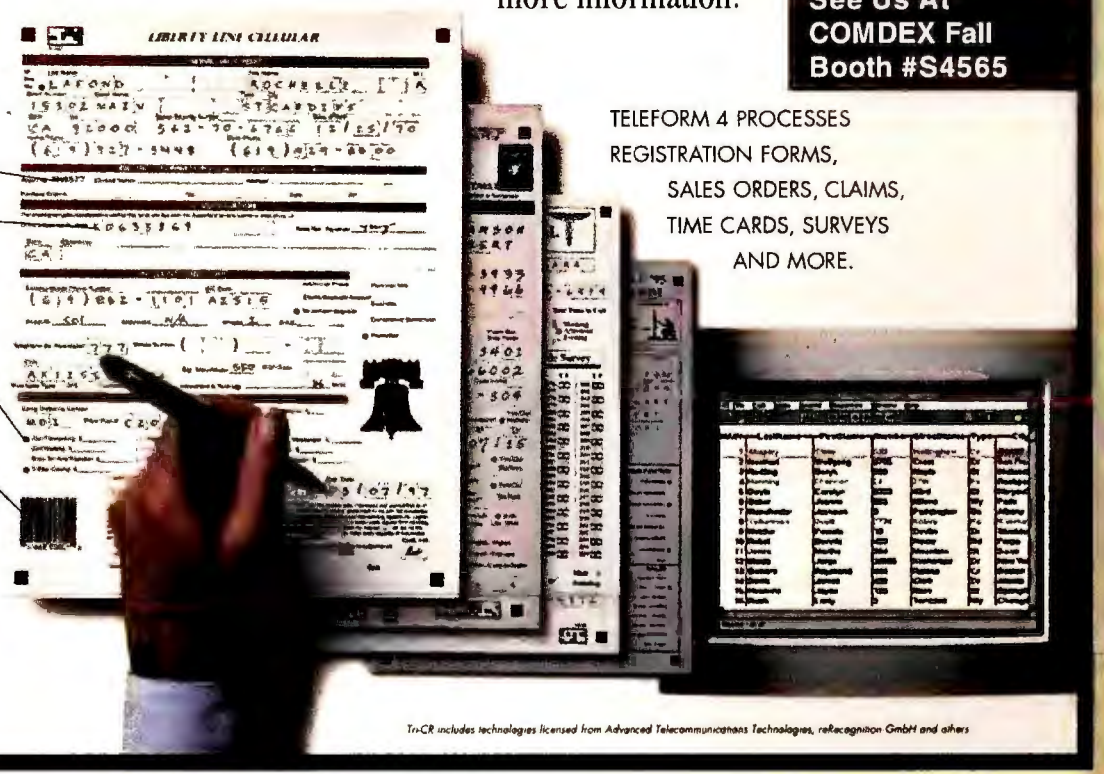

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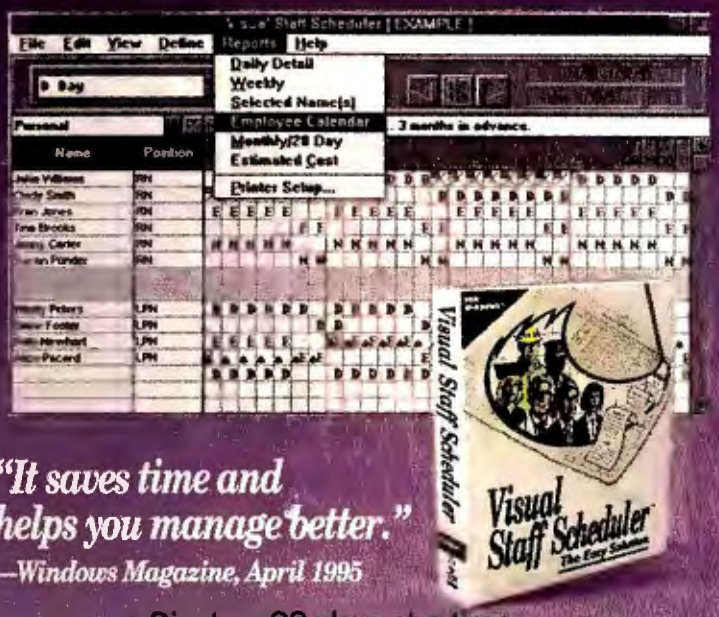

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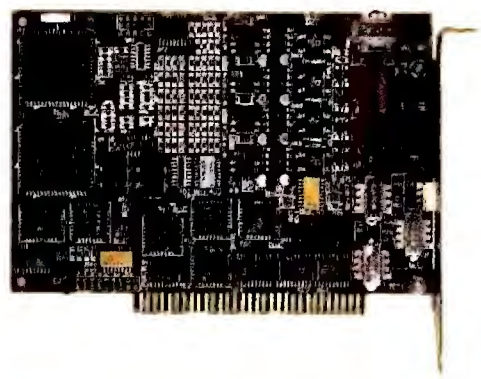

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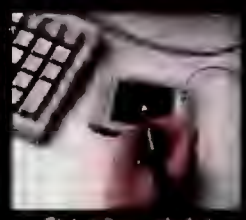

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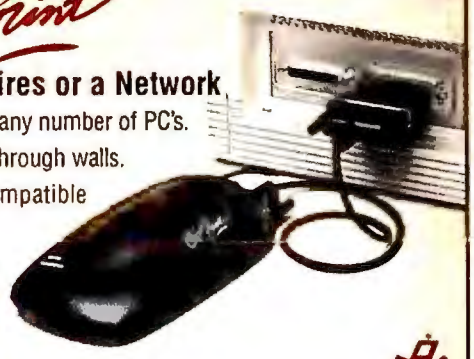

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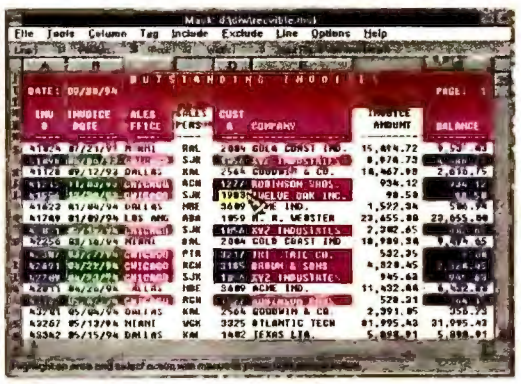

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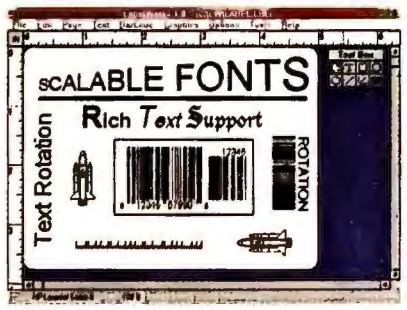

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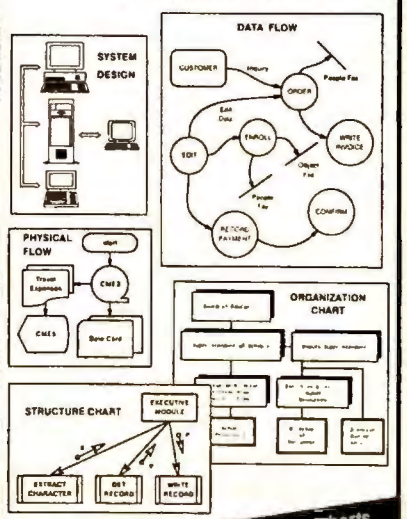

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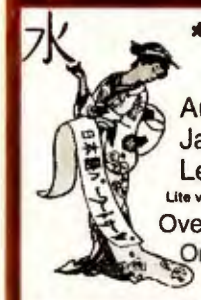

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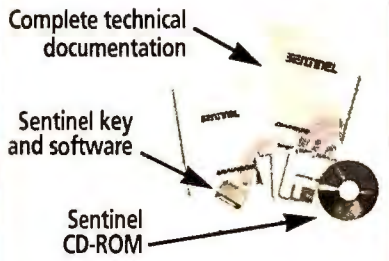

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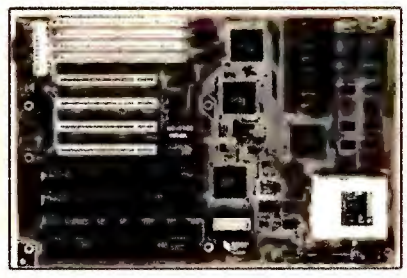

