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FIRST LOOK
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PC WORLD

July 1995 $4.95

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GRAPHICS
ONLINE SERV
PRINTERS
APPLICATION
UTILITIES
WEB BROWSE
OPERATING SY

BECAUSE TOMORROW I'M SENDING THEM OUTSIDE.

Into the cold, a blanket of fresh powder and eye-popping vistas. ● Can the real thing be even more moving than a Microsoft® PowerPoint® 4.0 presentation? ● That's just the way Marni Joslyn, head instructor of the Crested Butte Never Ever Ski School, wants it. After all, her job is to convince all smug, goofy, double left-footed beginners that they can make it down the mountain. (And you think you've got it tough.) ● Not surprisingly, before Marni brings her students to the mountain, she brings the mountain to her students. With PowerPoint 4.0, the leading presentation graphics software. ● Since Marni's familiar with the Microsoft Office family of applications, she's already familiar with PowerPoint's menus and toolbars. This makes getting started and navigating her way around as easy as getting down the bunny slope. ● How can she put such persuasive presentations together? ● Simple. First, she clicks into AutoContent Wizard, which helps her organize and outline her overall presentation thoughts and even offers tips on content. ● Next step, she clicks into AutoLayout Gallery and chooses a slide layout from the more than 20 options available. As if that wasn't easy enough, there's the handy Pick A Look Wizard to help her create the right look for her presentations. In short, PowerPoint 4.0 helps Marni perform like a pro.

● As Marni is often heard telling her students, practice makes perfect. The Rehearsal feature allows her to do just that—practice, practice, practice, so she never has to worry about falling flat in front of her class. ● What really makes Marni content at the end of the day is the power to take her students up that imaginary mountain and see them safely down again. (The only bruises the students have to show are imaginary.) For such a feat she certainly deserves an award. PowerPoint 4.0 has already won its share, 7 of the industry's most prestigious. ● Everyone has his own mountain to face. PowerPoint 4.0 can help you face yours. Call (800) 240-4782, Department XQP for more information.

Microsoft

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SCHOOL

THEIR SKIS
PLUNGE OVER
THE EDGE

THEY CARVE
THEIR WAY DOWN
THE SLOPE

THEIR
GLIDING WEDGES ARE
CLEAN AND CRISP

THEY BRUSHED THAT
LAST PINE TREE SO CLOSE
IT TICKLED
THEIR SPINES

AND THAT
FRIGHTENS ME
A LITTLE

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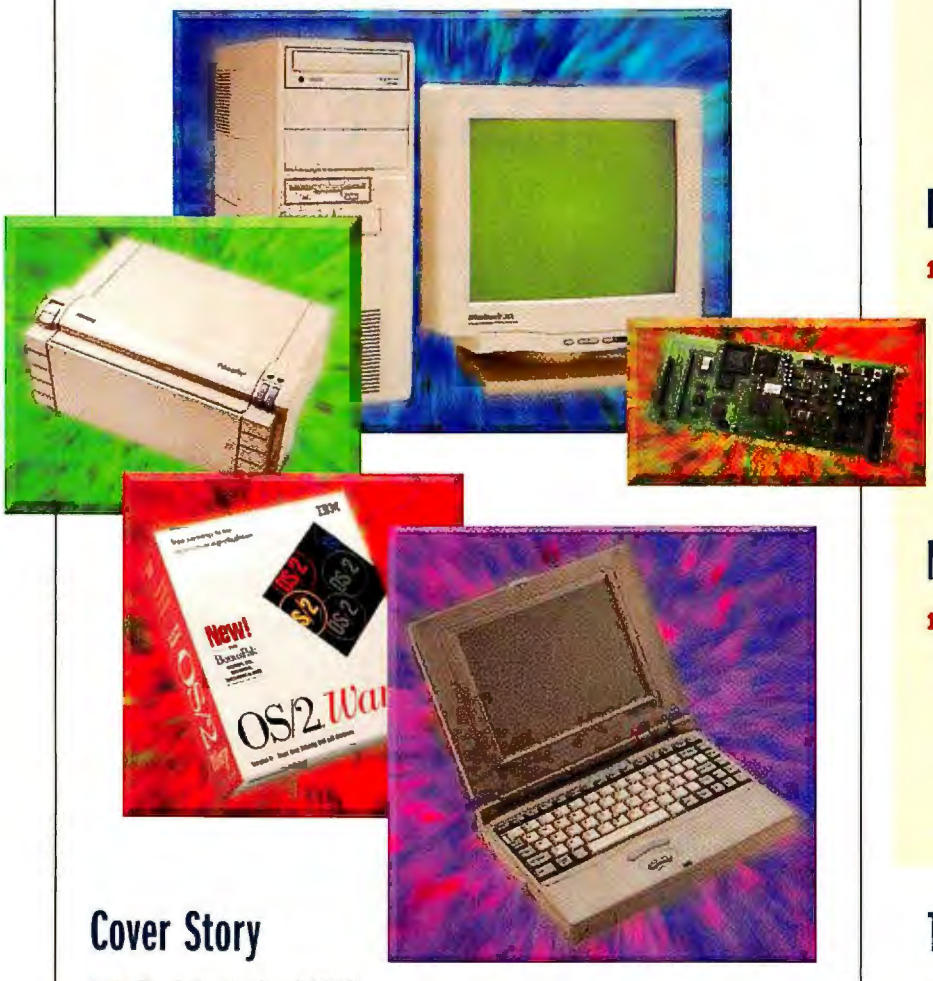

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140 Best Products of 1995
Where is expert advice for buying products when you need it? Right here. We polled consultants, user group presidents, industry editors and writers, and a select group of longtime *PC World* subscribers to ask their choices for the year's best products. Here are *PC World*'s 13th annual World Class Award winners—66 in all, from PCs to printers, applications to Internet tools, including 1995's Product of the Year.

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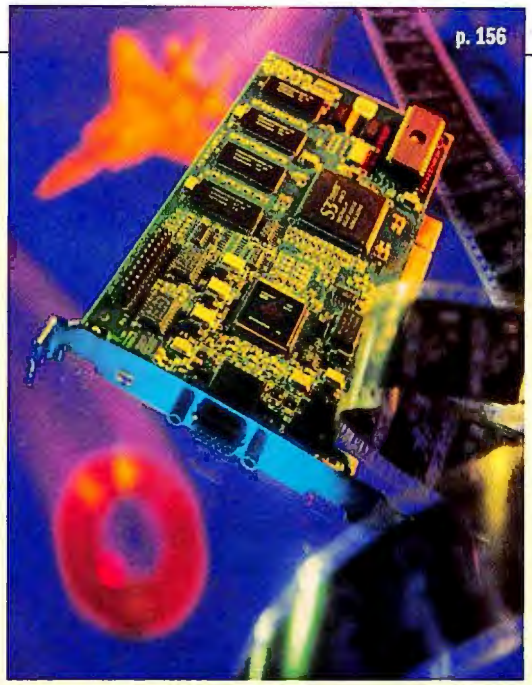
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Pentium-level performance for a pittance is here. This month's Top 20 Budget Desktop chart boasts a wide variety of Pentium and DX4 systems, some with 15-inch monitors, CD-ROM drives, sound cards, and more. Topping this month's charts: Vektron's budget PCI P-75, Dell's powerful Dimension XPS P120c, Gateway's loaded Liberty DX4-100 notebook, and WinBook's long-lasting XP SX-33 notebook.

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ZEOS® Pantera™

"...The Kind Of High-End System We Should All Have."

– *PC/Computing*, April 1995

With high perfomance and a low price, ZEOS Pantera scores big—and so will you.

PC/Computing said the Pantera is "a definite winner."

Windows Sources agreed: "The clear winner is the ZEOS Pantera. Its scores were the best across the board."

Unparalleled in the history of personal computing, the Pantera has continuously earned award after award—review after review—from *PC Magazine, PC World, PC/Computing, Windows Magazine,* and many more.

Without a doubt, leading experts from top industry publications agree that the ZEOS Pantera is your No. 1 high-performance PC.

Top-Ranked Performance

The Pantera, based on Intel's 486, DX4 and Pentium processors, leaps ahead of the pack with record-breaking performance and awesome power.

In a Pentium and 486 roundup, *PC Magazine* gave top honors to ZEOS Pantera: "Few product lines fared as well in our price/performance index as the ZEOS Pantera family....The Pentium machines produced first-place scores in their respective tiers, and the ZEOS 486DX2-66 earned a top-five ranking...."

What makes the Pantera the top performer? Superior engineering—starting with a ZEOS designed motherboard created specifically to take full advantage of the latest technological advancements. The motherboard is loaded with exceptional features such as PCI Local Bus expansion which delivers 32-bit data at a rate up to 132MB per second, an on-board PCI Local Bus Enhanced IDE Controller, and support for up to four IDE devices. EIDE hard drives are available to 1.2GB standard, upgradable to 4GB SCSI. For optimum EIDE hard drive performance, the Pantera even supports Programmed I/O Mode 4, which gives you the fastest data transfer rates possible.

And there's more...like a Diamond Stealth 64-bit PCI local bus video card *standard* for the ultimate video solution, and a 4X CD-ROM for increased data transfer rates.

The Pantera's performance is top ranked. In fact, *Windows Magazine* gave it their prestigious 1995 WIN 100 award. They said: "The Pantera 90 slashed through our benchmarks...ZEOS clobbers the competition."

Buy With Confidence

ZEOS is committed to providing you with an excellent value. With all the extras, options, and compatibility with all major operating systems—including Novell NetWare and OS/2—you can't go wrong with the award-winning ZEOS Pantera.

And with our *Computers Now!*® program, many of our most popular money-saving Pantera packages are ready to ship *the same day you order*—look for the CN! logo. We also give you the option to custom-design a system to your computing needs.

Either way, you can buy with confidence because of our ongoing dedication to provide you with high-quality features and state-of-the-art technology at an exceptional price.

And the value doesn't stop with your purchase. ZEOS has won seven *PC Magazine* Reader's Choice for Service & Reliability awards. And ZEOS was the first to provide you with 24-hour toll-free technical support—every day.

With striking performance, unequaled reliability and definitive value, the ZEOS Pantera is the only system you should have. To get the *Fastest Cat* around, call your ZEOS Systems Consultant today at 800-554-5220.

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

Windows Magazine Recommended 1994 — Pentium-90 November 1994

Windows 1995 Win 100 — Pentium-90 May 1995

Package 1		Package 2		Package 3		Package 4	
486DX2-66	$1295	486DX2-66	CN! $1595	486DX2-66	CN! $2095	486DX2-66	$2495
DX4-100	$1445	DX4-100	$1745	DX4-100	CN! $2245	DX4-100	$2645
Pentium-60	$1545	Pentium-60	CN! $1845	Pentium-60	$2345	Pentium-60	$2745
Pentium-75	$1645	Pentium-75	CN! $1945	Pentium-75	CN! $2445	Pentium-75	$2845
Pentium-90	$1745	Pentium-90	$2045	Pentium-90	CN! $2545	Pentium-90	$2945
Pentium-100	$1895	Pentium-100	$2195	Pentium-100	$2695	Pentium-100	CN! $3095
Pentium-120	$2145	Pentium-120	$2445	Pentium-120	$2945	Pentium-120	CN! $3345
➤ 4MB RAM		➤ 8MB RAM		➤ 16MB RAM		➤ 24MB RAM	
➤ **528MB** local bus IDE hard drive, 14ms		➤ **850MB** local bus IDE hard drive, 11ms		➤ **1GB** local bus IDE hard drive, 12ms		➤ **1.2GB** local bus IDE 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 color video card, 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus color video card, 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus color video card, 1MB DRAM		➤ **Diamond Stealth 64** PCI local bus color video card, 1MB DRAM	
➤ ZEOS 14" 1024 x 768 NI SVGA color monitor, .28mm dp		➤ ZEOS 14" 1024 x 768 NI SVGA color monitor, .28mm dp		➤ **ZEOS 15"** 1024 x 768 NI SVGA color monitor, .28mm dp		➤ **ZEOS 15"** 1024 x 768 NI SVGA color monitor, .28mm dp	
➤ 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-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11	
➤ **MS Works**		➤ **MS Works Multimedia CD**		➤ **MS Office Pro & Bookshelf CD**		➤ **MS Office Pro & Bookshelf CD**	

intel inside pentium

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), 3 PCI & 5 ISA (Pentium).
- ➤ ZEOS 101-key space-saving keyboard.
- ➤ 200 watt power supply with built-in surge suppressor. Switchable between 115/230V.
- ➤ FCC Certified Class B; UL Listed.
- ➤ Complete ZEOS Customer Satisfaction Package.

486 & DX4:
- ➤ RAM expandable to 128MB.
- ➤ EPA Energy Star compliant.

Pentium™ 60:
- ➤ 6 SIMM slots for low-cost upgrading. RAM expandable to 384MB.
- ➤ On-board Fast SCSI-2 option.

Pentium™ 75, 90, 100 & 120:
- ➤ 6 SIMM slots for low-cost upgrading. RAM expandable to 384MB.
- ➤ On-board PCI local bus Fast SCSI-2 and Ethernet LAN options.
- ➤ EPA Energy Star compliant (75, 90 & 100).

Favorite Options

1GB to 1.2GB Hard Drive Upgrade.....$95

1MB to 2MB Video DRAM Upgrade ..$59

Diamond Stealth 64 Video PCI Card with 2MB VRAM Upgrade $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
ZEOS SVGA NI, 1280 x 1024, flat screen.....$295

SCSI Controller Chip
For on-board SCSI. Includes drivers.....$49

Internal 14,000 bps V.32 bis Modem w/ 14,400 bps Send/Receive Fax.....$79

Internal 28,800 bps V.34 bis Modem w/ 14,400 bps Send/Receive Fax....$199

ZNYX EtherAction™ 32
PCI Ethernet LAN adapter with 10Base5, 10Base2 and 10BaseT connections.....$139

Front Drive Bay PCMCIA SwapBox
Installs into 3.5" drive bay. 2 Type II, or 1 Type III and 1 Type II $179

350 Internal Tape Backup
170 to 340MB (with compression), includes backup software $179

Multimedia Upgrade
Sound card and stereo speakers.....$128

10-Bay Vertical Case Upgrade.....$95

Microsoft® Office Pro & Bookshelf Upgrade From MS Works
Two CD-ROMs with online documentation $149

Many other affordable upgrades and options available. Call for details!

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All Pantera packages include MS-DOS 6.22 and Windows for Workgroups 3.11. Packages 1 & 2 include Microsoft Works (on CD or diskettes). Packages 3 & 4 feature Microsoft Office Pro—Word, Excel, PowerPoint®, Mail and Access'—& Bookshelf®. (Documentation online.)

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ZEOS Meridian™ Notebooks...

Meridians with unretouched photos of active matrix displays.

Top-Notch Speed Demons.

Vroooom! ZEOS Meridian notebooks are setting the pace—racing through application after application. They're swift and powerful. They're the *Indy*sputable performance champs.

And they just got faster! Added to our already speedy Meridian line is the ZEOS Meridian 850 notebook featuring a Pentium-75 processor.

While each Meridian product is distinct, they all have several hot features that add to their impressive speed and ease of use including local bus video; a comfortable palm rest with an integrated TruePoint pointing device; and an 84-key keyboard.

Meridian 400 Subnotebook

WINDOWS 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 subnotebook is molded with a special carbon-fiber material that cuts weight and improves durability. And with your choice of a 486DX2-50 or DX4-100 processor, hard drives to 350MB, and RAM that's user upgradable to 20MB, this notebook is "faster than a speeding desktop," as *Computer Shopper* said.

The 400 features active and dual-scan color screen options. You also get two Type II PCMCIA slots and an external ultra-light 3.5" 1.44MB floppy drive (included in Packages 2 and 3).

Meridian 800 Notebook

WINDOWS 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 it's large enough to use for presentations and everyday computing. And with your choice of a 486DX2-50 or DX4-100 processor, removable hard drives to 528MB, and RAM that's user upgradable to 20MB, this notebook is the raciest thing around.

For your viewing pleasure, the 800 is available with your choice of color displays—a whopping 10.3" dual scan or 9.5" active. You also get two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

Meridian 850 Pentium™ Notebook

Ultimate horsepower that takes the checkered flag! The Meridian 850 gives you supreme Pentium performance in a bundle weighing only 6.8 pounds. It's light enough to race around the world with you yet it's powerful and fast enough for the most demanding computing.

For turbo power, the Meridian 850 comes with a Pentium-75 processor; 8 or 16MB RAM—user upgradable to 32MB—with 256K synchronous SRAM cache; and removable hard drives to 810MB. For the best viewing, the 850 is available with your choice of color displays—

Purchase orders are subject to approval. Business leasing programs available. All prices, specifications and availability are subject to change without notice, call to confirm these and warranty details. Prices do not include shipping. The Energy Star emblem does not represent trademark of Micron Electronics, Inc. (c) 1995 MEI. ZEOS International, 1301 Industrial Blvd., Minneapolis, MN 55413 USA. Micron Electronics, Inc. is a publicly traded company (NASDAQ symbol: MUEI)

a mammoth 10.3" SVGA (800 x 600) dual scan or 9.5" active matrix. You also get 16-bit stereo sound through audio jacks (Sound Blaster Pro compatible) for the best in portable multimedia, two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

Buy With Confidence

No matter which ZEOS notebook you purchase, you'll be getting 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 will support you as you face the daily rat race. It'll organize each event, tally the results, and even report back to the office—lap by lap. What a way to work—whether you're in the office or speeding around. For a swift notebook that's raring to go 24-hours-a-day, call your ZEOS Systems Consultant today at 800-554-5220.