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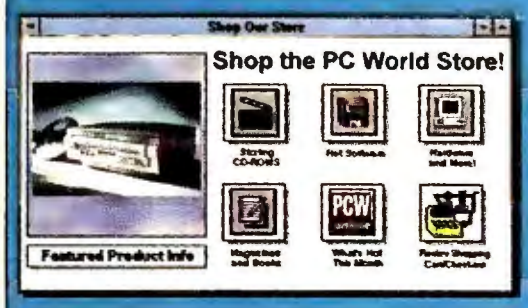

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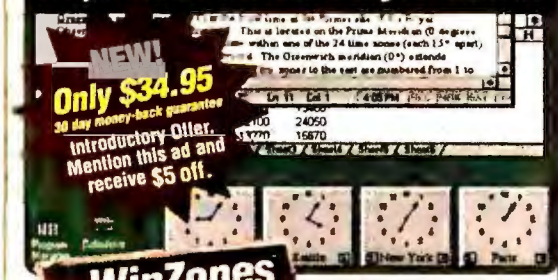

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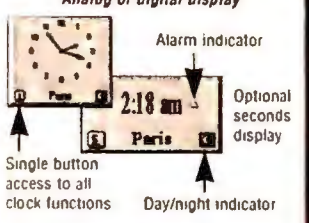

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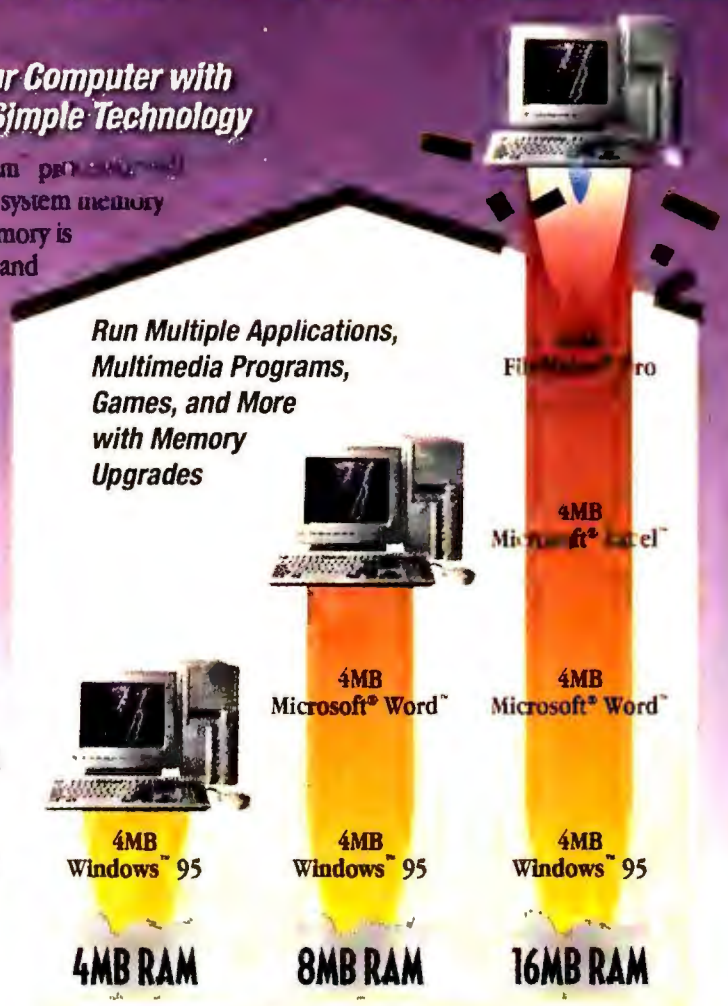

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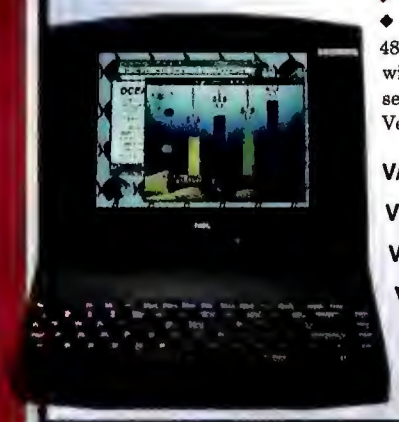

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- Caller ID, Silent Answer lets you receive both fax and voice calls on the same line

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1441 PnP External .....$94.00 #109105
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"Best buy in color scanners"

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- VistaScan® automates controls to a single step and provides network capability

With Image Folio & WordLinx

$379* * After $20 instant rebate. Regular Price is $399.00

UC1260 Color scanner

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- 9600 dpi max. interpolated

Includes Photoshop LE & WordLinx OCR

$739 #168728

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- 300 dpi CCD Scanner
- Automatic Document Feeder
- Faxing Software

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With four productive application modules: *PageFile, PageImage, PageType, OCR*

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Q Trailblazer 850MB EIDE Internal	#176300	$189.00
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Q Fireball 1080MB EIDE Int.	#161448	$215.00
Q Fireball 1080MB SCSI Internal	#161449	$285.00
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WESTERN DIGITAL

AC635 635MB EIDE Internal	#176303	$172.00
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AC31600 1.6GB EIDE Internal	#146357	$385.00

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Microsoft Windows'95

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Filepro 1GB SCSI Internal	#150825	$309.00
Filepro 2GB SCSI Internal	#131717	$725.00
Filepro 4GB SCSI Internal	#131864	$999.00

Seagate

210MB EIDE Internal	#176299	$88.00
Decathalon 850MB EIDE Internal	#163486	$194.00
Medalist XE 545MB EIDE Internal	#106226	$165.00
Medalist 1080MB EIDE Internal	#136179	$235.00
Hawk 1GB SCSI 3.5 Int	#106213	$379.00
Hawk 2GB SCSI 3.5 Int	#133039	$735.00
Hawk 4GB SCSI 3.5 Int	#138676	$979.00
Barracuda 2GB SCSI HD	#132795	$899.00
Barracuda 2GB Wide SCSI HD	#106227	$960.00
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Tecra 700

- Pentium 120MHz processor – fastest available on a notebook!
- PCI bus architecture (internal & external)
- 11.3", 800x600 high resolution displays
- Optional 4X CD-ROM Drive (swap floppy & CD-ROM)
- Multimedia docking station with PCI bus
- Built-in 16-bit sound, microphone, **2 speakers** & MIDI
- **HUGE**, 1.26GB hard drives

Processor	Screen	HD	Price
Pentium 120	11.3" Dual Scan	1.26GB	CALL
Pentium 120	11.3" Active	1.26GB	CALL

120MHz Pentium with PCI bus

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NEW!

Tecra 700

BIG! 11.3" Screens

WIN95 FREE UPGRADE

2130

Satellite 2110/2130

- 10.4" Dual Scan & Active
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use

Processor	Screen	HD	Price
486DX4/75	10.4" Dual Scan	330MB	$1979
486DX4/75	10.4" Dual Scan	500MB	2459
486DX4/75	10.4" Active	500MB	3059

WIN95 FREE UPGRADE

Satellite Pro T400

Pentium 75 with Built-in 4X CD-ROM

Satellite Pro 400

- Built-in 4X CD-ROM Drive(Swap floppy & CD-ROM) (Active model only, optional on Dual Scan)
- Pentium 75MHz Processor
- Built-in 16-bit sound, microphone, speaker & MIDI
- 10.4" Active & Dual Scan
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use
- Lithium Ion battery technology
- Built-in infrared for no hassle printer connections

Processor	Screen	HD	Price
Pentium 75MHz	10.4" Dual Scan	772MB	$3539
Pentium 75MHz	10.4" Active	772MB	4359

WIN95 FREE UPGRADE

90MHz Pentium

Portégé 610CT

Portégé 610CT

- Pentium 90MHz processor
- 9.5" True Color display for optimum color
- Built-in 16-bit sound (SoundBlaster Pro compatible), microphone & speaker
- Lithium Ion battery technology
- Accupoint stick for easy control

Processor	Screen	HD	Price
Pentium 90MHz	9.5" True Color	720MB	$4359

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Advantage Adventure Desktop

Advantage Adventure Multimedia
(4X CD-ROM) NEW for Windows 95

- Quad Speed CD-ROM Drive
- Advanced Telephony – 14.4 or 28.8 fax/modem, telephone answering system, and speaker phone (Differs by model. Call for details).
- Integrated 3-D surround sound system
- Loads of **FREE** software preinstalled
- Windows 95 keyboard for increased productivity
- AST Works II navigation software – featuring "SPOT"
- Intel P6 Overdrive processor upgradable

Chassis	Processor	HD	Price
Desktop (614)	Pentium 100	850MB	$2099
Minitower (B12)	Pentium 100	1.2GB	2199
Minitower (814)	Pentium 100	1.2GB	2499*
Minitower (B18)	Pentium 133	1.6GB	3099*

Monitors priced separately **16MB RAM standard*

Ask about NEW Ascentia 950N Pentium 90MHz

IBM®
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ThinkPad® 701

Aptiva®

NEW LOW PRICES!

ThinkPad® 701

Processor	Screen	HD	Price
486DX2/50	10.4" Active	360MB	$2199
486DX2/50	10.4" Active	540MB	2399
4B6DX4/75	10.4" Dual Scan	360MB	3149
486DX4/75	10.4" Dual Scan	540MB	3449
4B6DX4/75	10.4" Active	360MB	3699
4B6DX4/75	10.4" Active	540MB	3999
4B6DX4/75	10.4" Dual Scan	720MB	3649
486DX4/75	10.4" Active	720MB	4199

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- Quad Speed CD-ROM Drive
- 16-bit stereo sound - SoundBlaster pro Compatible
- Advanced Telephony - 28.8 fax/modem, full duplex speaker phone, answering machine & voice mail
- 30 Watt stereo speakers
- Built-in MPEG support for full screen, full motion video
- Over 40 **FREE** software titles

Chassis	Processor	HD	Price
Minitower	Pentium 75	1GB	$1799

Monitors priced separately

Additional Models Available

ThinkPad 760 P90 Notebooks with a 12.1" Active Display just announced. Call for Lowest Prices!

COMPAQ

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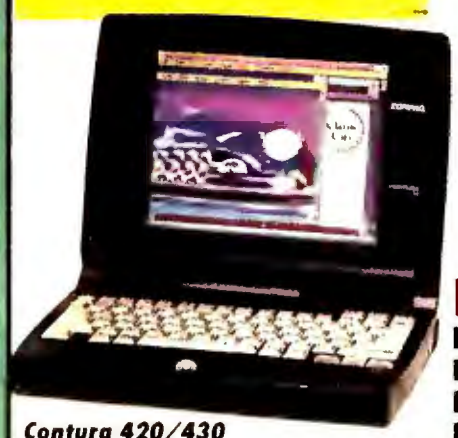

Contura 420/430
Product differs slightly from photo.

Contura 420/430

- 10.4" Active & Dual Scan
- Fast 486DX4/75 or 486DX4/100 processors
- Optical trackball – smoother & more reliable
- High capacity drives – up to 720MB
- Compaq, 3-year worldwide warranty

Processor	Screen	HD	Price
486DX4/75	10.4" Dual Scan	420MB	$2459
4B6DX4/75	10.4" Active	420MB	3029
4B6DX4/100	10.4" Dual Scan	720MB	2839
4B6DX4/100	10.4" Active	720MB	3499

NEW!

LTE 5000

LTE 5000

- 75MHz or 90MHz Pentium w/PCI bus & 256KB cache
- 32-bit PCI local bus graphics
- 8MB RAM exp. to 72MB
- Built-in 16-bit sound, microphone & **2 speakers**
- MultiBay – holds CD-ROM, 2nd HDD, Floppy, or 2nd battery.
- Up to 1.35GB hard drives (2.7GB max. capacity)
- Built-in infrared for wireless communications
- Supports NiMH & Lithium Ion batteries (up to 8 hrs.)
- Optional MPEG and TV video adapter

Processor	Screen	HD	Price
Pentium 75	10.4" Dual Scan	510MB	CALL
Pentium 75	11.3" Dual Scan	B10MB	CALL
Pentium 75	10.4" Active	810MB	CALL
Pentium 90	10.4" Active	B10MB	CALL
Pentium 90	10.4" Active	810MB	CALL*

**Features Built-In CD-ROM drive*

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90MHz Pentium

HP OmniBook 5000

- Pentium 90MHz with 32-bit PCI Local bus
- 1.2GB drives available for high capacity storage
- High resolution – 800x600 resolution on notebook display
- Built-in 16-bit sound, microphone & speaker

Processor	Screen	HD	Price
Pentium 90	10.4" Active	1.2GB	$5579
Pentium 90	10.4" Active	1.2GB	6239*

**16MB RAM standard*

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DeskJet 340 $289.99

HP DeskJet 340

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HiNote Ultra shown with Mobile Multimedia Station

Digital Starion
NEW! Windows 95 Multimedia Computers

- Quad Speed CD-ROM Drive
- Pentium 133 - fastest Pentium available!
- PCI local bus – high speed graphics
- Unbelievable sound - SoundBlaster Pro-compatible, SW WaveTable, Premium JBL speaker system
- Advanced Telephony - 14.4 fax/modem, full duplex speaker phone & answering machine
- Loads of **FREE** software, reinstalled

Chassis	Processor	HD	Price
Minitower (910)	Pentium 75	850MB	$1749
Minitower (915)	Pentium 100	850MB	1999
Minitower (920)	Pentium 75	1.2GB	2199
Minitower (930)	Pentium 100	1.2GB	2499
Minitower (940)	Pentium 133	1.2GB	2999

Monitors priced separately

HiNote Ultra

- All models 4 lbs. or less - **ONLY 1.1" thick**
- Built-in sound, microphone & speaker
- Lithium Ion battery technology
- Built-in infrared
- 3-year warranty - **FREE** 1-year Passport Service
- **NEW Mobile Multimedia Option now available**

Processor	Screen	HD	Price
486DX2/50	9.5" Duol Scon	340MB	$2549
486DX2/50	9.5" Active	340MB	3079
486DX4/75	9.5" Duol Scon	528MB	3079
486DX4/75	9.5" Active	340MB	3319
486DX4/75	9.5" Active	528MB	3639

NEC

Ready Multimedia
(4X CD-ROM) NEW for Windows 95

Chassis	Processor	HD	Price
Minitower	Pentium 75	1GB	$1899
Minitower	Pentium 100	1GB	2299
Minitower	Pentium 100	1.6GB	2699
Minitower	Pentium 120	1.6GB	2999
Minitower	Pentium 133	1.6GB	3299

Manitors priced separately

Versa 2000

- Lithium Ion battery technology
- VersaGlide touch-pad pointer – simple & accurate
- Built-in, upgradable 14.4 fax/modem (on selected models)
- LOADS of **FREE** software preinstalled

Processor	Screen	HD	Price
486DX4/75	10.4" Duol Scon	350MB	$1999*
486DX4/75	9.5" Active	350MB	2299*
486DX4/75	9.5" Active	350MB	2599
486DX4/75	9.5" Active	540MB	2799

**14.4 fax/modem not built-in*

NEC Versa 4000

- Built-in CD-ROM Drive! (Standard on some models, optional on others)
- Pentium 75 and Pentium 90 processors
- 256KB Level 2 Cache to optimize performance
- Unbelievable displays – 65K color Dual Scan, 16.8 million color Active (High resolution Active Matrix displays available – 800x600 res.)
- Built-in 16-bit sound, microphone, MIDI and **2 built-in speakers**
- Multimedia docking station with outstanding Altec Lansing 4 speaker array

Processor	Screen	HD	Price
Pentium 75	10.4" Duol Scon	540MB	$3499
Pentium 75	10.4" Duol Scon	540MB	3799*
Pentium 75	10.1" Active	540MB	3999
Pentium 90	10.1" Active	810MB	4649*
Pentium 90	10.4" High Res.	810MB	4799

** Features built-in CD-ROM drive standard*

PACKARD BELL

as low as **$1699**

WIN95 INSTALLED

Force Minitower

NEW! Windows 95 Multimedia Computers

- Quad Speed CD-ROM drive
- 16-bit SRS 3-D Amphitheatre Stereo sound
- PCI local bus, high-speed graphics
- Telephone answering system & fax/modem (full duplex speakerphone on selected models)
- LOADS of **FREE** software

Chassis	Processor	HD	Price
Minitower	Pentium 75	1GB	$1699
Minitower	Pentium 100	1GB	1979
Minitower	Pentium 133	1.2GB	2359+

+28.8 fax/modem *Manitors priced separately*

Other Packard Bell Models available. Call for details.