486 & DX4

Package 1			Package 2			Package 3		
Dual Color	**400C**	**800C**	**Dual Color**	**400C**	**800C**	**Dual Color**	**400C**	**800C**
486DX2-50	$1995	$2195	486DX2-50	$2295	$2395	486DX2-50	CN! $2595	CN! $2695
DX4-100	$2395	$2595	DX4-100	$2695	$2795	DX4-100	CN! $2995	CN! $3095
Active Color	**400A**	**800A**	**Active Color**	**400A**	**800A**	**Active Color**	**400A**	**800A**
486DX2-50	$2695	$2995	486DX2-50	CN! $2995	$3195	486DX2-50	CN! $3295	CN! $3495
DX4-100	$3095	$3395	DX4-100	CN! $3395	CN! $3595	DX4-100	CN! $3695	CN! $3895
➤ 4MB RAM			➤ 8MB RAM			➤ 8MB RAM		
➤ 260MB IDE hard drive			➤ 350MB IDE hard drive			➤ 350MB IDE hard drive (400), 528MB IDE hard drive (800)		
➤ 800: Internal 3.5" 1.44MB floppy drive			➤ 3.5" 1.44MB floppy drive. 400: External, 800: Internal			➤ 3.5" 1.44MB floppy drive. 400: External, 800: Internal		
➤ MS-DOS 6.2, Windows for Workgroups 3.11			➤ Custom nylon carrying case			➤ **14.4 PCMCIA fax/modem**		
➤ **MS Works**			➤ MS-DOS 6.2, Windows for Workgroups 3.11			➤ Custom carrying case. 400: Leather, 800: Nylon		
			➤ **MS Works**			➤ Extra battery		
						➤ MS-DOS 6.2, Windows for Workgroups 3.11		
						➤ **MS Works**		

Pentium

Package 1		Package 2		Package 3	
Dual Color	**850C**	**Dual Color**	**850C**	**Dual Color**	**850C**
Pentium-75	$3295	Pentium-75	CN! $3795	Pentium-75	$4195
Active Color	**850A**	**Active Color**	**850A**	**Active Color**	**850A**
Pentium-75	$4095	Pentium-75	CN! $4595	Pentium-75	$4995
➤ 8MB RAM, 256K synchronous SRAM cache		➤ 16MB RAM, 256K synchronous SRAM cache		➤ 16MB RAM, 256K synchronous SRAM cache	
➤ 528MB IDE hard drive		➤ 528MB IDE hard drive		➤ **810MB** IDE hard drive	
➤ Internal 3.5" 1.44MB floppy drive		➤ Internal 3.5" 1.44MB floppy drive		➤ Internal 3.5" 1.44MB floppy drive	
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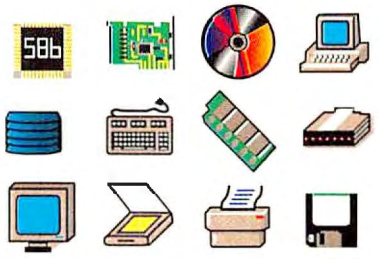

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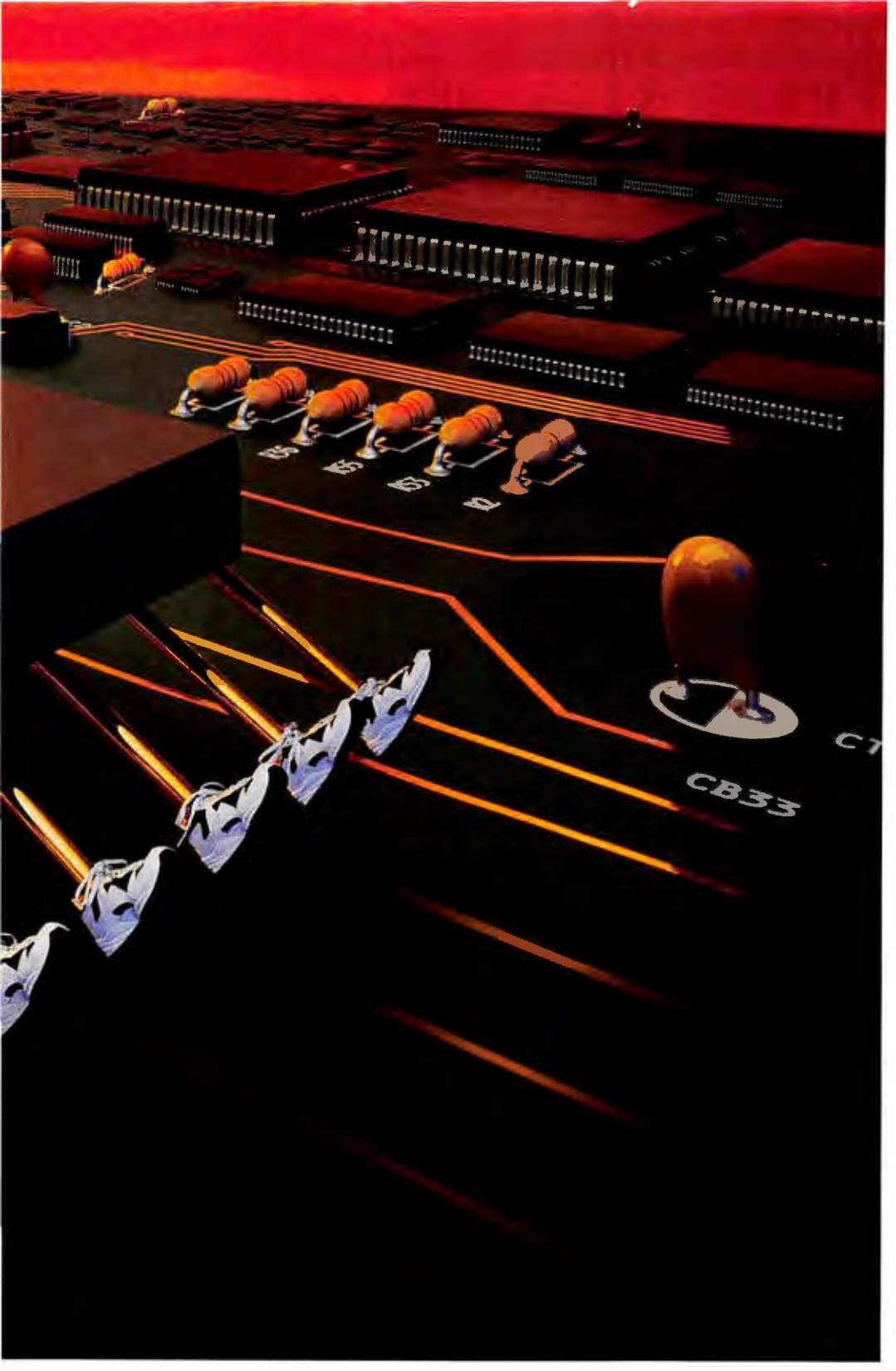

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1995 World Class Awards: Charting the Year's Progress

ERIC BUTLER

For 13 years, *PC World* has presented its World Class awards to the year's most outstanding products and companies. This year, 66 products, companies, and services earn World Class honors, in categories ranging from best business desktop PC to best online service (see "Best Products of 1995").

Much has changed since our 1994 awards. Last year's World Class desktop PC, for example, was Gateway's P4D-66, a 486DX2-66 system. This time, our panel of experts chose two high-powered systems as World Class winners: for best business PC, Dell's Dimension XPS P90, a Pentium-90 system that dominated *PC World*'s Top 20 charts for most of the year; for best home PC (a new category this year), Micron's P90 Home MPC, a Pentium-90 system with built-in multimedia.

Advances are evident in other hardware categories, too. In notebooks, Toshiba's T4900CT, based on a Pentium-75, succeeds last year's winner, the IBM ThinkPad 755C, which ran on a DX4-75. On the graphics front, the Diamond Stealth 64 DRAM, a 64-bit accelerator board, takes over from last year's winner, the 32-bit Diamond Viper. This year's awards also include the first affordable color laser printer, Hewlett-Packard's Color LaserJet.

Hardware Pulls Out in Front

While hardware awards went to a number of new products, the 1995 software winners present a very different picture. Once again, Microsoft swept the awards for business applications, with its word processor, spreadsheet, database, and office suite all at the top of their respective classes this year. For the second year in a row, Microsoft Encarta wins for best reference CD-ROM. Also for the second year, Broderbund's Just Grandma and Me wins as best children's game. More often than not, last year's software winners come out on top again this time—a tribute to their quality but also an indication of a broader phenomenon.

Both aspects of this year's World Class awards—powerful changes in hardware, less innovation in software—reflect the state of the PC marketplace. Part of the stall in software is due to the delay of Windows 95. But typically, innovation in software lags behind developments in hardware. New classes of hardware generally spur sweeping changes in operating systems and applications, often ushering in new interfaces and capabilities. The changeover from command-line DOS to graphical Windows, for example, did not begin in earnest until 486- and 386-based PCs had effectively displaced slower 286 machines (and until the third major revision of Windows finally got things right).

As impressive as advances in PC hardware have been this year, the advances we can expect in the coming year will be stunning. On the horizon: affordable desktop PCs based on Intel's P6 chip, which at 133 MHz is expected to run roughly twice as fast as today's Pentium-90. Part of the P6's power will be devoted to standard CPU tasks. Spare bandwidth—and there will be plenty—will go to processing video, 3-D graphics, picture manipulation, and voice. Likewise, graphics boards will incorporate 3-D graphics, video, and MPEG accelerators. Communications speed will accelerate rapidly as well—to 56 or 64 kilobits per second. This summer, for example, CompuServe and Prodigy will introduce 64-kbps ISDN access in various areas of the country.

Software Innovation Close Behind?

The wild card is software. Windows 95 is slated to ship in late August. Certain capabilities built into the operating system—true multitasking and multithreading—will take advantage of new hardware. With luck, the operating system will also provide a stable, robust platform for new 32-bit applications.

But it would be a waste of processing power to simply do the same things we do now, just faster. What we need are new types of applications, radical improvements to existing apps, and more realistic environments—in everything from geographic databases to presentation software and games—that harness the new class of hardware. We've begun to glimpse this type of change during the past two years as multimedia has caught on. We've also learned that ill-executed efforts will be a given; software that delivers a rich experience and vastly better ease of use will take time.

As impressive as advances in PC hardware have been this year, the advances we can expect in the coming year will be stunning.

For now, we congratulate this year's World Class winners—proven products that we rely on today. Next year, we look forward to recognizing new hardware and software that builds on and goes beyond this year's successes.

Cathryn Baskin, Editor

The WinBook's a winner...

February-May 1995, WinBook XP DX2/50 8/255 Mono

May-June 1995 WinBook XP SX33 8/260 Mono

"...the new top dog..." "WinBook's DX4-100 entry this month is a winner in many respects. For one thing, it's a speed demon that produced great test results, finishing our benchmarks faster than a typical DX4-100 notebook—this makes it one of the fastest notebooks you can buy for under $3000." *PC WORLD*, Top 20 PCs, May 1995

February-April 1995 WinBook XP DX4/75 8/125 Dual-scan

"The keyboard is comfortable, with big keys and a broad wrist rest." "System documentation is excellent." "Finally, the unit's modular design allows for easy replacement and upgrading of components. Adding up all the high points, we come up with a fantastic value and a number one budget mobile Best Buy." *PC WORLD*, Top 20 PCs, Feb. 1995

August 1994, WinBook XP DX2/50 4/260 Monochrome

With plenty of processing power, (and) enough battery life to handle a transcontinental flight easily,...the WinBook XP...is a value winner." "...the WinBook is the lightest full-size notebook in the roundup;..." "The WinBook XP posted an unprecedented battery life..., and though its dimensions are those of a regular-size notebook, its weight is closer to that of a subnotebook." *PC MAGAZINE*, Cover Story: Notebooks, Aug. 1994

Most Improved Portable January 1995 WinBook XP

"Is it too good to be true?...the WinBook has gone on to offer a notebook that everyone seems to want. The reason is simple: value....The WinBook XP offers good performance and surprisingly good battery life as well as affordable RAM and hard drive upgrades." *PC LAPTOP*, 1994 Editors' Choice Awards, Jan. 1994

April 1995, WinBook XP Best Value 486DX4 Notebook

"As the name says, the WinBook's a winner" "...the WinBook XP is an excellent value." *(Awarded BYTE Best for Low Cost Systems and 2nd Runner-Up for Desktop Replacement)* *BYTE*, 30 No-Compromise Notebooks, April 1995

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intel inside

Circle 197 on reader service card

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PC WORLD – May, 1995

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Network utilities—vital, but set aside 100K

DOS 6 utilities—handy, but about 120K

Multimedia—fun, but can you spare 50-80K?

Internet utilities—where will you get 120K?

If you don't have QEMM 7.5, what else have you sacrificed?

Sooner or later, as you push the limits of your PC's capabilities, you will run into a wall. Memory limits. Drivers that won't load. Crashes. "Out of Memory" messages. And you'll run into this wall whether you have one megabyte in your PC or 16.

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MemMaker, the memory utility that comes with DOS 6, does an OK job of delivering additional memory, but it just hasn't kept up with demanding users.

Say you wanted to run a mouse, sound card, SmartDrive, your DOS 6 and Novell utilities, and your Microsoft Bookshelf '94 CD ROM. You couldn't with MemMaker. Not unless you were willing to manually 'tune' it. And then you might end up with 490K or so to use. But QEMM 7.5 routinely returns 634K of conventional memory. And when you consider as little as one 'K' of memory makes the difference between a program loading or not, you can see where an additional 140K or so could be vital.

Hot new features

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QEMM 7.5 comes with a new version of our award-winning memory utility, Manifest, which reports details you can't find out any other way—like how Windows and the programs running under it are using memory or what software is using your IRQs.

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Circle 225 on reader service card

Truth in Specifications, Two Takes on Service

Cynics Never Prosper

Your feature "Buyer Beware: Inflated Claims, Unmet Promises" [*Top of the News*, May] was a marvelous piece of reporting. I was appalled by the cynicism described by Rich Sorkin of Creative Labs: "Until consumers are willing to spend what they do in the consumer audio market, you won't see the manufacturers [providing verifiable performance data for PC-based products]."

If this statement accurately represents PC companies' attitude about their responsibilities and obligations to consumers, those companies won't survive long in the global marketplace. The U.S. auto industry learned that in the nick of time. PC customers are more savvy and less forgiving than are car buyers, as the folks at Intel recently discovered.

Compared to some of the excellent audio gear available today at reasonable prices, PC audio products don't deserve to be priced higher. In fact, your test results suggest they are grossly overpriced. When even an analog cassette deck can outperform a digital audio device like a sound board, something is terribly wrong. Small wonder these companies feel the need to lie to us about specifications.

Lee Brooks, president, Ambience Digital Recording

The Straight Skinny on Pentium Upgrades

Eric Knorr's excellent feature "Pentium Upgrades: Were They Worth the Wait?" [*Top of the News*, April] was a gem.

Count me as one of the unsuspecting 486 owners whose system BIOS and motherboard design won't enable the Pentium OverDrive's write-back mode to achieve the near-60-MHz Pentium performance promised by Intel.

I suggest that anyone else contemplating this upgrade first read the fine print on the Pentium OverDrive box and save up instead for a new PCI-based Pentium system.

Vernon Craig, Flint, Michigan

No Substitute for a Live Lawyer

John P. Mello Jr. wonders why lawyers get paid so much to prepare living trusts when Nolo Press's Living Trust Maker 2.0 is so easy to use [*New Products*, March]. The answer is that a lawyer is paid to do a client's job right the first time.

The living trust mania, like many fads, is largely based on ignorance. Even if a will is not in dispute and there are no pursuing creditors, probate is not a waste of time and money. If a will isn't probated, heirs may be unable to get a title policy if they wish to sell an inherited house. Banks and stockbrokers may refuse to turn over assets.

If a will is undisputed and there are no creditors, some states provide for a simple probate. Probate in those cases may be less costly and burdensome than a living trust. Whether a living trust or a will best serves a client depends on many factors. Determining those factors and weighing their importance can be complicated.

Thomas John Fisher, Corpus Christi, Texas

False Analogy

I can't let Allan Jay Silver's comments in "Who's Zoomin' Who?" [*Letters*, April] go without response.

In attempting to justify software piracy, Silver used the analogy of a car owner who allows his spouse to drive his automobile. But what if she wants to drive the car at the same moment he's driving it? Would it be reasonable for him to ask the car dealer for a free copy of the car so they can both drive at the same time?

Top of the News

Buyer Beware: Inflated Claims, Unmet Promises

Don't Be Misled by Vendor Specs: Tips for Smarter Shopping

What if all the other men in your office liked your wing-tip shoes? Must the shoe store give you free copies for your friends to wear?

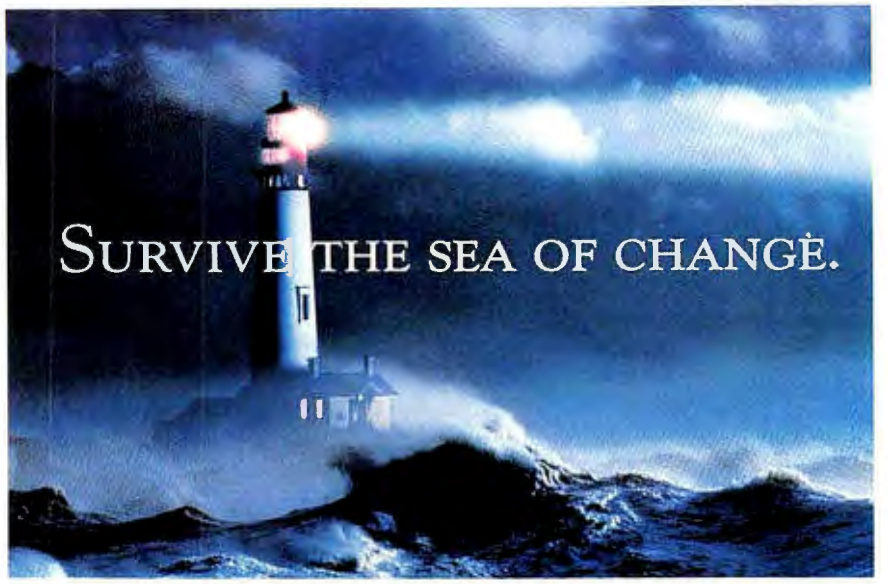
The fact that software is much easier to copy than a car or a pair of shoes does not give the registered user the right to make copies for those who have not paid for the program.

Mike Vitkauskas, Internet

Service Desk Talks Back

I would like to respond to April's *Consumer Watch*, "The End of 'No Questions Asked' Returns?" I work for a large PC manufacturer and have spent a good amount of time studying customer returns. This is a complex issue.

PC manufacturers, like all businesses, must stand behind every product they sell. However, Roberta Furger seems to imply that PC manufacturers are out to coerce customers into keeping products they do not want in an attempt to reduce the number of returns. Moreover, she portrays consumers as innocent "bystanders."



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Circle 32 on reader service card

Consumers today shop for CPUs with the same savvy bargaining skills as they do for TVs and automobiles. Many returns to PC manufacturers are systems that customers purchased, took home, and tried out for a few days but decided to return because they found a better deal somewhere else.

Second, software problems and conflicts are a major source of questions from consumers. PC manufacturers spend a great amount of time helping consumers work through problems that have nothing to do with the operating functions of the hardware. When your PC does not work correctly, who do you call, Microsoft or Compaq?

Also, Furger's article does not address the unique problems direct PC vendors face when working with consumers on returns. With "build to order" fast becoming the norm, a consumer can purchase a fully loaded PC with numerous options, gut it, and return it within 30 days. The vendor must take the time to open up the unit and make sure that everything is inside, yet the company is obligated to credit the customer's credit card as long as the company has received the returned product.

Finally, a PC manufacturer's attempt to reduce returns by adding restocking fees and charging for help with Windows is a business necessity, not an unwarranted attempt to abuse customers.

Robert A. Goldstein, Houston

Double Standard

When reading April's *Consumer Watch*, I was taken aback by the implication that anyone who buys a computer, finds a better deal, and returns the original PC is committing fraud. After all, Furger stated that after she bought a TV and found a better model on sale, she "without thinking twice...took the first set back, got [her] refund, and bought the other unit." What's the difference between buying a TV and buying a PC?

Jim Rooney, PC World Online

That's Service

In this age of fly-by-night vendors and mediocrity on demand, I must relate a refreshing incident. After absorbing all the

debate regarding the flawed Pentium processor, I decided to contact Intel Corporation for a replacement chip. An extremely courteous representative explained my options for chip replacement. Because of a disabling injury, none of these was convenient for me. Unbelievably, Intel offered me on-site service at the company's expense! Two days later, Dow Jones [which does on-site service for Intel] came out and swapped the chip.

Ordinarily, this story would not even be mildly interesting. However, since consumers have come to expect poor service as the norm, the way my request was handled represents a level of first-class professionalism of which Intel and Dow Jones can be extremely proud.

Dr. Marc J. Zimring,
South Pasadena, Florida

Flip Those Monitors

While reading your April article on 17-inch monitors, "Big Screens," a thought occurred to me. Those monitors have an average visible screen diagonal of 15.8 inches. Why not mount monitors with the long axis vertical instead of horizontal? This would allow 8½-by-11-inch documents to be displayed full size. No longer would we have to scroll to read the contents of a single page.

How about it, computer manufacturers?

Marshall Byer, Vista, California

User-Friendly Installations

So if I understood the April *PC World* correctly [*Consumer Watch*, *Shop Talk*, "And Behind Door A"], in order to load Warp to a 5¼-inch A: drive one must download some fancy program that permits copying Warp's 3½-inch disks to 5¼-inch ones, then use those copies in the A: drive. The words *user friendly* will never come up in *this* scenario.

I can think of two better solutions. One, IBM could produce an alternate version of Warp for older PCs with 5¼ inch A: drives. Or, IBM could release a software patch that permits use of the B: drive as the installation drive.

And some people say Microsoft is monolithic and monopolistic.

Paul J. Burke, CompuServe

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it

connects

the

machine

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is followed by an impulse
that shoots down
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Your fingers move
across a keyboard.
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how we are.

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Just Say DOS

In April's *Consumer Watch*, John Coons's letter said he had to change the floppy cables to install Warp.

The simplest solution to this problem would be to use the command **subst**. Have people started using graphical user interfaces to the point that they've forgotten good old DOS?

Dewitt Fairbanks,
Ladson, South Carolina

Editor's response: It would be convenient if you could boot with DOS, then use DOS's subst command to reassign the 3½-inch B: drive as the A: drive before installing Warp. Unfortunately, Warp requires you to boot with its installation disk in drive A:. —*Shane Rau, technical editor*

Corrections and Clarifications

The phone number we listed for Disney Interactive customer support in May *Bug Watch* (*Consumer Watch*) was a toll number; the toll-free number is 800/228-0988.

In May's "Software for Next to Nothing," we listed an outdated version of Wincode. The current file name of this freeware is **wncode26.zip**, and the file is available on PC World Online.

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

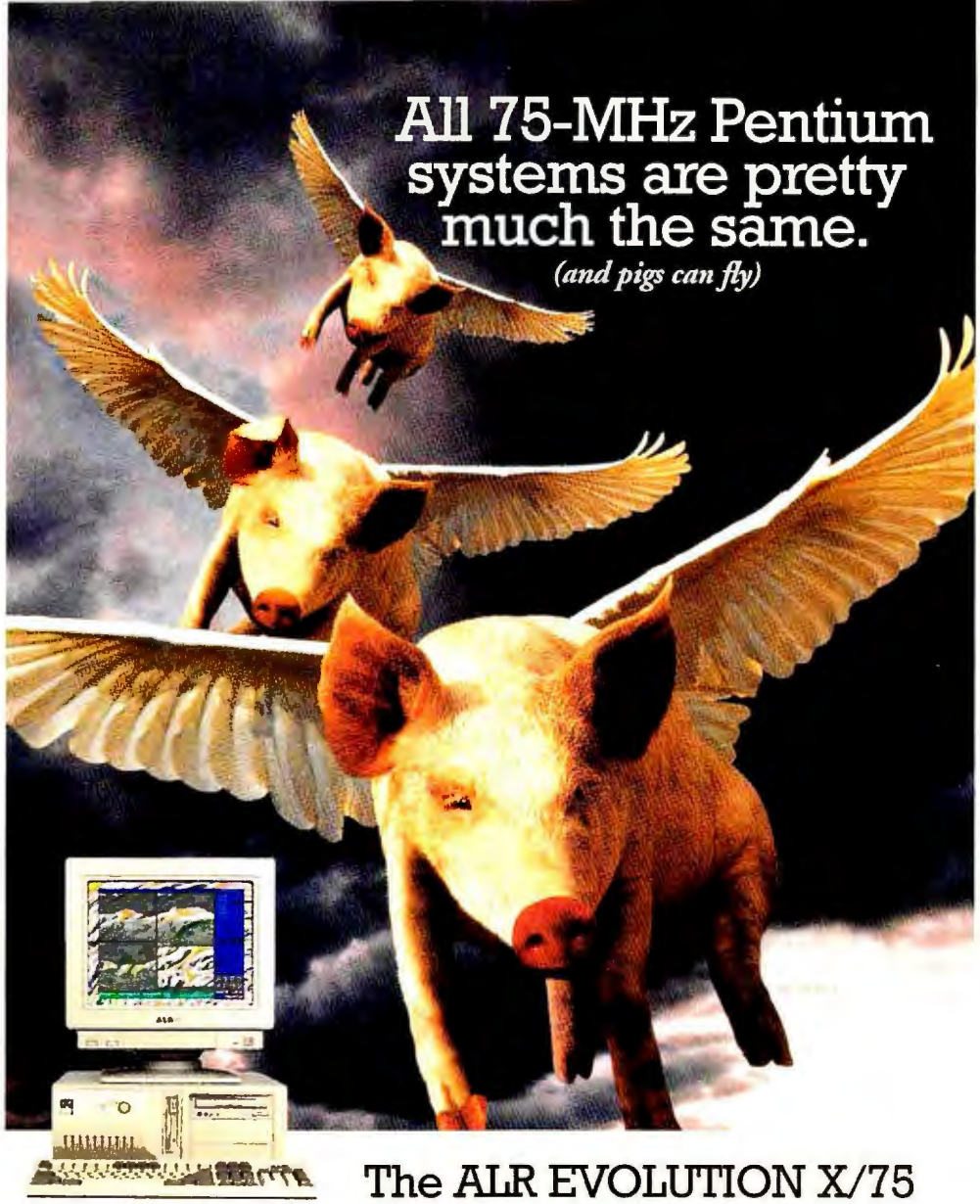
POWER TIP no. 321

Breaking Harvard Graphics Name Overlaps

To prevent long series names from overlapping in a Harvard Graphics bar or pie chart (DOS version 3.0 or Windows versions 1.0 and 2.0), break one or more names onto two lines by pressing <Ctrl>-<Enter> where you want the name to break.

In Harvard Graphics 2.3 for DOS, place a vertical bar (|) where you want the name to break. When you view the chart (using the <F2> key), the name will appear on two lines, but the vertical bar won't be visible.

Christina Tisher
Ellendale, Delaware



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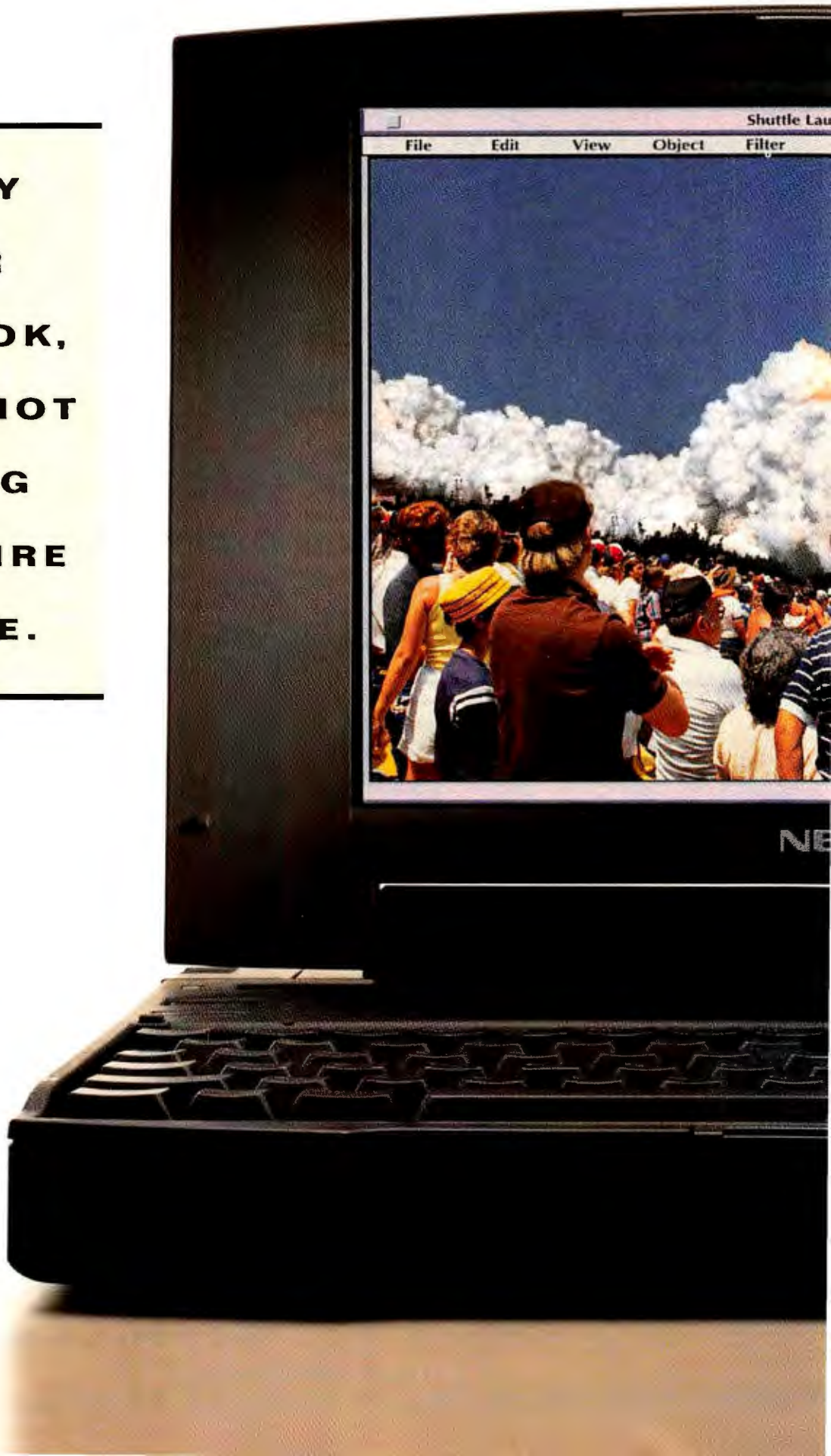

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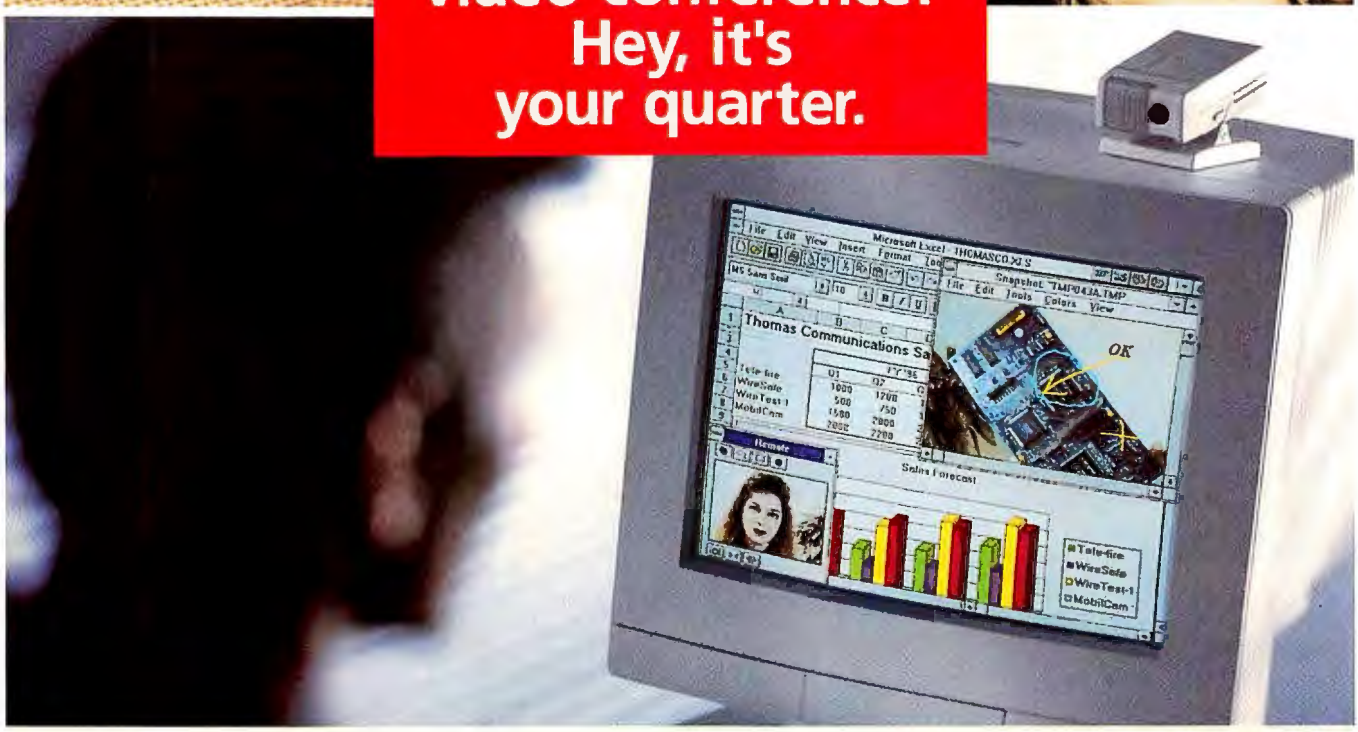

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Circle 77 on reader service card

PC User Groups: Ten Reasons to Sign Up Today

Let's play a game of free association. I say "PC user group," you say...

If you've never attended a user group meeting, terms like "nerd" and "computer junkie" might immediately jump to mind. But you don't have to be a hobbyist or a computer professional to join one of the roughly 10,000 user groups in the U.S. and Canada. Ranging in size from as few as 3 members to as many as 20,000, these organizations have something for everyone—from small-business owners to retirees and families hoping to get the most out of their new home computers.

There's no substitute for actually going out and seeing firsthand what your local group has to offer. So, to get you out the door, here are ten great reasons to join a user group, culled from the people who should know—user group members themselves.

1. Hardware and software support. One of the hallmarks of PC user groups is the willingness of the more experienced members to lend a hand to newcomers and get them up to speed. Just about every group has an informal technical support staff, composed of technically savvy members who volunteer their time to answer questions about hardware and software products that they're familiar with. Volunteers' home and work phone numbers are typically published in the group's newsletter (try getting that kind of service through the support plan offered by your software company). The call is free, and chances are the person at the other end of the line will know just as much as the software representative.

2. Industry execs up close and personal. If you like the idea of interrogating hardware and software company executives about everything from buggy products to lousy service, then you'll love the monthly general meetings. Presentations by company executives, followed by free-wheeling question-and-answer sessions, are often featured. You'll get the lowdown on current versions of leading products, plus the chance to quiz executives on a subject of your choosing—like why Windows 95 is so late, or why the Pentium upgrade chip doesn't work quite right, or...

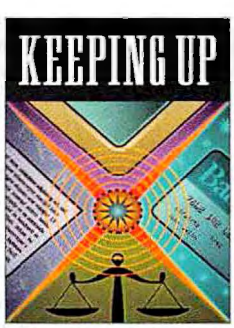
3. Really cheap software. If you can't get enough of *PC World*'s annual survey of great software under $50, you'll be delighted by the shareware available through your local user group. Hundreds of products are available for downloading from most user group bulletin boards; some groups even offer a different shareware program demo every month.