PCW 11/95

TEXAS INSTRUMENTS

Extensa 550

Extensa 550/550CD

- 75MHz Pentium w/PCI bus & 256KB cache
- Built-in 2X CD-ROM drive (optional on some models)
- Built-in 16-bit sound, microphone & speaker
- Integrated touchpad pointer
- 10.4" Active Matrix display/10.4" Dual Scan
- Built-in infrared for wireless communications

Processor	Screen	HD	Price
Pentium 75	10.4" Dual Scan	524MB	$2499*
Pentium 75	10.4" Duol Scon	524MB	2999
Pentium 75	10.4" Active	524MB	3599

**CD-ROM Drive is on optional accessory on this model*

Extensa 450

- 10.4" Dual Scan & 9.5" Active display
- GlidePad pointing device
- Advanced battery pro
- Built-in infrared for no hassle printer connections

Processor	Screen	HD	Price
486DX4/75	10.4" Duol Scan	340MB	$1799
486DX4/75	9.5" Active	340MB	2399

TravelMate 5000/5100

- 75MHz or 90MHz Pentium with PCI Bus to optimize Pentium processor performance
- 10.4" Active Matrix display with 2MB Video RAM
- 10.5" Dual Scan display with 2MB Video RAM
- 65K colors on notebook display
- 16-bit Sound Card, Speaker, Microphone & MIDI
- Upgradable hard drive - easily add more storage
- Built-In Dual Lithium Ion batteries
- Built-in infrared for no hassle printer connections

Processor	Screen	HD	Price
Pentium 75	10.4" Duol Scon	500MB	$3479
Pentium 75	10.4" Active	772MB	4499
Pentium 90	10.4" Active	1.2GB	5299

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CACHE MEMORY

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32Kx8	14.00	9.00	8.00	7.00
32Kx8 (3.3V)	–	14.00	9.50	–
64Kx1	–	11.00	9.00	8.00
64Kx4	–	11.00	9.00	8.00
64Kx8	–	15.00 (5V)	19.00 (3.3V)	–
16Kx4	–	8.00	7.00	6.00
128Kx8	–	29.50	26.00	24.00

Individual D-RAM Chips

	MEMORY FOR IBM & APPLE				
	50NS	80NS	70NS	80NS	100NS
1Megx1	–	6.85	6.45	5.95	4.95
1Megx4	–	49.00	39.00	38.00	–
1Megx4 (Zip Pk)	–	24.00	22.00	21.00	–
256x4 (Page Dip)	–	7.25	6.75	6.50	5.95
256 4(Static Dip)	–	–	9.95	–	–
256x4(Page Zip)	–	9.25	9.00	8.95	–
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64x4	–	–	–	3.75	–
64x1	–	–	–	–	2.00
256x16 SOJ	–	–	29.00	–	–
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1Meg x 9 (3 chip)	–	48.00	45.00	42.00	40.00	–
1Meg x 9 (9 chip)	–	49.00	46.00	43.00	41.00	39.00
4Meg x 9	–	–	154.00	149.00	139.00	–
16Meg x 9 (9 chip)	–	–	–	669.00	–	–

72 PIN SIMMS (EISA), EDO

	60NS	70NS	80NS
256 x 36 1 mg	–	69.00	59.00
512 x 36 2 mg	–	89.00	79.00
1 meg x 36 4 mg	189.00	179.00	179.00
2 x 36 8 mg	379.00	364.00	364.00
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16 x 36 64 mg	2799.00	2745.00	2745.00
1 x 32 4 mg	169.00	164.00	164.00
2 x 32 8 mg	349.00	329.00	329.00
4 x 32 16 mg	499.00	479.00	479.00
1 x 32 4 mg EDO	–	189.00	–
2 x 32 8 mg EDO	–	389.00	–
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	32Meg	500987-005	1078.00
Premmia LX P/60, MX4/66d, 4/100T, P/60	8 Meg	500987-003	320.00
	16 Meg	501340-002	549.00
	32 Meg	500987-005	958.00
	64 Meg	501569-001	Call
Premmia 4133, 4133S, 4/50d, 4/60d	8 Meg	501159-002	338.00
Premmia SE 4/33, 4/66d, P/60	16 Meg	501159-003	658.00
Premmia MTE 4/33, 4/66d, P/60	32 Meg	501159-004	1149.00
Manhattan G, V Series Server	64 Meg	501159-005	2298.00
Power Premium 3/33, 4/33, 4/33S, 4/50d, 4/66d	8Meg	500780-001	378.00
Premium 486/25, 486/25E, 486/33, 486/33E			
Premium 386/33TE, 486/25TE, 486/33TE			
Prem. II 386/25, 386/33, 486/33, 486 SX/20			
Bravo 486/25, 486/33	2 Meg Kit	500780-005	118.00
Advantage 486/25, 486/33, 486/33P, 486 SX/20			
Premium SE4/22	8Meg Kit	500780-001 } 64 pin	378.00
Premium SE 4/50, d, 66d, P/60	1 Meg	500780-003 } 64 pin	59.00
Prem. 386/33T, 386 SX16, Prem.It 388SX.20, 386/25	4Meg	500780-004	189.00
Premmia GX P/90, P/100	8Meg Kit/16MegKit	501565-001/501566-001	378/699
	32Meg Kit/64Meg Kit	501567-001/501568-001	1358/2699
AST Cupid Board	0-32 Meg	5008*8-001	179.00

AMBRA

Ambra Pentium-60	4/8/16 Meg	175.00/369.00/619.00
Ambra NC 425SL	2/4/8 Meg	109.00/199.00/366.00
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Ambra SN Series	4/16 Meg	189.00/639.00
Ambra Sprinta SLC II	2/8 Meg	89.00/319.00
Ambra N-75, N-100	4/8/16	189.00/369.00/619.00

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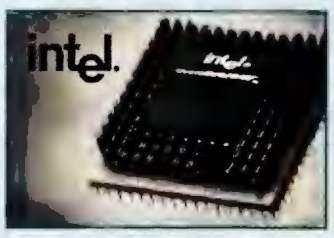

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954 Monitors and video boards
955 Accounting software
956 Graphics software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

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EDITED BY CHRISTINA WOOD

Consumer Watch

The Virtual Doctor

BY ROBERTA FURGER

Judy, the nurse in my pediatrician's office, and I have gotten to know each other pretty well. Over the years she's seen me through two kids; two dozen ear infections; tonsillitis; a broken leg; a hernia; chicken pox; and an incident in which a metal snap somehow got into my daughter's nostril. Through it all, Judy has answered my questions patiently.

There's just one problem: Judy works 9 to 5, Monday through Friday. The rest of the time, I have to fly solo.

Books are a great resource, but they rarely seem to address the exact problem, so I'm always left wondering what the appropriate response should be (do I call the doctor at 2 in the morning or wait it out?). Now, thanks to the explosion of multimedia titles and online forums, I have access to entire medical libraries' worth of information right from my home PC. CD-ROM titles cover everything from prescription drugs to common illnesses and their treatments. Online forums provide rich databases of information on everything from disabilities to cancer to Alzheimer's and also let you discuss your questions and concerns with others in similar circumstances.

Because there are more health-related resources than we could ever cover here, we're focusing on the best of those that might save you a trip to the doctor or calm your racing heart when someone is ill. Remember, though, that if you're getting medical advice from an anonymous source, exercise extreme caution. People can say anything they want online and may have their own interests—not your health—in mind. Always consider the source and consult a physician before taking action.

The Better Health & Medical Forum on America Online (keyword **health**) covers a broad range of material, including patients' rights, alternative medicine, and mental health topics. The real reason to check out this forum, though, is to meet others with similar health concerns. Sponsored by Health ReasonAbility Systems, Inc.

The Consumer Reports Complete Drug Reference on CompuServe (**go drugs**) provides guidelines on the use of prescription and over-the-counter drugs. Enter a generic or a brand name to find out a drug's function, side effects, and proper use.

Dr. Schueler's Home Medical Advisor Pro 4.0 lets you create a database of your medical records and diagnose your illnesses. This CD-ROM from Pixel Perfect has a huge color atlas of medicine and lists 5000 drugs, more than 800 diseases, and 500 poisons. The biggest plus: It offers names and numbers of various medical specialists. Pixel Perfect, Inc.; street and direct price $59.95; 800/788-2099, 407/779-0310.

Reader service no. 778

First Aid Online (**http://www.symnet.net/Users/afoster/safety**) is a great basic resource (sponsored by the information access company Symnet) for the treatment of a wide variety of common mishaps: from treating cuts, burns, and insect bites to removing foreign objects from ears and eyes.

Health Database Plus, CompuServe's outstanding health article retrieval service (**go hltdb**), includes magazines such as *Health*, *Nutrition Today*, and *Parents*. It's sponsored by Information Access Company. For more in-depth coverage of issues

CHIP SIMONS

relating to health, look in the two sections called Health and Fitness Journals, and Health Reference Books and Pamphlets.

The Health Support Forums, a popular section—hosted by a variety of groups—on CompuServe (**go hlt-13**), offers discussion groups on many health topics. You'll find dialogues on specific conditions in the Diabetes forum, the Muscular Dystrophy Association forum, and the Disabilities forum.

HealthSoft Complete Guide to Symptoms, Illness & Surgery covers more than 800 symptoms, 500 illnesses, and 177 surgical procedures. (Star Press also publishes the Complete Guide to Prescription & Non-Prescription Drugs.) Find out about probable causes, diagnoses, treatments, and precautions, and check out complications and possible outcomes of surgical procedures. This CD-ROM could be a hypochondriac's best friend. Star Press, Inc.; street price $34.95; 800/782-7944, 415/778-3100.

Reader service no. 779

Chestnut HIV/AIDS Resource Guide, a legal reference on HIV and AIDS, can help you cut through the red tape to access AIDS- and HIV-related government services by providing Social Security disability guidelines, antidiscrimination statutes, Equal Employment Opportunity Commission regulations, and Centers for Disease Control reports. CD Titles, Inc.; street price $9.95; 617/494-5330.

Reader service no. 780

Lifelines Health Page, http://www.rain.org/idsolute/lifehome.html, is a great resource on everything from alternative medicines to computer-related injuries. It's written in English and Spanish and includes dozens of pointers to other sites. The page is sponsored by I.D. Publications.

The Mayo Clinic Family Pharmacist is a thorough guide to prescription and over-the-counter medications, early detection of problems, and first aid, and provides pointers on leading a healthier life. It includes an outstanding medical dictionary. IVI Publishing; street price $45; 800/432-1332.

Reader service no. 781

The National Institute of Allergy and Infectious Disease offers National Institutes of Health resources, NIH's phone book, and public-health info. Also noteworthy are summaries of articles and text from *AIDS Treatment News*. For Gopher access, use **odie.niaid.nih.gov**, and select *AIDS Related Information*.

The newsgroup misc.kids.health is a must for every parent on the Internet. Subscribers post questions on everything from ear infections to vaccinations and get responses and support from other parents. It's chockfull of useful advice.

Even Judy would be impressed.

Research for this article was conducted by San Francisco–based freelance writer Leslie Crawford. As always, you can contact Consumer Watch *with problems and questions. We'll investigate complaints and write about issues of broadest interest. See page 12 for contact information.*

VIRTUAL LIVING

TRAVELSOURCE

http://www.travelsource.com

From ranch vacations to gourmet wine tours, you'll find unique travel destinations at this site, courtesy of tour operators.

HERBS & SPICES

http://www.teleport.com/~ronl/herbs/herbs.html

Descriptions, recipes, growing advice, helpful sources, and the history of herbs. Operated by a couple of computer nerds who like herbs.

THE VIRTUAL GARDEN

http://www.pathfinder.com/@@CudINgDHQAIAQHYY/vg

Includes access to the Time-Life Gardening Library, gardening content from *Sunset* magazine, and advice from garden societies.

CONTEST CATALOGUE

http://www.catalogue.com/contest

This list of sweepstakes and giveaways includes game sites, scavenger hunts, and trivia challenges.

—Angela Freeman

ROBERT ZIMMERMAN

Feedback

Shady Operation

We've received several letters regarding Nevada Computer in Boulder City, Nevada. Customers complained that they placed orders and their credit cards were charged, but products were never shipped. According to Bill Manns, sales manager for the company, Nevada Computer was bought and relocated to San Diego. The new owner discovered that shortly before the buyout the old company had started charging for products without shipping them. Manns advises customers who ordered before May 1, 1995 to contact their credit card companies for reimbursement. However, Donald Piper, who ordered from Nevada in early May, tells us Nevada never shipped the RAM he ordered—though they continually promised it. He had the charge removed by his credit card company. Manns admits things were hectic at first and orders fell through the cracks.

TAKE NOTE: During the 1-hour program *The Computer Clinic With Steve Bryant*, QVC sold 1560 Packard Bell Pentium 75s. That's a QVC record for unit sales, according to the television shopping service.

Totally Tubular

America Online's SurfLink is bringing far-flung gnarly dudes and babes together on the information surfway. Log on for surf championship results, discussions with the champs, and reports on wave conditions. Now even posers and wannabes can learn the lingo, hang with hotdoggers, or just satisfy a surf jones without the inconvenience of sand in the wetsuit.

Microsoft Band-Aid?

If you have questions about upgrading to Windows 95, you've probably been getting a busy signal. Did you know you can call Microsoft

Cybertoys for Everyone in the House

Money in your pocket, online disconnect, tools for school

Pocket Quicken

HANDY SAVIOR

I'm saved! The source of my salvation is a 4½-ounce, $99 personal digital assistant from Intuit and Franklin Electronic Publishers (the makers of Bookman hand-helds). No, this isn't a Bible (though you could buy that module for around $30), it's Pocket Quicken. Now, I'll confess that I've tried to use Quicken to rein in my haphazard finances. The problem is that I do my best spending when I'm not in front of a computer. And by the time I return to Quicken, I've conveniently forgotten how much I spent. But Pocket Quicken comes along when I shop and keeps an eye on the details (like account balance), while I focus on more germane matters (like shoe size). When I'm home, I can upload my transgressions to desktop Quicken. Pocket Quicken also has two empty cartridge slots where you can snap in any of 15 (at press time) credit-card size cartridges that contain a thesaurus, dictionary, Bible, or perhaps games to while away the hours not spent shopping. —*Christina Wood*

- **Pocket Quicken** $99; Intuit; 800/243-4650 ext. 810288. Grade: A+

DO-IT-YOURSELF GREETINGS

My family doesn't do cards. It's not that we don't care enough to send the very best, it's just that most of the time we forget to go out and buy 'em. That's why Hallmark Connections Card Studio, created by Micrografx in conjunction with—you guessed it—Hallmark Cards, is perfect for our household. Whether it's a birthday party for the kid down the street or an anniversary card for the in-laws, we can choose and create a card in just a few minutes. You can't bring in your own graphics, but you can modify the Hallmark sentiment or scrap it entirely. It's fun, and it's easy to use. There's even a reminder feature for those of us who need a nudge now and then. —*Roberta Furger*

- **Hallmark Connections Card Studio** street price $49.95; Micrografx; 800/653-2610. Grade: A

Reader service no. 782

LEARN TO SEE

As a photography instructor, I was skeptical of Better Photography: Learning to See Creatively, a photography class on book and disk. But after I popped in the CD and thumbed through the book, this know-it-all learned a few new tricks. Award-winner Bryan Peterson shares his techniques via sound clips and more than 700 examples of his work. Over 80 lessons teach you to compose strong photos, use available light, spot interesting details, and broaden your understanding of lens effects and exposures. When you think you've got the gist of a particular lesson, experiment with ex-

PHOTO: JAMIE BIONDO; ICONS: JOHN HERSEY; ILLUSTRATION: ROBERT ZIMMERMAN

FEEDBACK CONTINUED

after hours? In an effort to handle the flood of calls, the company extended free phone support hours. Now you can call for Windows 95 help between 5 a.m. and 8 p.m. PDT. The support hours for other products are still 6 a.m. to 6 p.m. The longer Windows 95 hours will remain in effect until Microsoft decides the volume of calls is under control.

Dial-a-Quote

If you're shopping for a computer, you may be wondering how much to pay. Now there is a 900 line that will tell you the rock-bottom price on the type of PC you're seeking. Just dial 1-900-976-8723 to access the Computer Purchaser's Help Line. The company researches prices on computers from national suppliers and maintains a list of the lowest prices. The call will cost $4.99 for the first minute and $1.99 for each minute after that. Of course, you'll want to consider a lot of other matters—like service, reliability, and performance—when buying a computer. But it's handy to know what the base price is.