4. First looks at new software and hardware. User groups are among a software company's best resources when it comes to finding beta testers. Members are routinely asked to try out new products—or upgrades of existing products—before companies release them to the masses. Not everyone has the stomach for beta testing, but if you want to be the first person on your block to have Windows 96, this may be the ticket.

5. The inside scoop on local stores. Thinking about buying a locally built clone, but need some advice on where to shop—or which stores to avoid? Look no further; user group members will fill you in on just about any PC store in town—from the mom-and-pop shops to the computer superstores. Don't be surprised if members even throw in suggestions on mail-order companies for good measure.

6. Tips and tricks galore. Whether you are interested in using your PC to publish a newsletter or manage your investments, chances are your local user's organization has a special interest group for you. SIGs are a great way to brainstorm problems, learn what's new in PCs, and become an expert on a specific application or class of products. And if your local group doesn't have the SIG that you're looking for, ask around—chances are that you'll be able to find it—or you could start the SIG yourself.

By Roberta Furger



United Connection joins the ranks of CompuServe's basic service offerings, billing itself as the fastest online travel service in operation (go united). To tempt passengers to try the new service, United Airlines is offering up to 5000 Mileage Plus miles for booking through United Connection (you get 500 miles per segment flown by April 30, 1996). You just enter your travel dates and your departure and arrival points, and United Connection will search for the best United fares...

If you're experiencing repetitive strain injuries related to your job, you might want to read *How to Handle Your Workers' Compensation Claim* by Christopher A. Ball (Nolo Press, 1995, 800/992-6656). Although the book deals primarily with California law, it contains some general advice, including how to receive the medical care and benefits you're entitled to and, if worst comes to worst, negotiate a settlement.

ILLUSTRATIONS: JEFFREY PELO; PHOTO: ERIC BUTLER

U.S. Robotics Sportster V.34 modems

Bug: **Sportster owners have reported a problem that's come to be known by the colorful moniker "spiral death syndrome" on the Usenet news group comp.dcom.modems. Under certain line conditions, if your modem first connected to another V.34 modem at a speed greater than 21,600 bps and less than 28,800 bps, it may gradually fall back to a rate as low as 9600 bps but never return to its original connect speed.**

To check for the problem, try downloading a large compressed file from a fairly distant BBS or online service (closer connections will tend to connect at 28,800 bps). At the beginning of the download, press +++ (slowly) to switch the modem into command mode, then enter ati6. The modem should display a screenful of connection information, including speed. V.34 connections will display two numbers (such as '26400/26400'). The first is the receive speed, the second the send speed. Enter ato to return to terminal mode. After the transfer has completed, enter command mode and check the speed again. If the rate is noticeably slower (such as 14400/26400), your modem may have the problem.

Workaround: **U.S. Robotics says it is aware of the problem reports and has assigned two engineers to try to isolate and verify the bug. Meanwhile, you can prevent the problem by disabling fallback with the undocumented AT command s15=2. Although you could store this setting in the modem's nonvolatile RAM (using the command ats15=2&w), making it a default for all connections, fallback is actually a good thing under most line conditions. A better plan is to identify the connections during which the undesired fallback usually occurs and add s15=2 to the communication application's dialing string.**

- **U.S. Robotics Technical Support; 708/982-5151**

Additions to the Windows Calculator Bug

Several readers asked for help locating the fixed Windows calculator file on Microsoft's ftp server (ftp.microsoft.com) mentioned in April's *Bug Watch*. The file, ww1138.exe, is located in the /softlib/msfiles subdirectory. If you do your Internet downloading with a Web browser, point it at ftp://ftp.microsoft.com/softlib/msfiles/ww1138.exe. Another reader wanted to know what the error was and how to test for it, information we inadvertently omitted from the column. For a humorous answer to both questions, try subtracting 3.10 from 3.11, the numbers of the two most recent versions of Windows. If your calculator is buggy (which it almost certainly is), you'll get an answer of zero.

—Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details, or post your report on PC World Online. We'll investigate problems and report on those with the broadest interest. Due to the volume of queries, we may not be able to return your call, and we are unable to provide technical support.

7. Used hardware for cheap. Looking for a computer for the kids—or maybe an old 386 to use on a small network? User group members are upgrading their hardware all the time and frequently sell their old stuff at reasonable prices. The best part: You'll know where to find the seller if you run into trouble later.

8. More fun than reading a book. Most groups have a help session at the beginning of every meeting—a chance for members to ask each other for technical advice and assistance. It's a great resource, whether you're new to computing and need to learn the basics or are an old pro with a new problem.

9. Learn to program in Visual Basic. Okay, so maybe that doesn't interest you. But whether you want to learn to navigate the Internet or figure out how to trace your family tree with a genealogy program, you'll have instant access to experts in just about every PC subject imaginable—all for roughly $30, the cost of most annual memberships.

10. Great networking opportunities. Company presidents, marketing and sales executives, MIS professionals—all attend user group meetings. Where better to look for a new hire or put the word out that you're in between jobs? Watch out, Rotarians...

What Are You Waiting For?

Convinced? Ready to attend the next user group meeting in your town? Then call the user group locator service line, sponsored by the Association of PC User Groups, at 914/876-6678. Or check out the annual user group listing (usergrp.zip), which is available on PC World Online.

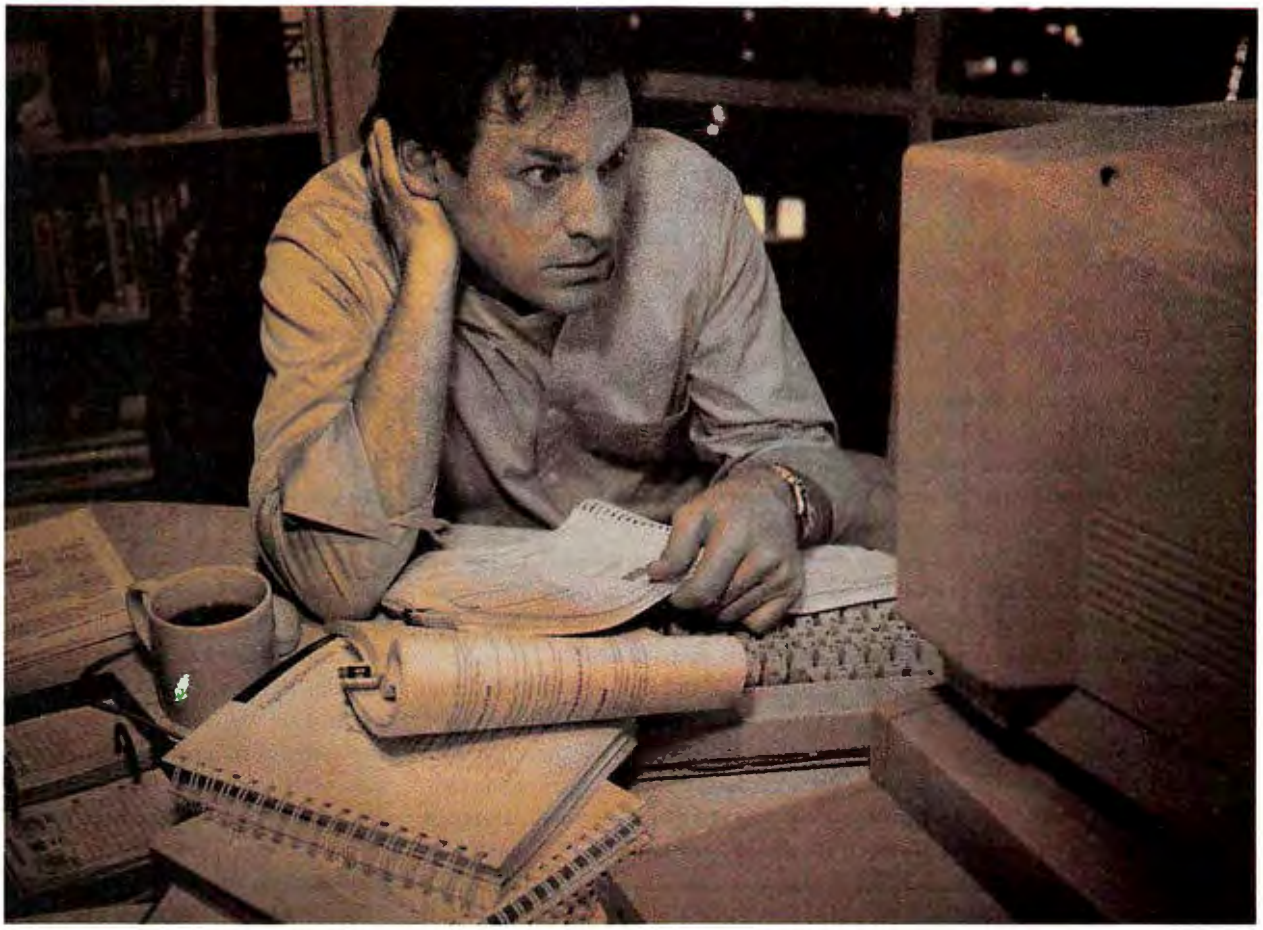
Shop Talk

I Needed Help, They Wanted Money

I recently purchased my first computer—a Compaq Presario CDS 924. I bought it because of Compaq's reputation for service, reliability, and upgradability. My problems began almost immediately with numerous General Protection Faults. After several calls, I finally got the problem solved when a technician told me to change Windows settings.

The next problem occurred when I tried to enable 32-bit disk access in Windows. I wasn't successful. When I called Compaq this time, they initially wouldn't let me talk to a technical support person unless I gave them my Visa or MasterCard number first. I complained and eventually got through to technical support. But nobody could give me the advice I needed. After being transferred and put on hold, I was told by a technician that my Presario was not a local bus system, and that 32-bit disk access wasn't possible. I was also told that since there weren't any local bus expansion slots, it wasn't even possible to upgrade to obtain the 32-bit access.

Basically, I am very disappointed with Compaq and its Presario computer. I've contacted Compaq to approve a



Find the manual, find the other manual, read them both to get the information to fix your printer. Or click on the CompuServe icon.

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refund through the retailer where I purchased the system.

Paul Read,

Brantford, Ontario, Canada

Editor's note: We contacted Compaq regarding Read's problems and learned he was free to return his Presario to the retail outlet he bought it from at any time. The representative we spoke to explained that while Compaq sells local bus systems and systems upgradable to local bus, the Presario is not one of them. It is not necessary, however, to have a local bus computer to run Windows 95. A local bus computer would give better performance, as it would for any operating system or application.

As for the technical support problems, Compaq announced in January 1995 that it would charge $35 to answer technical questions about software not made by Compaq. This includes Microsoft's Windows and DOS programs, as well as other software that may be ordered preinstalled on the computer. Compaq does not charge to answer hardware questions, questions about TabWorks (an interface included with all Compaq machines), or questions about software installation and configuration. And it doesn't charge corporate accounts for technical support.

When you reach Compaq's technical support line, you may be asked to present a credit card number before your question is answered. If you feel the question has to do with hardware, with installation or configuration, or with a Compaq software product, say so when you get a technician on the phone. The technician will not automatically charge you just because you give a credit card number.

Compaq is not the only company that charges for software technical support. Of the few hardware manufacturers that offer detailed, instructional support on the software programs that come bundled on their computers, most—IBM PC Direct and Dell, for example—charge for the service. And almost every software company already charges to answer questions about its software—after a grace period.

If you don't want to pay for technical support, check your documentation or go online for help. But if you are desperate to get a problem resolved, the $35 that Compaq charges may not be too onerous. The fee includes whatever it takes—even if that's more than one phone call—to get your questions answered.

On the Software Side

I bought Stacker 4.0 because I heard it was a good program. Then one day my computer crashed and I called Stac Electronics for help. To my surprise, when I typed in my serial number (as directed by the voice-mail system that answered the phone), I was told that my period of free service had expired and I would have to pay a fee to get my questions answered.

Duber Bedoya, Vero Beach, Florida

Editor's note: We forwarded Bedoya's letter to Stac Electronics for a response. A company representative confirmed that 90 days after the first call to technical support, Stac begins charging for telephone support (though online and fax-on-demand support is still free.) According to the Stac representative, Bedoya placed his first call to technical support about three months before the call he reported to us. That's when the clock started ticking on his free support plan. Because Bedoya was surprised by and unhappy with the charge, Stac gave him a free upgrade to the latest version of Multimedia Stacker for Windows and DOS. With that upgrade he will be eligible for another 90 days of support. For more information on technical support policies and trends, see "The Hidden Cost of Tech Support" in the May issue.

And When the Support Is Free?

In March 1994 I purchased a Gateway 2000 P5-66 based on *PC World*'s superb review of the product. Today, I regret not taking more stock in *PC World*'s continued warnings about Gateway's technical support. It has gone from barely tolerable (a typical 15-minute wait on the support line) to intolerable. I have concluded that Gate-

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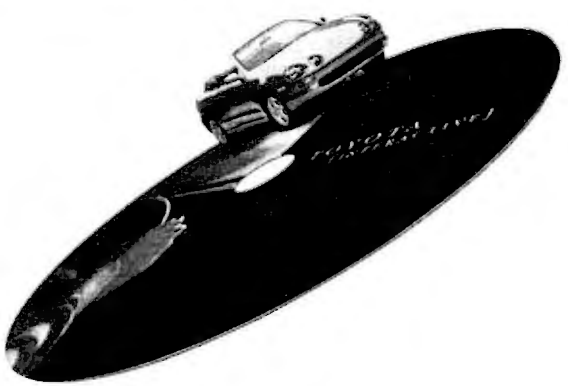

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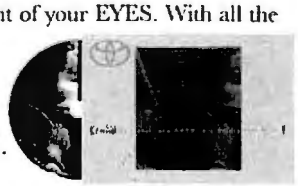

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Circle 221 on reader service card

way has shut down the incoming technical support lines. All I get is a message saying, "Call back; all technicians are busy."

I will not buy from Gateway again.

Perry Jacobson, Murrietta, California

Editor's note: While Gateway does not charge for technical support, its long hold times and difficulty of getting through are legendary. According to our Reliability and Service surveys, the average caller's waiting time for Gateway is 13 minutes (the industry average is 9 minutes). The time it takes to speak to a person who can help you is 34 hours (industry average is 25 hours); the time to get a problem resolved is 11 days (industry average is 9 days).

We spoke to Wendell Watson, corporate communications manager for Gateway. He told us the company is in the midst of redesigning its technical support department, which should somewhat alleviate the problem. In November 1994, the company opened a new Kansas City, Missouri, facility—which now has nearly 1000 employees—so it could bring in new sales and technical personnel (the employee pool in North Sioux City, South Dakota, was tapped out). Gateway has hired an engineering expert to redesign the technical support department, and the company has beefed up the phone system. "I think it will go a long way toward fixing the problem," says Watson. "But as soon as we make the service better, more people will call us—rather than calling someone who is charging for the support." Despite the current trend, Gateway has no plans to charge for technical support.

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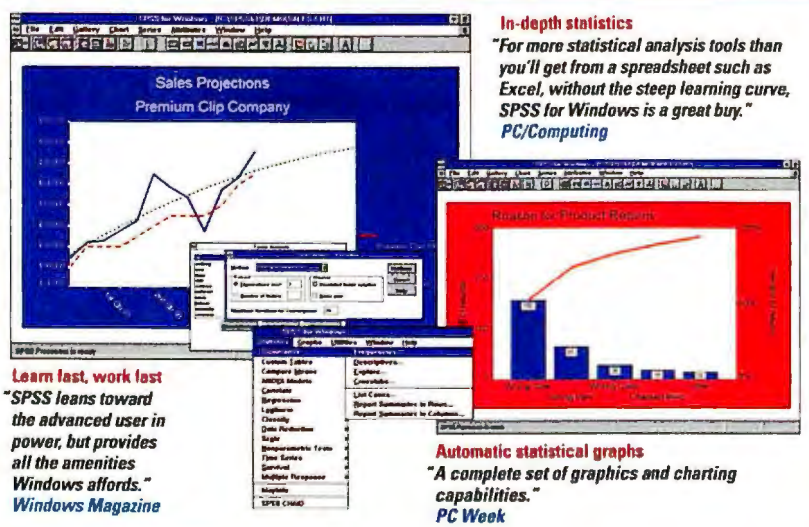