TAKE NOTE: As of April 1995, 5.1 percent (5 million) of the nation's households were online, according the the latest Survey of Hardware Ownership.

Source: The NPD Group, Port Washington, New York.

Digital Movies

Now you can buy movie tickets right from your desktop. MovieFone—the company that brought us interactive telephone movie information and ticketing with 777-FILM—is behind the new Movielink service. Find it on any online service that offers World Wide Web access, or point your browser to http://www.movielink.com. On America Online use the keyword movies or showtimes. Once there, you'll find previews and up-to-the-minute film times for every theater in 25 cities. And if you don't feel like standing in line, you can buy your tickets in advance, although it will cost you a service charge of $1 per ticket for the convenience.

By Christina Wood

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posure and lenses in the virtual Photolab. I've seen lots of photography CD-ROMs, but this is my pick for photographers looking for creative advice. —*John Goddard*

- **Better Photography: Learning to See Creatively** $79.95 (CD only, $59.95); DiAmar Interactive; 800/234-2627. Grade: A

Reader service no. 783

A RUBBER SUIT FOR YOUR DESK

Absorbing the principles of scuba diving from a computer screen is a bit like trying to learn sign language with your hands tied behind your back. Nonetheless, Scuba Tune-Up Multimedia, designed by the Professional Association of Diving Instructors, is a useful refresher course for certified divers or a good study aid for those in training. It offers a six-part quiz that reviews basic practices, planning procedures, fundamentals of breathing compressed air at various depths, and the use of dive tables.

But while the accompanying graphics glow with pretty colors and the video snippets offer satisfactory demonstrations of technique, this disc captures none of the beauty and excitement that make diving an otherworldly experience. Ultimately, this tune-up is little more than mental gymnastics—an inadequate alternative to getting wet, and a rather expensive come-on for the PADI dive programs and retail shops that are listed in two rather detailed directories. —*Derk Richardson*

- **Scuba Tune-Up Multimedia** $54.95; Professional Association of Diving Instructors; 800/729-7234. Grade: C-

Reader service no. 784

COLLEGE LITE

Kaplan's hybrid five-disc On Campus '96 offers a database of 1700 colleges and universities with general information, maps, 300 visual tours, even a common admissions application form. You can specify a set of criteria—for example, a top-ranked school in a rural area that offers soccer—and an on-screen counter displays the schools that fit your requirements. The friendly interface duplicates a dorm room and offers lots of bad-taste touches teens will love. For example, the online help is available by dialing 911 on a video phone; the grunge girl who answers has a fashion sense only a teen could apprcciate. Still, I'd use On Campus '96 to start my search, not end it. The tours are brief—and the visuals for some schools look like a handful of postcards, with sketchy maps and chirpy narration. But the Kaplan CD set is a good beginning for a quick look at a lot of colleges, or a fun way to research the campuses you want to visit. —*William Rodarmor*

- **On Campus '96** $49.95; Kaplan Interactive; 212/752-1840. Grade: A-

Reader service no. 785

Casio's QV-10

FAST, FUN, AND FILMLESS

I'm a fool for cool cameras, especially filmless ones. Casio's QV-10 slips in your pocket, holds lots of images (96 snapshots at 640 by 480 in 16.8 million colors), doesn't need a flash, and sports a pivoting lens for close-ups and self-portraits. Best of all, a tiny active-matrix screen lets you compose photos, see exposure adjustments, and delete bad shots right on the spot. With Apple's QuickTake camera (reviewed here in August) you have to sit in front of a computer to see your photos. The Casio plugs into your TV or VCR. Or you can save the images as .tif or .bmp graphics files for your PC. Unfortunately, battery life is brief: The Casio gobbles four AA alkaline batteries in 2 hours. An AC adapter is included. —*John Goddard*

- **Casio QV-10 Digital Camera** street price $795; Casio Inc.; 800/962-2746, 201/361-5400. Grade: A

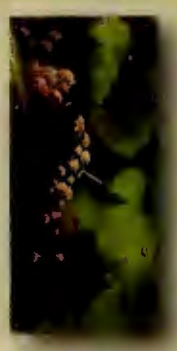
Reader service no. 786

DISAPPOINTING CONNECTION

When I heard that Compton's Interactive Encyclopedia, 1996 Edition, boasted an online connection, I was thrilled. I thought I'd be able to ask Compton's to search its own database and then go online and look for new information. What a disappointment. There's no connection between the CD-ROM and the regularly updated online encyclopedia. In fact, the online connection consists only of an icon in the CD to launch you into the new Compton's forum on America Online. The forum is a great resource, but you don't need the CD

PHOTO: JAMIE BIONDO

VINO ON THE DESKTOP



You don't have to travel to Napa Valley to get to wine country. Through the Internet, you can have a virtual vineyard on your desk. Most Web sites offer tour info, wine ratings, and even the chance to bid online in live auctions. But only a few sites allow you to order direct. Here are three of the best wine sites.

The Grapevine (**http://www.winery.com**). This full-service Web site links visitors to scores of U.S. wineries (most in California). Get information on the wineries, wine availability, maps to tasting rooms.

American Wine on the Web (**http:///www.2way.com/food/wine**) is an online magazine with reviews of wine, books, CD-ROMs, and videos.

Virtual Vineyards (**http://www.virtualvin.com**). Created by Master Sommelier Peter Granoff along with Robert Olson, Virtual Vineyards features top-rated wines, some of which are hard to find. —*Michael S. Lasky*

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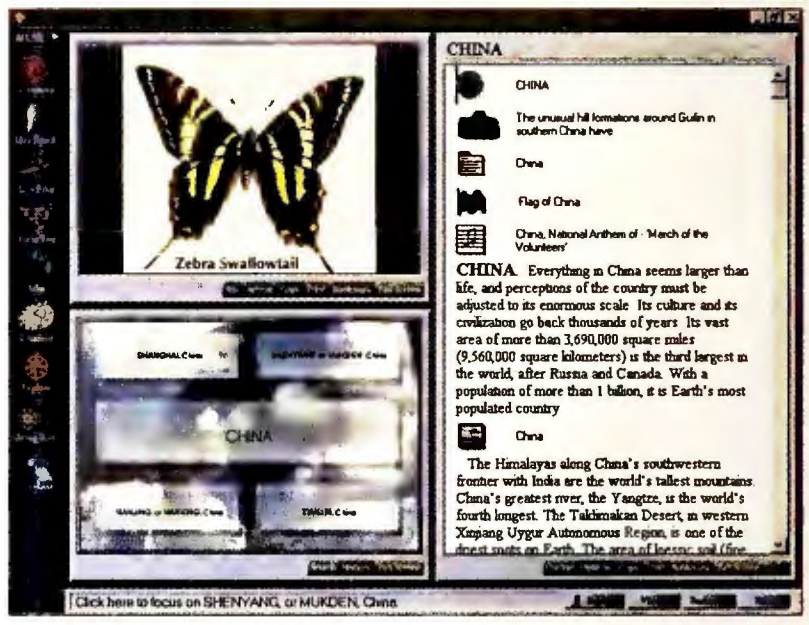
to get to it. The disc itself does offer a collection of first-rate articles that are a cut above those found in other multimedia encyclopedias—they're long, detailed, and intelligently written. And the user interface is pretty to look at and easy to use. But the various media involved—text, pictures, video, and so on—don't integrate all that well. I often found myself looking at a picture of one subject with text on another, all on the same screen. —*Lincoln Spector*

- **Compton's Interactive Encyclopedia** street price $79.95; Compton's New Media; 800/261-6109, 619/929-2500.
  Grade: B
  Reader service no. 787



Compton's may give you information overload.

WILL YOU (GASP) MARRY ME?