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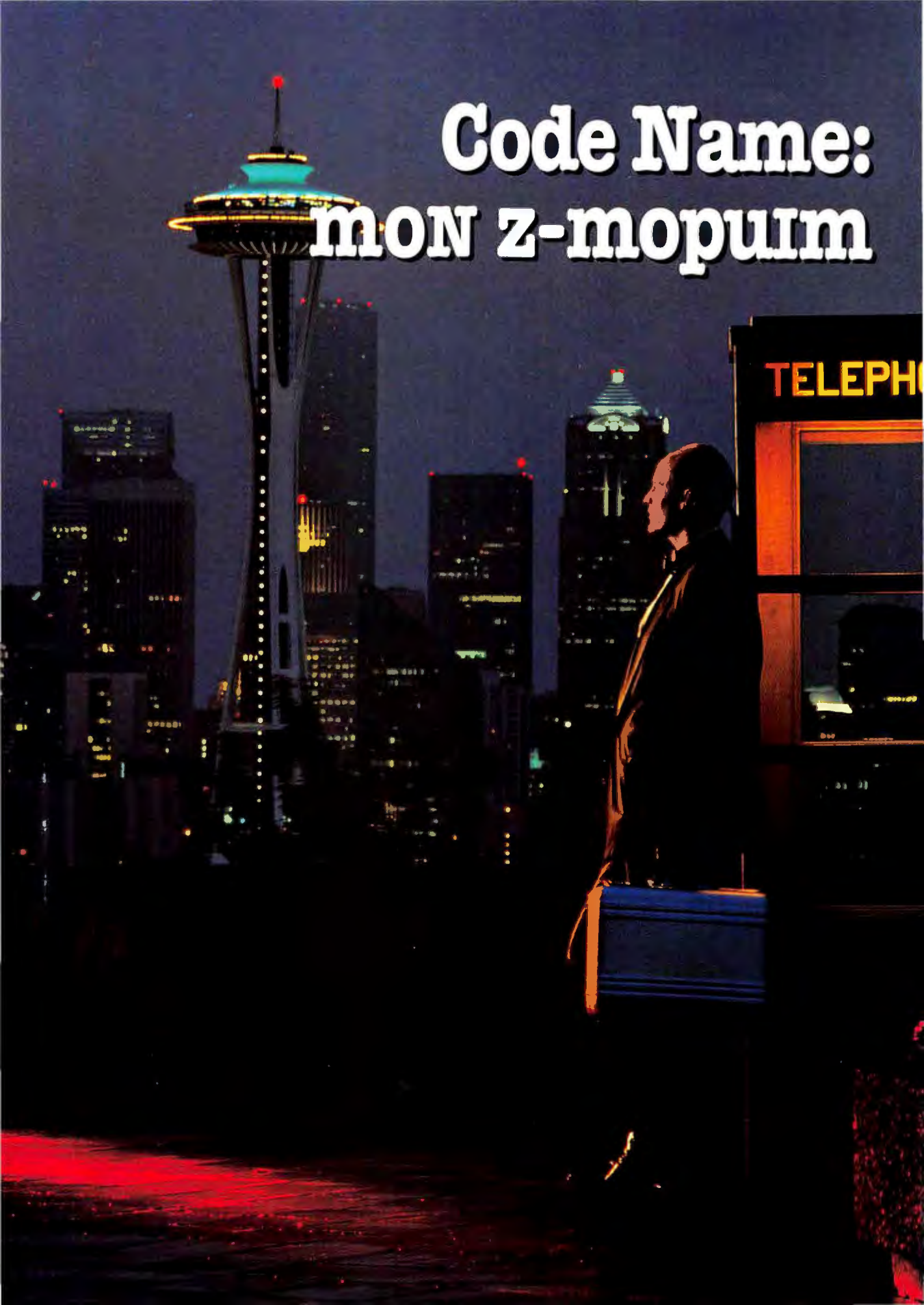
Circle 253 on reader service card

Aces for Saturday Support

While I was trying to connect a fax-modem to my Acer computer, I (or the software) corrupted all 5000 files on my computer. I panicked and called Acer. This happened on Saturday, so I wasn't expecting much help. I was very wrong. The people at Acer spent most of Saturday and part of Sunday helping me. Even when I got frustrated and mad, they didn't. The company is even sending me a repair kit to fix what we could not solve over the phone. I would have been totally lost without Acer's help and probably would have spent a lot of money to have the machine fixed. If the comments of people like me who use the products out there mean anything, I think Acer should be moved up the list of ratings and the word spread that Acer is an excellent computer company and it makes an excellent machine.

Rick Guardiola, Ithaca, New York

PC WORLD online *The file from this article is available via PC World Online on America Online and CompuServe.* Shop Talk *is written and researched by* PC World *senior associate editor Christina Wood with research assistance from Reader Liaison Peggy Nauts. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 12 for contact information.*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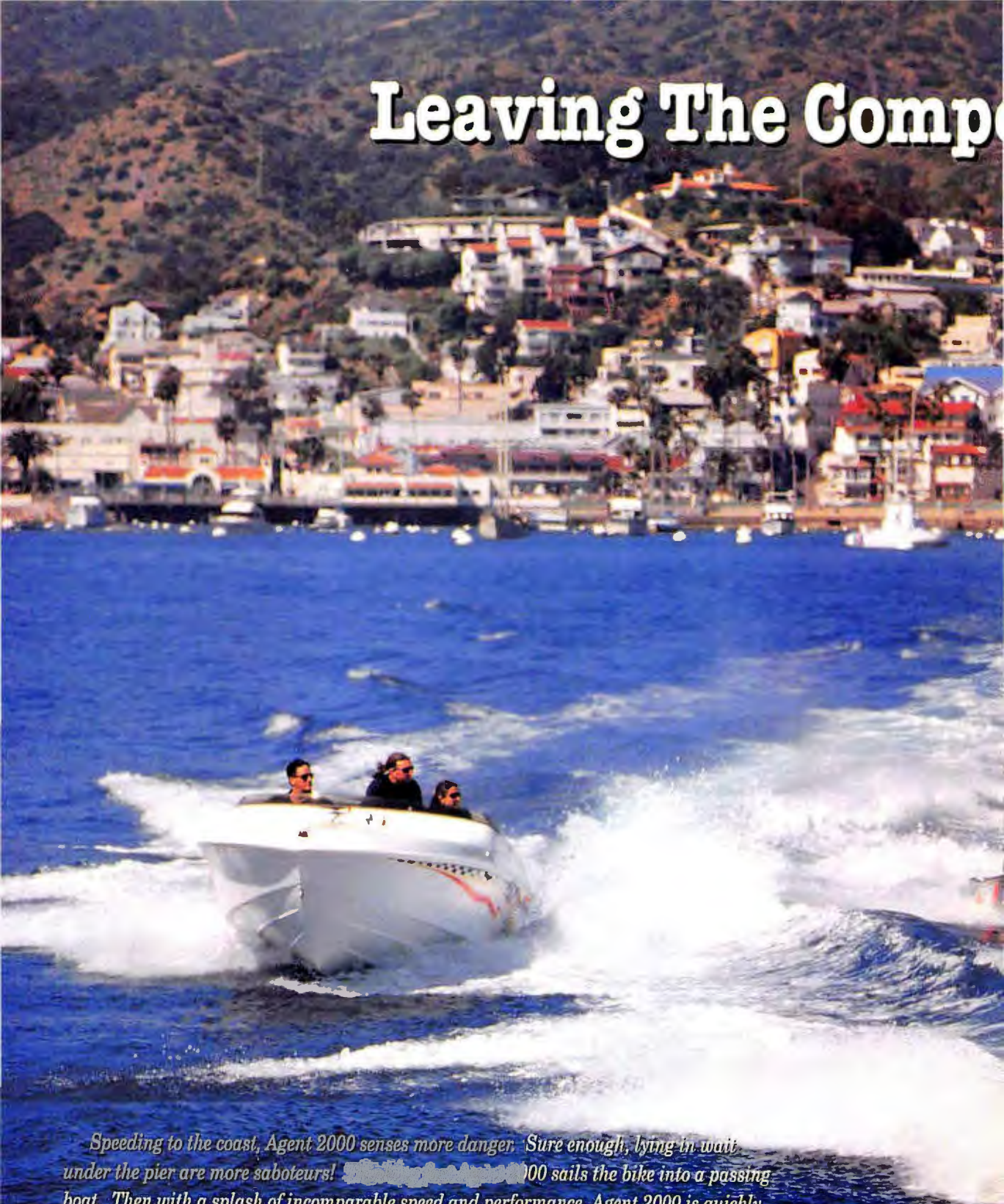
etition In The Wake ...

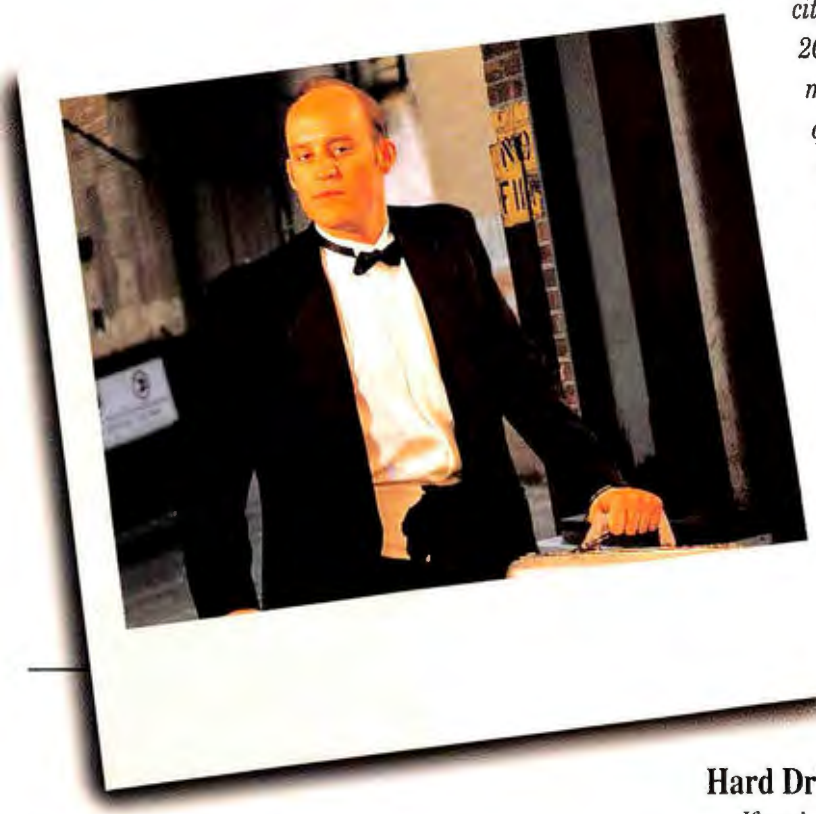
Leaving The Comp



Speeding to the coast, Agent 2000 senses more danger. Sure enough, lying in wait under the pier are more saboteurs! [redacted]00 sails the bike into a passing boat. Then with a splash of incomparable speed and performance, Agent 2000 is quickly leagues ahead of the competition. "So long, shark bait!" calls 2000.

Agent 2000 Is On A Mission!

The journey begins with the competition in hot pursuit. But it will take a lot more than they've got to overtake Agent 2000. The perfect combination of speed and power give Agent 2000 the outstanding performance to stay ahead of the pack. "I know just the trick," thinks 2000. And with that, the 120-horsepower kicks in, leaving the competitors in the dust.



The exchange went off without a hitch. Soon the city lights would be far behind. At dawn, Agent 2000 must begin the journey back. When the metallic briefcase is safely returned to headquarters in North Sioux City, South Dakota, the mission will be complete. The happiness of computer users everywhere is at stake. For in the briefcase is Gateway 2000's Secret Code — a new way to bring all PC users the latest computer technology at the best value on the planet. Undaunted by thoughts of the competitors' plans to thwart the mission, Agent 2000 keeps cool and races ahead to ensure all Gateway 2000 customers tomorrow's technology today.

The Best Performance

Gateway 2000®'s dossier is filled with accounts of great feats to bring PC users the latest computer technology and unmatched performance. It's our strategy to ensure all Gateway customers the tools to take them far into the future.

P5-120XL!

In a quest that took us to the ends of the earth, Gateway 2000 dares to bring you the P5-120XL: "Fastest PC in the World" (May 1995, *PC/Computing*). Don't doubt it. It's the world's most famous action-packed performer. Equipped with a 120MHz Intel® Pentium® processor, 16MB EDO performance-enhanced memory, 256KB pipelined burst cache, 1.62GB IDE hard drive and a 4X three-CD changer, this machine is powerful and fast enough to navigate you through any risky computing situation!

EDO (Extended-Data-Out) Memory

The next time you've masterminded an unforgettable plot, you'll want plenty of memory to back you up. EDO performance-enhanced memory gives you high-speed memory for your memory-intensive graphics, demanding number-crunching applications and future multi-tasking environments like Windows™ 95. And the combination of EDO memory and pipelined burst cache, on 120MHz systems, gives you the latest memory technology and the performance of next-generation cache, increasing system performance up to 20 percent!

Hard Drives

If you're thinking the bigger the better, you're right on. All Gateway Pentium processor-based systems are equipped with 730MB, 1GB or 1.62GB IDE hard drives. The 1.62GB hard drive is standard on the P5-120XL — or you can easily upgrade to it. It's the largest IDE hard drive to be found, featuring Mode 4 support, 9ms access time and a 12.5Mb/s data transfer rate.

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With a flight ready for take off, Agent 2000 is sabotaged! In a flurry of arms and legs, the unworthy opponents are overthrown. They cannot defeat 2000's sheer will and determination to deliver the best features, quality and value to all PC users.

The Best Features

Gateway 2000® beats the competition to the punch with the world's best features!

4X Three-CD Changer

The multimedia world gains major ground with the introduction of Gateway's 4X three-CD changer! Load this fast 4X CD-ROM drive with three CDs and you have 1.8GB of data at your fingertips. The 4X three-CD changer is either standard or available as an upgrade option on all Gateway desktop systems. All Gateway systems with 4X CD-ROM drives give you a 600KB data transfer rate for true full-screen, full-motion video and it's ATAPI compliant and ready for Windows™ 95.

Software

You can have action and excitement for the whole family — and the tools to conquer all *your* special missions. Gateway outfits you with incomparable software applications on all our systems. Choose a Family PC™ multimedia system and be transfixed by Gateway's new Generations Software Collection including 51 software programs! Professional Gateway PCs include Microsoft® Office Professional 4.3, the world's number-one selling software suite. And all Gateway desktop PCs include MS Windows for Workgroups 3.11 — the fastest version of Windows available (today).

Vivitron™ Monitors

Electric color, a razor-sharp focus and crystal clear images — all from a Gateway 15- or 17-inch Vivitron monitor! These monitors feature Sony® Trinitron® tube technology — technology that the most discerning viewers have relied on for decades.

The Best Service and Support

Gateway 2000 delivers another powerful blow to the competition by providing all our customers with award-winning, **toll-free** technical support for the life of their Gateway system! All Gateway desktop systems and monitors are also covered by a three-year limited warranty. Write or call us for a free copy of our warranty.

The Best Quality

For nearly 10 years, Gateway 2000 prevails when it comes to bringing PC buyers the highest-quality computer components available — the best we can possibly offer. The evidence speaks for itself with the MS Mouse, Gateway's programmable AnyKey® keyboard, and of course, our trademark cow-spotted boxes!

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It's A Quick Getaway With

"Home free," thinks Agent 2000. Just then the flight attendant approaches. "Hello Agent 2000, and welcome to Ambush Airlines. May I place your briefcase in the overhead compartment? No? Well then, perhaps a better place is smacked upside your head!" Agent 2000 knows it's now or never. Prying open the airplane door, 2000 checks the combination compass / wind velocity chart, jumps ... and lands only a tractor ride away from Gateway 2000 headquarters!

The Best Portable PCs

Don't be fooled by stripped-down portables posing as great values. They'll just leave you up in the air without the performance that you really need. Outsmart them by choosing Gateway 2000®'s high-performance portables, the Liberty™ and ColorBook.2™ They're loaded with the power to handle the increasing demands of today's (*and tomorrow's*) technology.

Performance

When your special assignments take you out in the field, have outstanding performance without anything to weigh you down. Free yourself with the 4.2-pound Gateway Liberty portable PC. The DX4-100 Best Buy model includes 100MHz of processing power with 256K L2 cache for Pentium® processor-like performance. Gateway also gives you plenty of RAM that will increase battery life and improve your overall system performance! With 24MB RAM and a 720MB hard drive, the Liberty DX4-100 Best Buy gives you the speed and power to run all your hard core applications without a snag.

Features

The Liberty's sleek 4.2-pound design delivers all the goods with a 10.4-inch screen, infrared technology, an impressive battery life and incredible software applications pre-installed.

The screen display on your portable should be a crucial buying factor. Our 10.4-inch color screen on the Liberty produces vivid

Gateway 2000's portable PCs — the ColorBook² and Liberty.

GATEWAY 2000® LIBERTY™

- 4.2 Lbs., 10" x 8" x 1.6"
- 10.4" DSTN Color Display
- 1MB Video RAM
- Choice of Desktop IR Receptor or External Floppy Drive
- Intel® 486 DX2 or DX4 Processor
- Instant On
- NiMH Battery & AC Pack
- 2 PCMCIA Type II Slots
- EZ Point™ Integrated Pointer
- Removable Hard Drive
- 78-Key Keyboard
- Parallel, Serial, VGA & PS/2® Ports
- OAG® FlightDisk®, World Clock, & Ascend® personal information manager (PIM) for use w/ Franklin Day Planner®
- MS-DOS® 6.22 & WFW 3.11
- Microsoft® Works for Windows™ 3.0 or MS Office Professional 4.3**

LIBERTY DX4-100 Base

10.4" DSTN Color Display, 8MB RAM, 340MB HD, MS Works

$2999

DX2-50 $2749

LIBERTY DX4-100

10.4" DSTN Color Display, 12MB RAM, 540MB HD, 256K L2 Cache, MS Works

$3499

*LIBERTY DX4-100 Best Buy 48-Hour QuickShip**

10.4" DSTN Color Display, 24MB RAM, 720MB HD, 256K L2 Cache, TelePath™ 14.4 XJACK® Fax/Modem, Extra Battery, Leather Carrying Case, Desktop IR Receptor, External Floppy Drive, MS Office Professional 4.3**

$4499

COLORBOOK²™

- 5.7 Lbs., 11.65" x 8.5" x 1.77"
- 10.3" DSTN Color Display
- Intel 486 DX4 Processor
- Minimum 8MB RAM (expandable to 24MB)
- 1.5MB Video RAM (includes 512KB cache)
- Removable Hard Drive
- 3.5" Diskette Drive
- Integrated 16-Bit Sound and Speaker
- NiMH Battery & AC Pack
- EZ Point Integrated Pointer
- 2 PCMCIA Type II Slots
- 85-Key Keyboard
- Parallel, Serial, VGA & PS/2 Ports
- MS-DOS 6.22 & WFW 3.11
- MS Works for Windows 3.0 or MS Office Professional 4.3**

COLORBOOK² DX4-100

8MB RAM, 340MB HD, MS Works 3.0

$2999

COLORBOOK² DX4-100 Deluxe

8MB RAM, 540MB HD, TelePath 14.4 Fax/Modem, Carrying Case, MS Office Professional 4.3**

$3499

COLORBOOK² DX4-100 Best Buy

16MB RAM, 720MB HD, TelePath 14.4 Fax/Modem, Carrying Case, MS Office Professional 4.3**

$3999

LIBERTY PROFESSIONAL PACK

MS Office Professional 4.3, PCMCIA TelePath XJACK 14.4 Fax/Modem, Extra NiMH Battery, Leather Carrying Case

$449

**48-Hour QuickShip program applies only to the Liberty DX4-100 Best Buy configuration. Your PC will be delivered within two business days from the time of order. No additions or deletions can be made to the configuration. Available for approved credit card orders only while quantities last. Domestic U.S. orders only. Call us for details about other QuickShip offers.*

***MS Office Professional 4.3 includes Word, Excel, PowerPoint® presentation graphics program, and Access® database.*

SERVICE AND WARRANTY

- Lifetime portable-specific toll-free service and support
- One-year limited parts warranty
- 30-day money-back guarantee
- Special VIP warranty. We'll ship a replacement to you within 24 hours during warranty. Only available at the time of purchase for an additional $100.