Getting engaged is fun. Then comes planning the wedding—a nightmare of decisions, reservations, expenses, and details. And your mother would like it all done (her way) yesterday. Emily Post's Complete Guide to Weddings CD-ROM may help. Listen to music samples, look at menu ideas and flower arrangements, study ceremony traditions, find party-planning ideas—all without leaving the house. Emily offers advice on how to choose a photographer, reception site, and cake; who to invite; and so on. Plus, the disc comes with Emily Post's wedding etiquette book. And to keep you organized, you'll get forms for guest lists and budgets, as well as a calendar to help keep you on schedule. Some sections of the disc, however, fall short on details. Examples of ceremonies are practically nonexistent, and the section on prewedding parties such as bridal showers and bridesmaid luncheons is woefully inadequate. You'll often need to consult the hardcover book for more in-depth information. The disc also shows you what you may *not* want to look like on your wedding day: It favors women with big, big hair. —*Laurianne McLaughlin*

- **Emily Post's Complete Guide to Weddings** street price $39; HarperCollins Interactive; 800/424-6234, 212/207-7000. Grade: B
  Reader service no. 788 ▶

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The Digital Diet

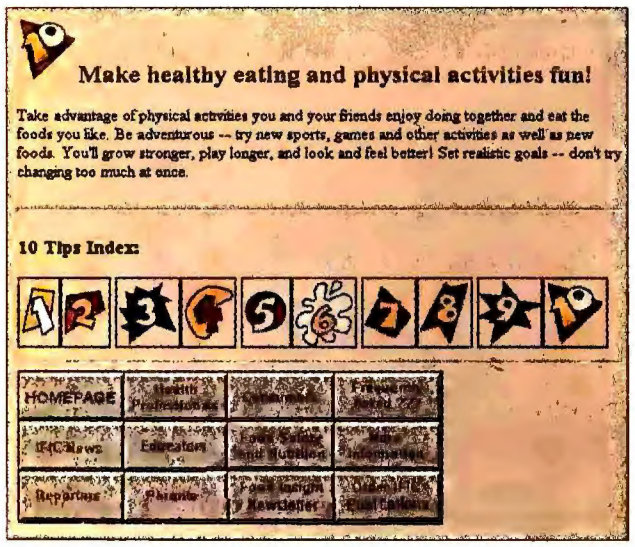
Tricks for shedding those extra pounds.

BY LINCOLN SPECTOR

It will soon be that time of year—between Thanksgiving and New Year's—that a friend of mine ealls the Great American Butter Festival. Since we're all about to fatten ourselves up, I thought I'd write about watching your weight, and how your computer can help.

First, the bad news: It can't help much. Even a Pentium-100 with 32MB of RAM won't give you more willpower or make fattening foods less enticing. (True, Windows configuration problems can spoil your appetite, but the effect is temporary.)

The good news is that there's some useful information on the World Wide Web, and a couple of handy shareware programs for tracking what you eat. If you want to get in shape before, between, or after the holiday binges, the right computer tools can help...some.



IFIC's Internet site offers free, healthy information.

The first thing you need to do is educate yourself about nutrition. It's not just a matter of calories. There's fat, calories that come from fat, getting a balance of nutritious foods, and so forth. You could see a doctor or read a book, but this is a computer magazine, so I'll tell you about some Web sites. First, try the International Food Information Council Foundation, a nonprofit organization devoted to telling you what you should eat, at **http://ificinfo.health.org**. Among the more useful pages you'll find on the IFIC site are '10 Tips to Healthy Eating' and 'Simple Strategies for Reducing Fat'. If you don't have Web access, you can reach the IFIC via e-mail at **foodinfo@ific.health.org**.

The University of Illinois maintains a worthwhile Gopher site that points to many articles on nutrition, including a text version of the U.S. Department of Agriculture's Food Guide Pyramid and a Fast Food Calorie Counter, at **gopher://gopher.uiuc.edu:70/11/UI/CSF/health/heainfo/nutrition/guide** (no spaces).

To find other sites, check out Yahoo at **http://www.yahoo.com**—one of the best places to start any Web exploration. Select *Health•Nutrition*, and wing it. Just be careful where you click, or you could end up (as I did) at the Interactive Frog Dissection Kit.

CALCULATING CALORIES

Now comes the hard part—practicing what you have learned. I've found two shareware programs that can help, both designed to help you plan a day's or week's meals by showing you how many calories you're taking in, how much fat, and so on. My life isn't that well organized, but I found that I could use either program in reverse: At the end of the day I'd run up a total of what I'd eaten. It's called shock therapy.

The simpler of the two programs is Heart Smart, by Henning Associates. Basically, this is a specialized calculator with a database of foods attached. As you add foods to your list, the program totals calories, grams of fat, cholesterol, and fat percentage. Not everything you eat will be in the program's database, but Heart Smart makes adding new foods as easy as turning down more boiled turnips. The program is both quick and easy, but it lacks guidelines. Nowhere does it point you in the direction of a balanced diet. You'll find the Heart Smart program as **hsmart.zip** on PC World Online.

A well-balanced diet is what the far more ambitious Pyramid Weight Loss Diet, from NutriSoft, is about. Tell Pyramid some personal information, and it tells you how many calories a day you should take in, how many calories your favorite exercise burns off, and whether you're getting everything you need. It does the latter via a graph based on the USDA's Food Guide Pyramid (hence the name). If your graph doesn't look like a pyramid, you soon will.

Unfortunately, Pyramid Weight Loss is as user friendly as steamed eggplant. The complex process of setting up a diet isn't clearly explained, your daily calorie and fat goals aren't on screen as you enter foods, and adding new foods to the database is like tweaking system.ini. It takes fortitude and willpower to use Pyramid, but so does losing weight. You can try a limited version of Pyramid Weight Loss as shareware—**nspwld.zip** on PC World Online.

These programs can point you in the right direction. You have to do the walking yourself—and avoid the roadside diner as you go.

- **Heart Smart** $15; Henning Associates; 800/823-6896
  Reader service no. 730
- **Pyramid Weight Loss Diet** $29; NutriSoft; 71563,124 (CompuServe), keyword nutrisoft (America Online), nutrisoft@aol.com (Internet)
  Reader service no. 731

PC WORLD online *The files from this article are available via PC World Online. Lincoln Spector is a* PC World *senior associate editor.* *See page 12 for contact information.*

ROBERT ZIMMERMAN

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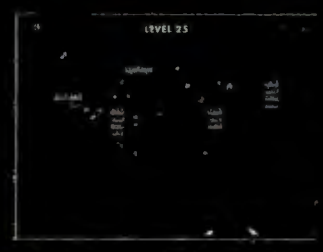

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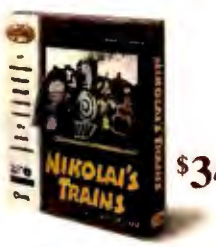

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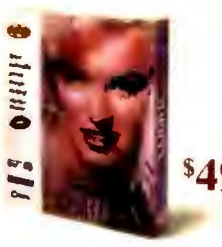

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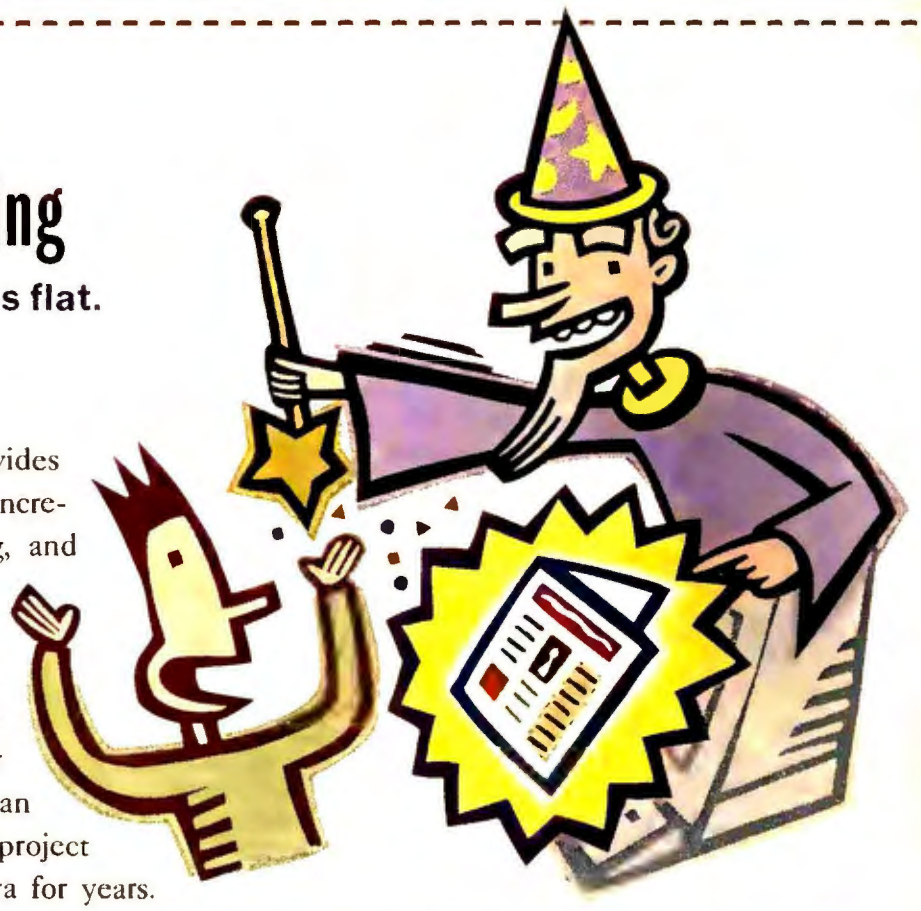

"I've got an emergency," my wife said to me recently. "Can you whip up a quick threefold brochure for tomorrow's Nature Center fund-raiser?"