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- PCMCIA network adapters, twisted pair **$129**
- Coaxial adapters **$159**
- Token Ring adapters **$399**

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With a firm grip still on the metallic briefcase, Agent 2000 arrives at Gateway 2000 headquarters and is ushered into President Ted Waitt's office. There two Teds stand face-to-face!

"You've arrived with the Secret Code intact!" exclaimed Ted. "Excellent! Good work Agent 2000!"

With that, Agent 2000 removes her mask: it's Undercover Agent Monique! "Thanks Ted," she replied. "I could hardly wait to get back to North Sioux City. Just what is this code name 'mon z-mopuim?' Is it a new kind of mouse pad design?"

"No, no 2000," chuckled Ted, "much more important to our customers than that. But I'm afraid you were so expedient in returning that it's too soon to tell you. You see, there is a time-release lock on that briefcase. Anyone who opened it early would've activated an ink spill in the briefcase and destroyed the Secret Code!"

"Can't you please give me just a little hint?" pleaded 2000.

"Well, while you were on this special assignment, I was back here finding a way to bring Gateway 2000 customers all the newest technology with Windows 95!" exclaimed Ted. "The Secret Code is a way to get Microsoft's new operating system on a value-packed Gateway PC that's optimized for Windows 95! This combination of superior system performance and Windows 95 will revolutionize the way PC users compute! It's all part of Gateway 2000's formula of bringing customers the latest technology for the best PC values on the planet. ***For details about the Gateway's Windows 95 Secret Code, customers can call us at the 800 number below and ask!"***

"Brilliant Ted!" exclaimed 2000. "I can hardly wait to get the Secret Code to Windows 95."

"Yes, the wait will soon be over," said Ted. "Thanks again, 2000. Oh, you didn't run into any problems did you?"

"Nah, piece of cake," she replied.

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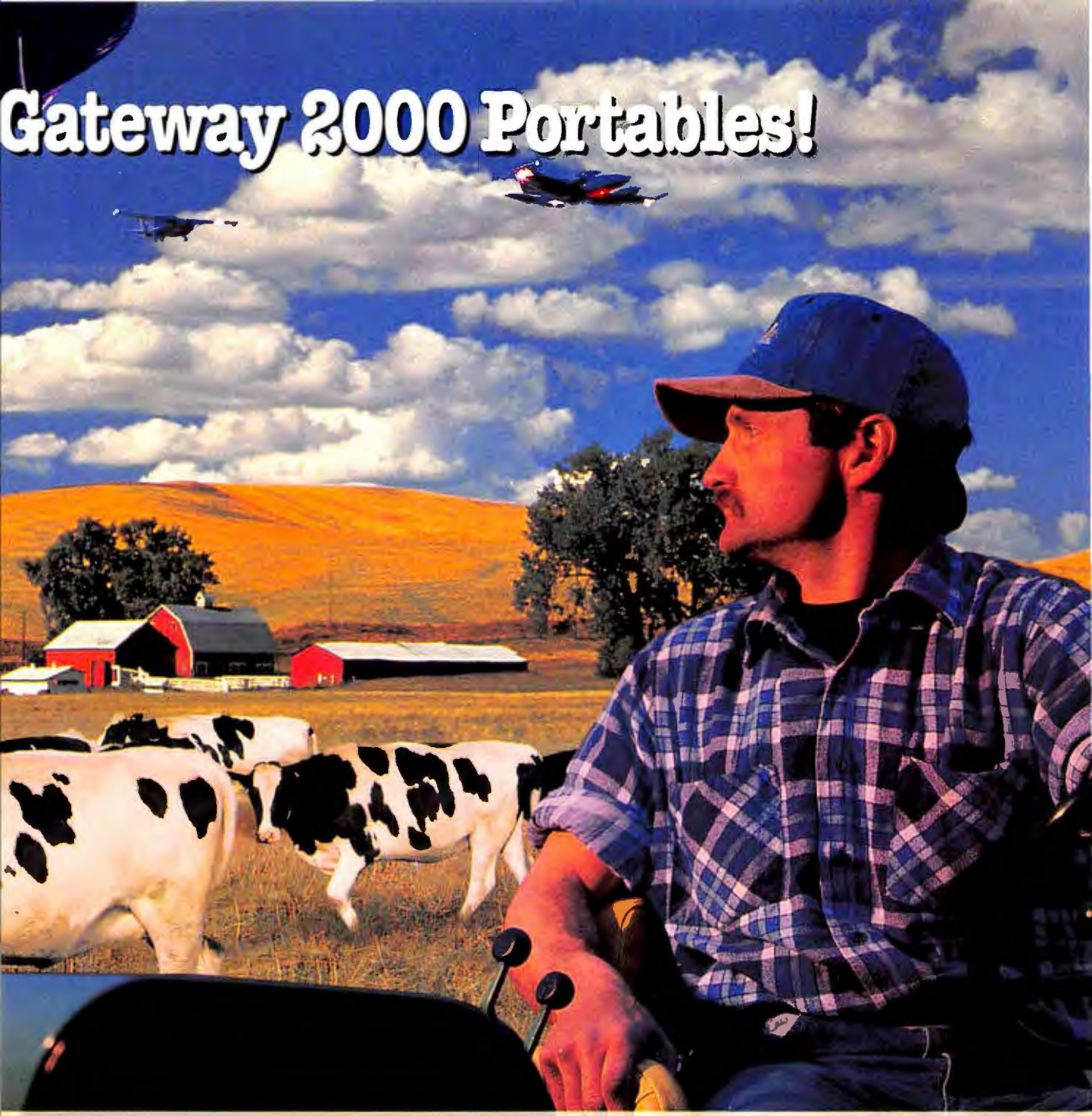

color, brightness and clarity. You'll also find that the 10.4-inch screen has 23 percent more viewing area than a 9.4-inch screen, allowing you to see more spreadsheet cells, full word processing documents, and giving you the ability to read small fonts better.

The Gateway Liberty adds even more mobility with its infrared (IR) technology. Using wireless file transfer, you can transfer files between your Liberty and desktop (or between two Liberty PCs!) without cables. IR is also important for tomorrow's portable computing needs. Windows™ 95 was engineered with IR in mind, and IR-ready printers will be available soon.

Not enough battery life and suddenly your portable PC isn't much help! Nickel metal-hydride batteries (NiMH) on the Liberty will give you the best performance. You'll get up to four hours or more with power management. The Liberty was also designed to be upgradable to lithium ion batteries.

The value of your Gateway portable PC goes up, up, up with pre-installed software applications. All Gateway portable PCs include Microsoft® Works for Windows™ 3.0 or MS Office Professional 4.3 pre-installed. You also get the OAG® FlightDisk,® World Clock, and Ascend® software applications.

Looking for ways to make your getaways more productive? Call a Gateway 2000 portable sales representative today!

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4DX2-66 FAMILY PC

- Intel® 66MHz 486DX2 CPU*
- 8MB RAM
- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 4X CD-ROM, 16-Bit Sound Card & Altec™ ACS-5 Speakers
- TelePath™ IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 14" .28 CrystalScan® Color Monitor
- 7-Bay Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS® 6.22 & WFW 3.11
- Generations Software Collection
- 3-Year Limited Parts Warranty

$1699

P5-75 FAMILY PC

- Intel 75MHz Pentium® Processor*
- 8MB EDO Performance-Enhanced Memory
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
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- 3.5" Diskette Drive
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- MS-DOS 6.22 & WFW 3.11
- Generations Software Collection
- 3-Year Limited Parts Warranty

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P5-100 FAMILY PC

- Intel 100MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X 3-CD Changer, 16-Bit Sound Card & Altec ACS-5 Speakers
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 17" .26dp Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey® Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- Generations Software Collection
- 3-Year Limited Parts Warranty

$2899

Generations SOFTWARE COLLECTION

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- Intel 66MHz 486DX2 CPU*
- 8MB RAM
- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 2X CD-ROM
- 3.5" Diskette Drive
- 14" .28 CrystalScan Color Monitor
- 7-Bay Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Works 3.0 & Money 3.0
- 3-Year Limited Parts Warranty

$1449

P5-75

- Intel 75MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X CD-ROM
- 3.5" Diskette Drive
- 15" .25dp Vivitron Color Monitor
- 7-Bay Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf® & Money 3.0
- 3-Year Limited Parts Warranty

P5-75 $1999
P5-90 $2199

(90MHz Pentium processor, 730MB HD, 8MB RAM, 256KB cache)

P5-100 BEST BUY

- Intel 100MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X 3-CD Changer
- 3.5" Diskette Drive
- 15" .25dp Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf & Money 3.0
- 3-Year Limited Parts Warranty

$2499

P5-120 BEST BUY

- Intel 120MHz Pentium Processor*
- 16MB EDO Performance-Enhanced Memory
- 256KB Pipelined Burst Cache
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X CD-ROM
- 3.5" Diskette Drive
- 15" .25dp Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf & Money 3.0
- 3-Year Limited Parts Warranty

$2999

P5-120XL

- Intel 120MHz Pentium Processor*
- 16MB EDO Performance-Enhanced Memory
- 256KB Pipelined Burst Cache
- 1.62GB 10ms IDE Hard Drive w/ Mode 4 Support
- PCI Enhanced IDE Interface
- ATI Mach 64 Graphics Accelerator with 2MB VRAM
- 4X 3-CD Changer
- 16-Bit Ensoniq® Wavetable & Altec ACS-31 Speakers w/ Subwoofer
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 17" .26dp Vivitron Color Monitor
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- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf & Money 3.0
- 3-Year Limited Parts Warranty

$3999

If you can't find a system that suits your needs, call us and we'll be happy to custom build one for you.

***MS Office Professional 4.3 includes MS Word, Excel, PowerPoint® presentation graphics program, and Access® database.*

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

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Revolutionize your communication needs with the TelePath 28.8 fax/modem Communication Center. Internal fax/modem, 28,800bps modem, V.34, with 14,400bps fax capability. Sends and receives both faxes and voice messages. Includes a CompuServe® trial membership. **$149** *(TelePath™ IIv 14.4K 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**

Multimedia

New 4X Three-CD Changer

Enhance the value and usefulness of your PC with the 4X three-CD changer. It supports multisession photo CDs and XA format, enabling simultaneous audio and data with additional hardware. You'll have access to three times the amount of information of a regular CD-ROM drive and the ability to switch between programs. **$100** *(upgrade from 4X CD-ROM)*

Audio Multimedia Kit

Here's everything you need to add multimedia to a Gateway PC.

- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- 2 Altec™ Lansing ACS-5 speakers

$99 *(with system purchase)*

Wavetable Audio Multimedia Kit

Once you've heard wavetable audio, basic audio will never do!

- Ensoniq® Soundscape™ 16-bit wavetable sound card, MT-32 and FM mode compatible. Supports most software for popular sound cards and standards including General MIDI, Sound Blaster, AdLib, Roland MPU 401, MS Windows Sound Sytem and MT 32
- New Altec Lansing ACS-31 three-piece speaker system
- Blue Ribbon Sound Works' SuperJAM! jr. software

$209 *(with system purchase)*
$110 *(upgrade from systems with 16-bit sound card and Altec speakers)*

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High-performance 16-bit Ethernet cards.
16-bit Triple Media Card supports BNC, AUI and Twisted Pair media **$109**
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Infomover™ brand NE2000plus™ Ethernet cards
Triple Media Card w/ 25-foot coax cable **$89**
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Call the Gateway 2000 special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers. Sales hours: 7am-10pm Weekdays.

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Seven exciting software applications specifically for kids with Sesame Street® Numbers; My First Incredible, Amazing Dictionary; The Cat Came Back; The Yukon Trail™; Keroppi Day Hopper; Math Blaster®: In Search of Spot; and Sing-Along Kids™. Also includes a 20-disc storage rack and microphone. **$99**

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Seven top-of-the-line flight CDs. Includes TFX™: Tactical Fighter Experiment, Aces Over Europe, Maximum Comanche®, Strike Commander, Privateer, Wing Commander™ Armada; and Warplanes. You also get a joystick and 20-disc storage rack. **$99**

Sports Pack

Six action-packed sports applications. Includes Unnecessary Roughness '95™; Hardball 4™; FIFA International Soccer; PGA Tour® Golf; NHL® Hockey '95; and NASCAR® Racing. Also includes Gravis GamePad™ and CD holder. **$99**

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Gateway 17-Inch Vivitron™ Color Monitor

Non-interlaced color monitor using Sony® Trinitron® tube technology, capable of 1280 x 1024 resolution in non-interlaced mode, .26 dot pitch.
Upgrade from a 14-inch CrystalScan® 1024NI monitor **$360**
Upgrade from a 15-inch Vivitron monitor **$260**
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A full-featured 300dpi printer loaded with enhanced PCL 5 and 26 scaleable typefaces with 1MB standard HP Memory Enhancement Technology. Includes parallel cable. **$559**

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Features clear, sharp 600 x 300dpi black printing on plain paper with a variety of built-in typefaces. Color option also available. Includes parallel cables.
$299 (w/out color) **$339** (w/ color)

Call for other printer options.

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers. You can also apply for the Gateway 2000 DuoLine™ MasterCard® card, issued by Dial National Bank, Des Moines, Iowa.

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Here's a small piece of big news for everyone who computes away from the office.

Pereos, the maximum mobile storage device, has arrived.

Now, if that doesn't make your eyes bug out, then you haven't arrived at home, at a hotel, or at 30,000 feet, only to discover the data you need is back at the office.

Which would you rather carry around, this cartridge or 800 floppies? (Hint: the cartridge is far more reliable.)

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It also comes complete with powerful data management software that locates and synchronizes your files and makes backup a breeze.

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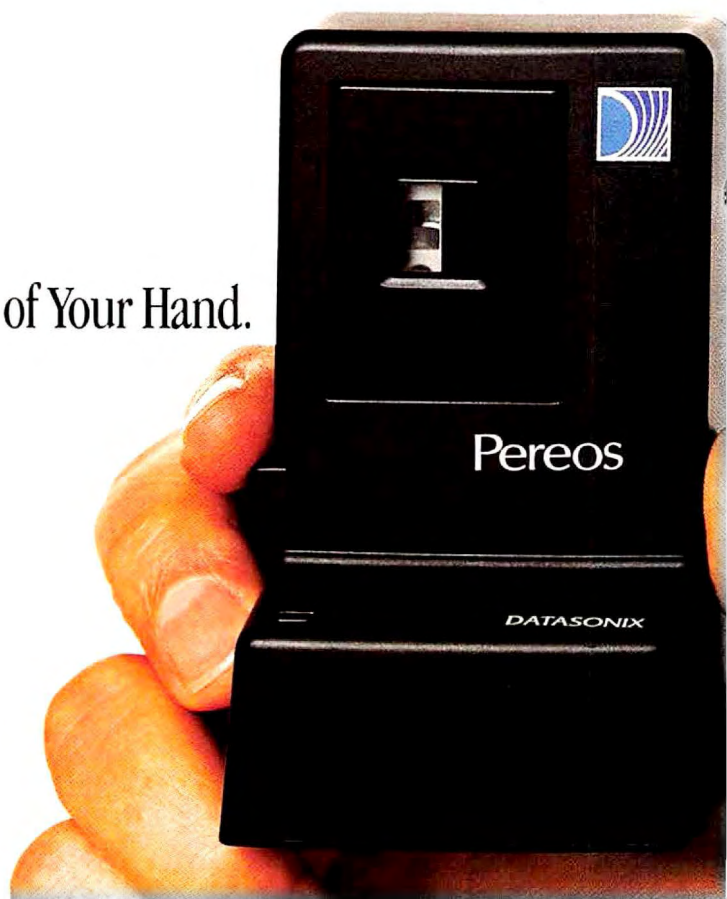


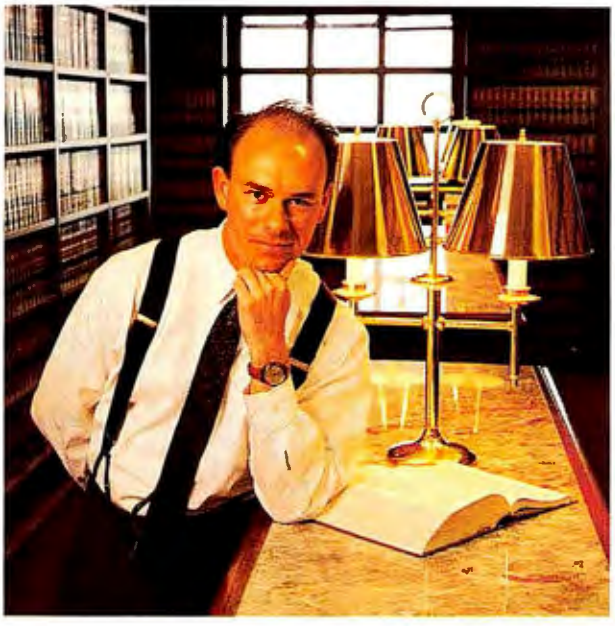
Circle 113 on reader service card

Upgrading to Windows 95

In the constantly changing universe of personal computer technology, there are three fundamental precepts. First: Today's state-of-the-art system is tomorrow's doorstop. Second: When Microsoft upgrades an operating system, even the most resistant among us—sooner or later—must follow suit. Third: Facing change is rarely easy.

And confronted with the upcoming release of Windows 95, PC users and information systems managers everywhere are gnawing their fingernails. This mother of all software upgrades promises plenty but also seems risky. Its brand-new interface, for example, is supposed to get novice users up and running quickly, while experienced users will reportedly get more power from their PCs. But will Win 95 also unlock a Pandora's box of problems? And how do you get a company full of PC users to make the switch in anything close to an organized fashion?

This month Steve Kaiser, information systems manager for Seed and Berry, a Seattle patent, trademark, and copyright law firm that has been working with a beta version of the product since September 1994, offers words of wisdom for upgrading to the new operating system. —*Ed.*



GEOFF MANASSE

Steve Kaiser is the information systems manager for Seed and Berry in Seattle.

The Parent Trap

A good information systems manager is like a good parent—watchful without being overprotective. As an IS manager, I must protect corporate information systems and equipment, while relaxing the controls enough to let employees become productive, responsible users.

The company I work for, Seed and Berry, is a 33-year-old, 120-employee law firm. I'm responsible for managing a network of 115 486-based PCs that store, route, and process nearly 100,000 documents for 2500 clients. Besides answering questions, resolving problems, and organizing training, I also install, configure, and upgrade systems and software—usually doing the latter over long nights and weekends. And in my spare time, I'm supposed to plan a technology strategy for tomorrow.

Because our firm has doubled in size since we switched from DOS to Windows 3.1 four years ago, the IS workload has also doubled. Accordingly, I'm always encouraging users to become more self-sufficient. Our users include busy attorneys, and getting them to attend software training classes is a challenge.

Other than our expert users, most Seed and Berry employees learn only the basic functions of Word, Excel, or Access—whatever they need for daily use. To switch printers, install a new program, or create a Windows icon for a DOS application, they call me.

Our firm is located in Seattle, where everything Microsoft does makes news. So the more computer-literate users at the firm were excited when they heard about the benefits of Windows 95: a new, friendlier interface; support for long file names; the ability to install devices such as printers, fax-modems, and scanners without fiddling with IRQs; support for 32-bit applications; faster printing; and an electronic in-box that handles faxes, E-mail, and online services.

Most exciting for me, however, was the promise that the new environment would make life easier by automating many of the tasks I handle, while putting more control into the hands of users. Given all these potential benefits, Seed and Berry volunteered our company to be a beta test site in September 1994.

Radical Windows

Almost as soon as I loaded the software, I realized how radically different Windows 95 is from Windows 3.1 or even Windows for Workgroups. Fortunately, we had already upgraded most of our hardware to 486s with at least 8MB of memory. Thus, upgrading hardware was not an issue for us. I figured we'd be able to take the new environment out for a test drive with a minimum of difficulty, but I decided to play it safe. I developed a strategy to help us make the switch and deal with any difficulties we encountered.

First, I took a good hard look at what the environment would let me administer, control, and plan. Windows 95 offers options for many administrative functions, such as requiring password

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access or allowing people to share files on hard drives. So, for example, I customized the setup procedure to prevent users from seeing (or acting on) the options best reserved for the network administrator, such as the capability to change network protocol settings.

Next, I set up a pilot program, in which a core group of computer-savvy users could play with Windows 95 before anyone else. This group would use Windows 95 to perform all their normal work. If they could show that the new operating system wasn't scary, other people might become curious enough to try it.

Before installing the software, I held a few training sessions for the core group. I also made some decisions that forced people to swim. For example, Win 95 offers a choice of interfaces—the old, familiar Windows 3.1 and the new interface. In all cases, I installed only the new interface.

Once Windows 95 was installed on these early users' systems, I held regular meetings with them to discuss any problems they had run into. In all cases, the users liked the new operating system and said the transition from Windows 3.1 to Windows 95 was easy. They reported only one glitch—since fixed—a bug that mixed font sizes at random.

All in all, we have been pleased enough with our experiment to enroll in Microsoft's Preview program: As of March, we're paying $30 per user to run the prerelease version of the software on the machines of an additional 30 users. By the time August rolls around (assuming Windows 95 is on schedule), we should have all our employees up and running on Win 95. And it has already made a difference in my work. The core group of users say they're more productive, and they call on me less frequently than before. That means I have more time to investigate new technologies and enjoy my weekends.

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.*

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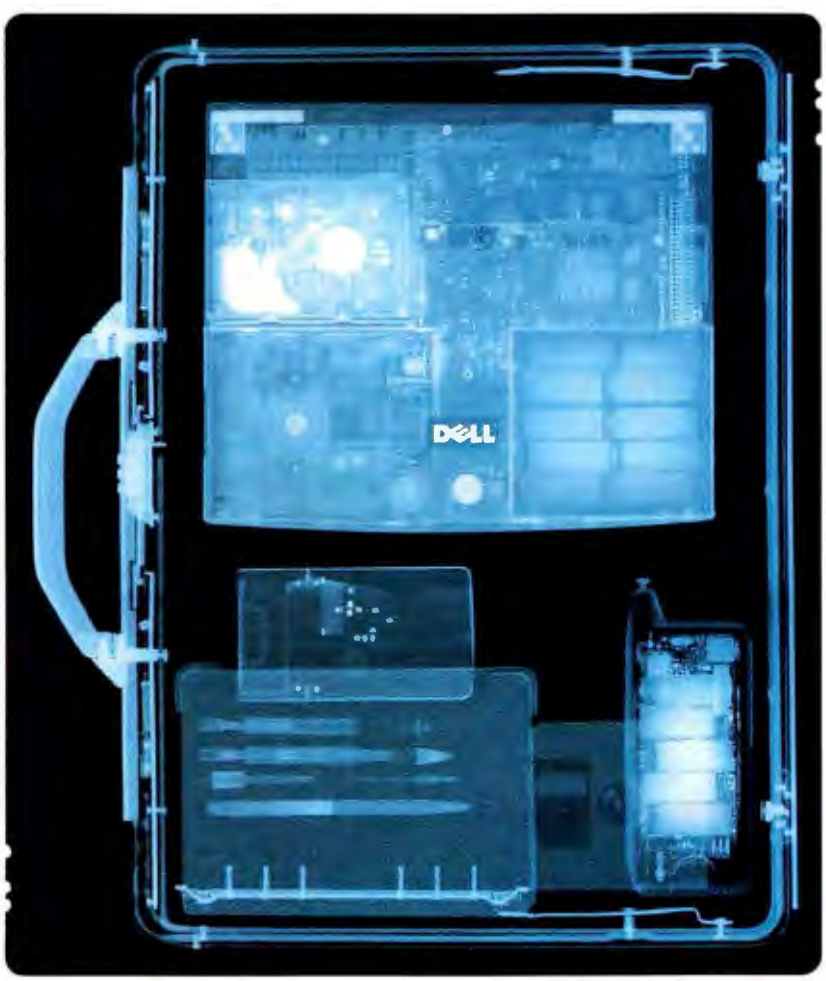

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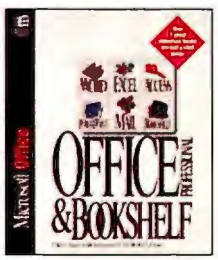

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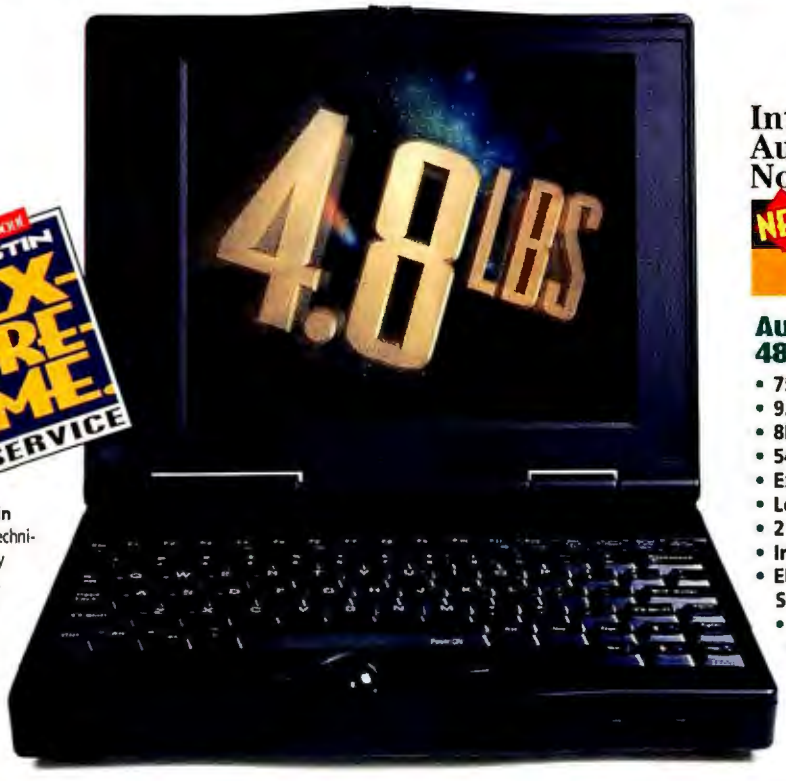

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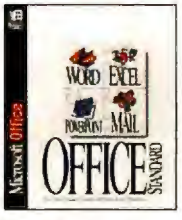

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DX2-100 $499		P5-100 $1099

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CD-ROM: Today's Big Sneeze?

ERIC BUTLER

In the early days of the film business, folks flocked to Kinetoscope parlors to squint at a state-of-the-art production: a moving image of a mustachioed fellow named Fred Ott silently sneezing.

New entertainment technologies are hard to resist, even in their comically stumbling beginnings. In the infancy of various media, people crowded around Victrolas to listen to scratchy recordings, adjusted their crystal sets until faraway singers crackled above the static, and peered at baseball games on TV screens so tiny the ball was virtually invisible. When a new technology is compelling enough, its limitations don't matter: The medium truly is the message.

In the computer industry, entertainment arrived with the video game. Today we chuckle at the crudeness of Pong, Space Invaders, and Donkey Kong; in their time, they seemed the height of accessible technology. After years of promise, their interactivity has now combined with other forms of information and entertainment to produce so-called multimedia, mostly in CD-ROM form. Once more we are at the beginning of an era, a time when pioneers must overlook or overcome major problems as a medium finds its way technically and creatively. All this will get better; for now we must deal with failings that may seem humorous in 10 or 20 years.

Take installation: With DOS or Windows, getting a CD-ROM to run can be more frustrating than putting up a TV antenna rotator. Disney's debacle with its CD-ROM of The Lion King was widely reported. I've known PC-savvy people who gave up trying to install even the best-selling Myst on equipment just to the left of "standard."

My least favorite recent surprise? Installing QuickTime 2.0 for Windows makes most discs using earlier versions unplayable. Imagine the user's delight in trying to figure out why a disc that ran just fine only yesterday is completely dead today! A patch is available online; it isn't perfect.

Then there are the display problems, only some of them related to the classically terrible Windows drivers. The seven dwarfs of multimedia video are Tiny, Grainy, Fuzzy, Jerky, Blocky, Buggy, and one you can't see at this resolution. I've spotted exceptions: The otherwise lame Blown Away game had full-screen video clips that were surprisingly good—for a CD-ROM. But the sad truth is that digital video demands a medium designed for it, and that medium is a few years away.

The seven dwarfs of multimedia video are Tiny, Grainy, Fuzzy, Jerky, Blocky, Buggy, and one you can't see at this resolution.

Images: Handle With Care

Since developers insist on producing for the least common denominator—640 by 480 pixels and 256 colors—even still images require careful handling. Some discs succeed: The travel photos in Medio's Safari and the paintings in Corbis's A Passion for Art look particularly good, except when they include large areas of continuous tones. Still, higher resolutions and more colors are desperately needed.

So are better interfaces. For now, no two are alike, except in their awfulness. Personal pet peeves: disabling the keyboard so you can't use the <Page Up> and <Page Down> keys to move through text, and not indexing reference material so you can search it. Offenders are legion.

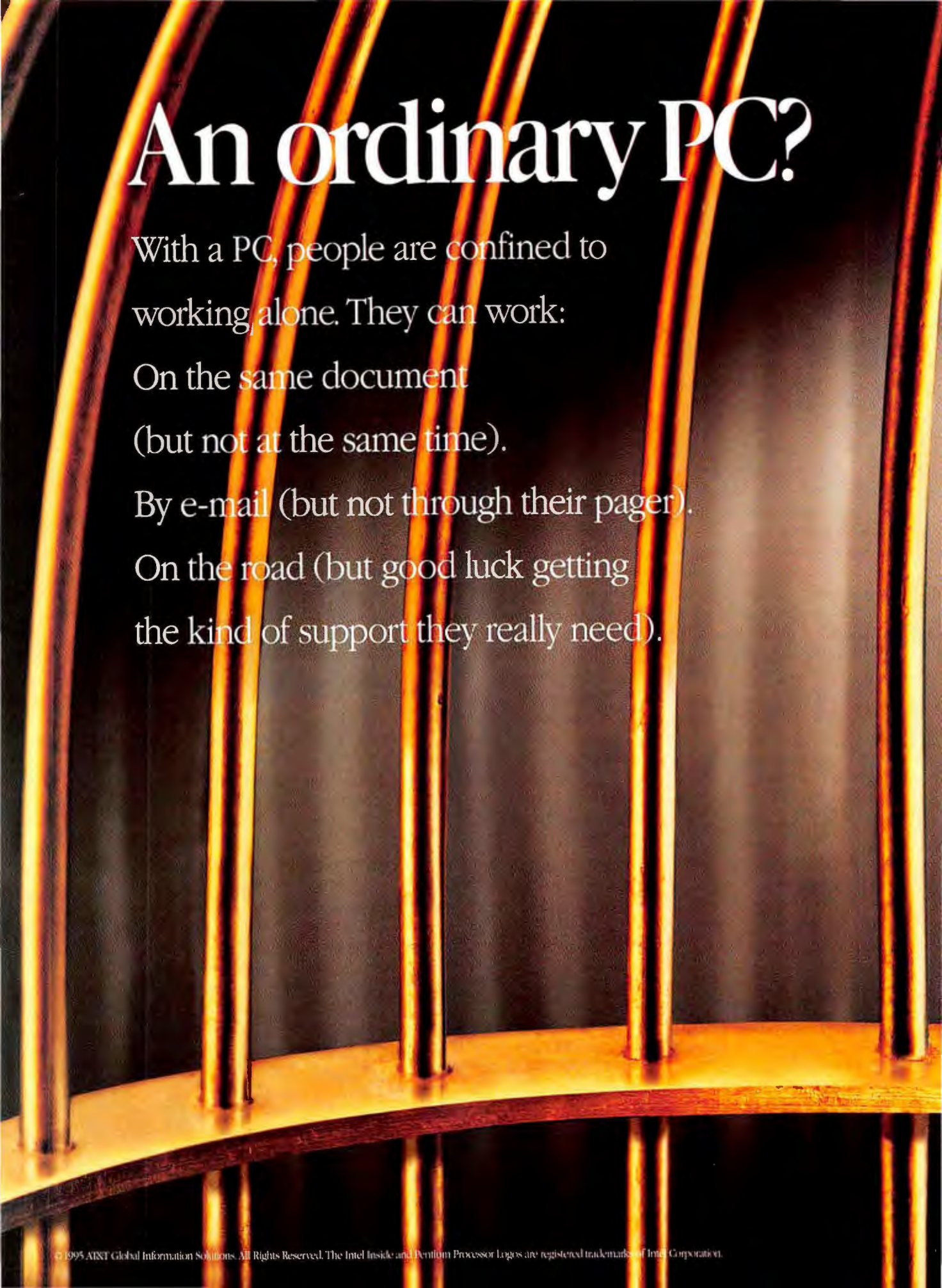
Some vendors apparently believe that anything at all can sell on CD-ROM, but they are beginning to have a rude awakening. Many titles, like GTE Interactive's awful Vitsic series, are essentially videotapes transferred with all the interactivity (and none of the resolution) of...well, a videotape. Many, many books have been turned into CD-ROMs; with the exception of some reference titles, the discs almost always cost more and are almost always inferior.

Voyager deserves special mention for its titles, which—like my favorite, Dazzeloids—often express a personal point of view, all too rare in this age of corporate media domination. Microsoft, the epitome of corporate domination, produces pretty good CD-ROM titles, too. Cinemania is useful if incomplete; good as they are, Microsoft's baseball and basketball references would be better if they were indexed. But no publisher's logo guarantees quality. Both Voyager and Microsoft have delivered their share of clunkers.

This technology will undoubtedly improve. But in the meantime, we can expect to see modern counterparts of Fred Ott's sneezes—and worse. As with any medium, the item in shortest supply is the one thing technology can't replace: creativity.

By Stephen Manes

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*



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PENTIUM PCs PICK UP THE

Another power boost: Intel bumps up Pentium speed by 11 percent—and three system makers respond with faster, pricier PCs.

FASTEST YET: Pentium systems for the power hungry (from left): Dell Dimension XPS P133c, Gateway 2000 P5-133XL, and Micron P133 Millennia.

Edited by Andy Reinhardt

PACE TO 133 MHZ

TEST DRIVE If you're a power-hungry PC user with a system based on the fastest Pentium processor available, you've got a status symbol. But enjoy it while you can—at the rate Intel is rolling out new Pentiums, no PC stays at the top of the heap for long.

Case in point: Intel has just introduced a Pentium that clocks in at 133 MHz, bringing to an end the 120-MHz model's brief reign. Just two months after our first look at 120-MHz Pentium PCs (*Top of the News*, May), we're putting preproduction 133-MHz systems from Dell, Gateway 2000, and Micron through their paces.

There's no need to panic if you've invested in a 120-MHz machine. These new 133-MHz PCs, starting at around $4000 in the configurations we tested, deliver a performance edge that's modest, not monumental—much smaller than the 20 to 30 percent advance the fastest Pentium-120 systems achieve over typical 100-MHz products. The price differential is modest too. Dell's 133-MHz system costs $275 more than an identically configured 120-MHz version; Micron's is $300 more, and Gateway's is $400 more.