"No sweat," I responded confidently. "I'll have it for you in a jiffy."

She pulled up a chair while I loaded Corel Ventura, my industrial-strength desktop publisher. After 45 minutes of lining up the columns and adjusting the four-color separations, we were ready to start entering some text. "Listen, Sweetie," she said, "I've got to get this to the printer, ummm, today." *Sweetie* always means trouble.

As Judy's deadline loomed, I realized that I needed to take another tack. I dug around the office and found a copy of Microsoft Publisher, an $80 program I've resisted because of my Computer Elitism Disorder—I can't cope with applications that retail for less than $395 and don't have hundreds of impossible-to-figure-out features. I mean, without 0.1-degree image rotations, why bother?

Fighting down my anxiety, I installed Publisher, clicked the Use a PageWizard Assistant icon, selected Three-Panel Brochure, and answered some simple questions. Then we watched as the program created the document. I nailed the job—graphics, text, and a jazzy design—in 20 minutes flat. My wife stopped calling me Sweetie, I retrieved my status as the household MIS, and I logged off feeling well-adjusted. Therapy at its best.

If you're not familiar with Microsoft Publisher, you should be. Publisher helps you design greeting cards, letterheads, banners, flyers, brochures, newsletters—all sorts of documents suited for homes and small businesses. What really sets Publisher apart are the remarkable PageWizards. These clever, self-running templates make you look talented by asking you questions and creating professional-looking newsletters and brochures based on your answers.

Publisher also provides a spelling checker, incremental line spacing, and kerning—rare tools in a graphics program this cheap. I may even decide to try it for my user group newsletter, an ambitious monthly project I've done in Ventura for years. Publisher comes with 17 PageWizards (another 20 are sold separately), plus 125 clip art images (325 in the CD-ROM version).

But do you want to hear what drives me crazy about Publisher? Little things like not being able to open more than one document at a time. Or struggling with Word Art, a powerful tool that changes text by using, say, patterns, shapes, or colors; it's not terribly intuitive, and at times it's downright kludgy. And listen, Microsoft, I don't care how you do it, but give me more than one level of undo.

WHEN $80 IS TOO MUCH

After looking at Publisher, I began to think. If a low-cost publishing package is this good, an even lower-cost one might be terrific. So I tried the virtually unknown Print Artist (once virtually unknown as Instant Artist). It sells for only $44 and lets me create documents such as signs, greeting cards, banners, and calendars. It also comes with 400 fonts and more than 6300 graphics—on two CD-ROMs. The proprietary fonts work only in Print Artist (yes, the program also recognizes your existing fonts). The good news about these fonts is that they draw on screen faster than greased lightning, and they don't clog up your Windows directory. The bad news: If you like a font and want to use it elsewhere, tough.

Print Artist's cool preview feature lets you see changes before you actually make them. Print Artist has another remarkable skill: It lets you find graphics by category or keyword and allows you to search by the object pictured. That was just what was called for when I needed an image of a hammer for a friend's birthday card (don't ask)—it took me only four keystrokes.

The bottom line: For about $120, you'll probably want to own Publisher *and* Print Artist. You'll get the best of everything. And no one will call you Sweetie.

- **Microsoft Publisher 2.0** $80; Microsoft; 800/426-9400, 206/882-8080
  Reader service no. 795
- **Print Artist** $44; Sierra On-Line; 800/757-7707, 206/649-9800, 206/641-7617 (fax)
  Reader service no. 796

Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 12 for more information.

You can e-mail the editors of the PC World @Home section at home@pcworld.com, and write to us at 501 Second St. #600, San Francisco, CA 94107. We're eager to hear your responses and opinions about any topic related to home computing.

ILLUSTRATIONS: TOP RIGHT, ROBERT ZIMMERMAN; BOTTOM RIGHT, JOHN HERSEY

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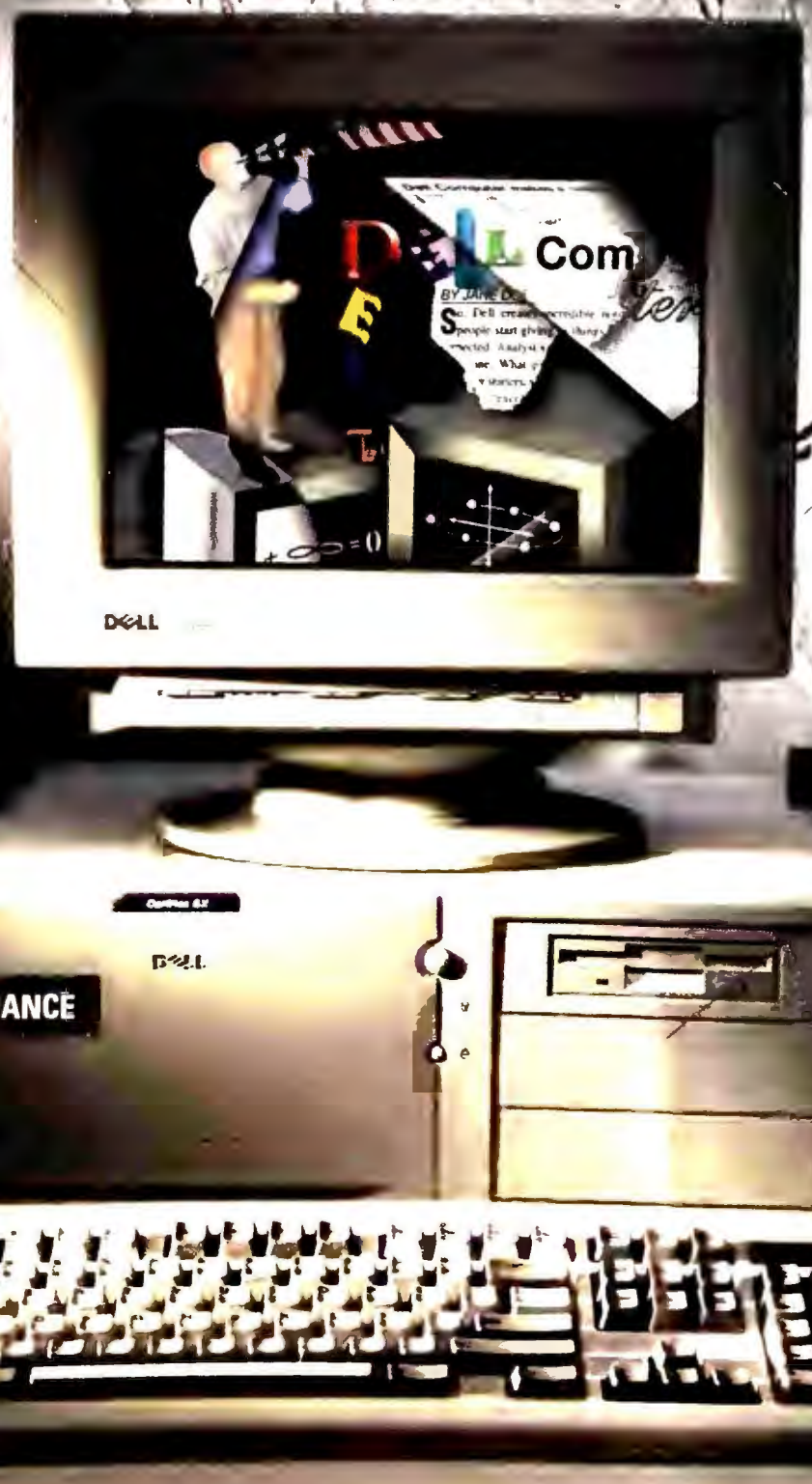

intel inside
pentium processor

Microsoft® Windows®95

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- Integrated Audio
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intel inside

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