Using Intel's clock-multiplying technology, the 133-MHz Pentium runs at twice the speed of its 66-MHz system board, or about 11 percent faster than a Pentium-120 (which runs at two times the speed of a 60 MHz system board).

Our Windows and DOS benchmark suite indicates a greater performance boost

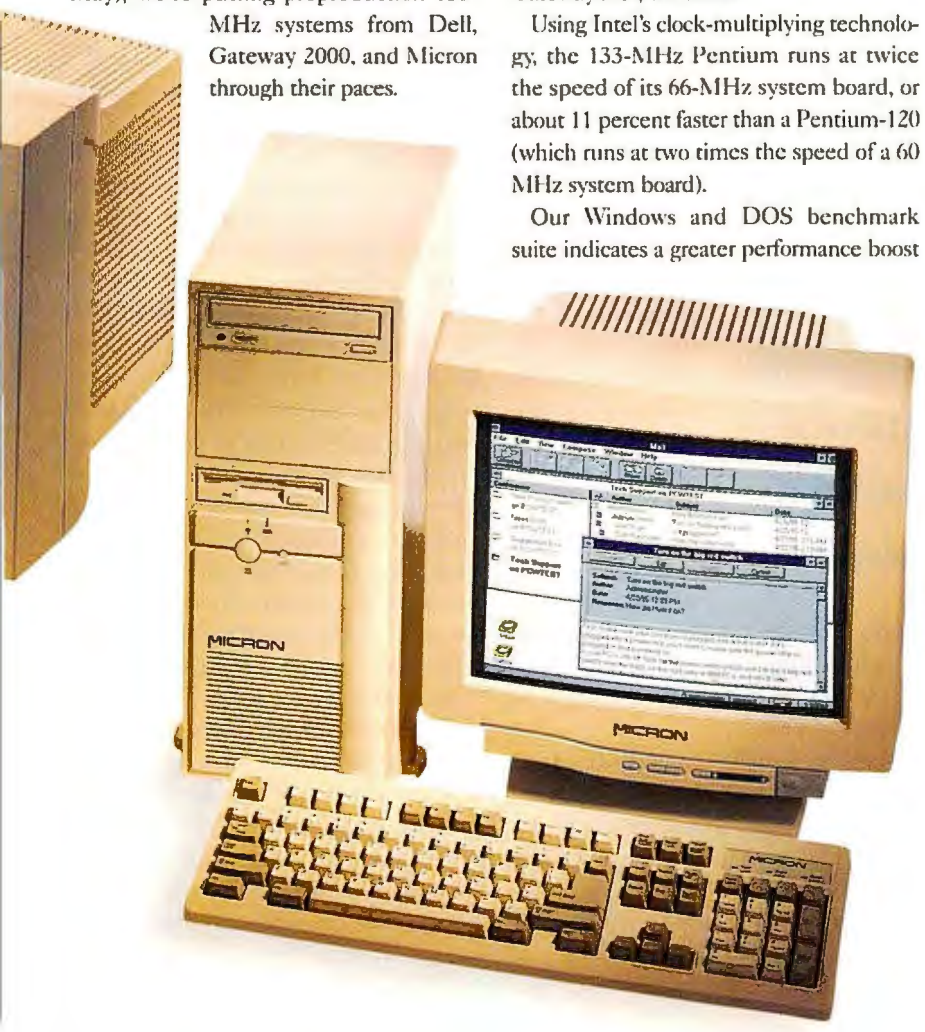


PHOTO: JOHN GREENLEIGH; ILLUSTRATION: JEFFREY PELO

Breaking News

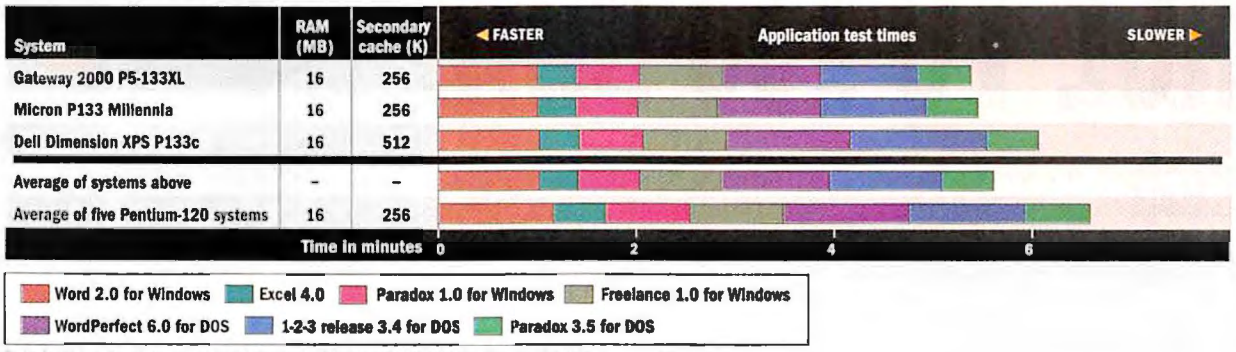
PAYING THE PRICE FOR WIN 95: The cost of upgrading to Windows 95 could be as high as $1600 per user, say industry analysts. The direct cost will be less than $500 per workstation: about $80 per machine for Windows 95 itself, plus $60 for technician labor and $350 for user training, says Dataquest senior analyst Rob Enderle. But when you add the cost of buying Windows 95 versions of application software (assuming each machine uses four packages), the price could jump by another $1100. On the other hand, a new study from the Gartner Group projects companies can save $1180 per year per user in support costs by using Windows 95 instead of Windows 3.1. "Windows 95 is a heck of a lot cheaper to support," says Dataquest's Enderle. "The operating system is designed to be installed from a central server, along with the applications." —J. A.

WIN 95 ADD-ON: Microsoft intends to ship a pack of add-ons for Windows 95 shortly after the operating system becomes available. Microsoft Plus will include an enhanced compression utility and Microsoft's Internet Jumpstart kit. Drive Space, Microsoft's existing compression utility, will be enhanced to support hard disks up to 2GB, and the user can now set compression levels. The Jumpstart kit, which includes Microsoft's Internet Explorer, is designed to get you up any running quickly and easily on the

(continued on page 65)

TEST REPORT

Pentium-133s: Gateway and Micron Finish Neck and Neck



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

over a Pentium-120 than 11 percent, however: Our three Pentium-133s averaged over 14 percent faster than the average Pentium-120.

But if you compare each of our three Pentium-133 models against its manufacturer's Pentium-120 counterpart, the performance difference is smaller, from 6.5 to under 8 percent. Why? Because each company's Pentium-120 enjoys the benefit of the same recent technology that its Pentium-133 counterpart does. For example, all three companies use such speed-enhancing components as Intel's Triton PCI chip set, 16MB of EDO RAM, high-speed cache memory, and Mode 4 Enhanced-IDE hard disks in their Pentium-120s. Unfortunately, not all the Pentium-120s that we tested have these advantages.

Gateway 2000 and Micron tie for the honor of finishing our test suite in the fastest time ever—14 percent faster than the average Pentium-120 system.

Not all Pentium-133 systems will sport these components, either: USA Flex and AT&T are both introducing units that won't use the Triton chip set or EDO RAM. For USA Flex, it's simply a matter of the chip sets and memory being in short supply; when they're more plentiful, the company will introduce a Pentium-133 PC that uses them. AT&T, however, chose not to use them because the Triton chip set can't support dual-processor PCs such as its Globalyst 730, and EDO RAM doesn't offer parity memory checking.

Of the Pentium-133s, the Micron P133 Millennia and the Gateway 2000 P5-133XL finished neck and neck overall, with the Dell Dimension XPS P133c slightly behind. The Micron and Gateway tied statistically for the honor of finishing our test suite in the fastest time ever, each around 10 percent ahead of the Dell. But the Dell's weakness was almost entirely with DOS applications; look only at our Windows benchmarks, and speed differences among the three systems aren't significant.

Beyond Performance

These systems offer a variety of creature comforts that help explain their price tags. For $4498, Micron's P133 Millennia provides a 1.6GB hard drive, one of the first 6X CD-ROM drives on the market, a 64-bit Diamond Stealth video card with 2MB of VRAM, a 15-inch monitor, a Sound Blaster 16 sound card, Jensen speakers, and a 28.8-kbps modem. Gateway 2000's P5-133XL at $4399 gives you a 1.6GB hard drive, a quad-speed CD-ROM drive that handles three discs at a time, a 64-bit video card with 2MB of VRAM, a 17-inch monitor, a wavetable sound card, Altec-Lansing speakers, and a 28.8-kbps modem.

The $3999 Dell Dimension XPS P133c boasts a 17-inch monitor, a 1GB hard drive, U.S. Robotics' V.34 28.8-kbps modem, Creative Labs' high-end Sound Blaster AWE32 wavetable sound card, Yamaha speakers, and a quad-speed CD-ROM drive. This Dell system comes with Number Nine's new FX Motion video card—a 64-bit video card with 2MB of VRAM—while the 120-MHz Dell we tested sported Number Nine's higher-end Imagine card, a 128-bit model with 4MB of VRAM. The video card may explain why the 133-MHz Dell lagged behind the Micron and Gateway in DOS applications and was actually *slower* than the 120-MHz Dell in our benchmarks using 1-2-3 for DOS.

While Dell concedes that the FX Motion may cause lagging performance with DOS-based applications, the company says it performs comparably to the Imagine at most resolutions and color depths. The card has one compelling feature the Imagine lacks: built-in support for the MPEG motion video compression standard, which

ILLUSTRATED DROP CAPS: GORDON STUDER

lets the Dell play back full-screen MPEG video clips that appear nearly as crisp and smooth as broadcast TV images—a feat that previously required a separate MPEG card such as Sigma Designs Real Magic. The Micron's Diamond Stealth card, when equipped with an option card, can also play back MPEG video clips.

If you find these systems' prices intimidating, bear in mind that PC manufacturers may initially be able to obtain only limited Pentium-133 chips and are likely to put them in fully loaded big-ticket PCs like the ones we tested. Both Dell and Gateway plan to use the chip only in high-end models at first, but Micron will offer a $2799 Pentium-133 configuration aimed at home users.

Dell's system is the least expensive. Micron makes the smallest percentage price jump to 133 MHz. Gateway 2000 offers the best price/performance ratio.

The Pentium-133's arrival is likely to help lower the prices of PCs based on other, more plentiful Pentium models. Work-Group Technologies, a Hampton, New Hampshire, research firm, predicts the average price of Pentium PCs will plunge by $600 between June and September, in part because Intel typically cuts the cost of older chips shortly after introducing a new model.

Of course, it's a safe bet the price of 133-MHz Pentium PCs will also tumble over time, as did 100-MHz PCs and earlier Intel-based systems. However, Pentium-133 systems may not provide the best value for users of typical Windows applications until the end of the year, suggests Mike Feibus, a principal at Mercury Research in Scottsdale, Arizona. For now, he says, "the Pentium-100 is the clear sweet spot in terms of price and performance."

By the time Pentium-133 PCs enter the mainstream, Feibus says, AMD, Cyrix, and NexGen may be well on their way to making processors that can keep pace with the 133-MHz Pentium. Intel itself plans to introduce a 150-MHz Pentium later this year, as well as its next-generation processor, code-named P6, which at 133 MHz is expected to provide roughly double the performance of a 90-MHz Pentium.

—Harry McCracken

Dell Dimension XPS P133c

Key Features: 16MB RAM • 1GB hard drive • 28.8-kbps modem • Number Nine FX Motion video card with 2MB VRAM • 17-inch monitor • Quad-speed CD-ROM drive • Sound Blaster AWE32 sound card
Pricing: $3999
Availability: Mid-June
Dell Computer Corp., 800/289-3355
Reader service no. 892

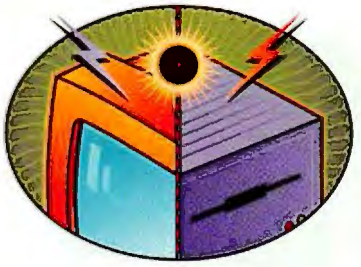
Gateway 2000 P5-133XL

Key Features: 16MB RAM • 1.6GB hard drive • 28.8-kbps modem • Video card with 2MB VRAM • 17-inch monitor • Three-disc quad-speed CD-ROM drive • Wavetable sound card
Pricing: $4399
Availability: Mid-June
Gateway 2000 Inc., 800/846-2000
Reader service no. 893

Micron P133 Millennia

Key Features: 16MB RAM • 1.6GB hard drive • U.S. Robotics 28.8-kbps modem • Diamond Stealth video card with 2MB VRAM • 15-inch monitor • 6X CD-ROM drive • Sound Blaster 16 sound card
Pricing: $4498
Availability: End of June
Micron Electronics, 800/223-6571
Reader service no. 894

ILLUSTRATION ABOVE RIGHT: JEFFREY PELO



Breaking News

(continued from page 63)

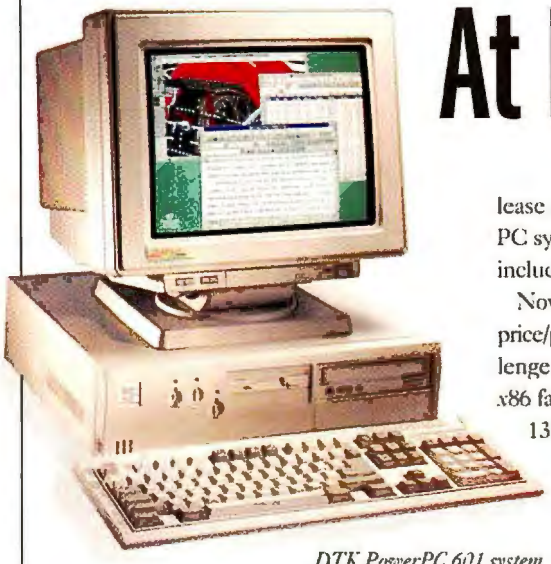
World Wide Web. For example, it walks you through the process of signing up with an Internet provider and configuring your system, and it helps you create an icon to take you directly to your favorite page on the Web. Though Microsoft would not confirm a price, the product is expected to sell for less than $50. —E. H.

SAFER BUSINESS ON THE NET: The new Commerce Server from Netscape Communications provides secure financial transactions via the World Wide Web, including online banking and credit card purchases. It uses public-key encryption technology from RSA Data Security to foil cybercrooks, encrypting transmissions between users and the Web server. The Commerce Server runs on UNIX or NT systems. Other Netscape products include a Merchant System to establish electronic malls in cyberspace, and a Publishing System for newsletters and other publications. —J. A.

USE THE INTERNET TO GET YOUR CC:MAIL: Lotus is expected to ship software this year that will let cc:Mail users retrieve messages from any PC with Internet access, using a Web browser instead of the normal cc:Mail client. Lotus previewed the product at the Electronic Messaging show in May. The software will reside on your company's mail server. Pricing has not been set, says Mark Stieglitz, marketing manager for cc:Mail. —L. M.

(continued on page 67)

At Long Last, PowerPCs



DTK PowerPC 601 system

For two years you've heard about the promise of the PowerPC: prices comparable to those of Pentium PCs along with fasten-your-seat-belt speeds that make the Pentium look as if it's out for a Sunday drive. PowerPC systems aimed at Windows users are finally coming to market. Microsoft and Motorola are wrapping up a version of Windows NT for the PowerPC (before IBM finishes its PowerPC release of OS/2), and a small fleet of PowerPC systems will be announced this month, including machines from IBM and Canon.

Now comes the hard part: Will PowerPC price/performance be strong enough to challenge Intel's relentless improvements to its x86 family? The latest Pentium, clocked at 133 MHz, is slated to be followed in months by a 150-MHz version and the next-generation P6.

Another hurdle facing PowerPC system vendors: The only applications that can perform competitively against Intel systems are 32-bit programs compiled for the PowerPC version of NT. Though programs written for DOS and Windows 3.1 will execute on PowerPCs, they have to run through an emulator (provided to Microsoft by Insignia Solutions)—software that mimics a 286 chip.

IBM says it expects DOS and 16-bit Windows programs to run at about one-third their normal rates, meaning that a 100-MHz PowerPC would run x86 software at roughly the same speed as a 33-MHz 486. The success of the PowerPC thus depends on availability of new 32-bit applications—especially graphics and multimedia programs that take advantage of the PowerPC's fast floating-point unit.

System Choices

Three suppliers will lead in early PowerPCs: IBM, Motorola, and start-up FirePower Systems. Most PowerPCs will come from one of these firms, though sold under many labels. A group of Taiwanese vendors, including DTK, will also sell systems. Neither U.S. nor Taiwanese models will be compatible with Apple's PowerMacs.

Motorola's Computer Group said last fall it would sell PowerPC systems running Windows NT. The company's PowerStack systems are set to ship as soon as Microsoft releases the new Windows NT 3.51.

The entry-level Motorola, the DT603-

Reality Check: Will You Buy PowerPCs That Run Windows NT?

▶ **Name and title:** Marshall Fernholz, PC network manager for the American Medical Association in Chicago.

▶ **1995 PC products budget:** $856,000

▶ **PC vendors:** Primarily IBM, some Apple Macintoshes and PowerMacs

▶ **Are you more likely to purchase PowerPCs now that Windows NT is available for them?** "That may be a good reason to buy them," Fernholz says. "We'll take a look when IBM releases machines." Until now, IBM's PowerPC systems have run only AIX, the company's UNIX variant. But Fernholz says Windows NT makes PowerPC systems more appealing to more companies. He would like to make Windows a universal platform for the 1100 users at his office, who now use both PCs and Macs.

PowerPCs running Windows NT could replace PowerMacs, he says. If PowerPCs deliver more performance than Pentiums at comparable prices, they'll be compelling. The extra speed will help multimedia, desktop publishing, and future needs such as teleconferencing.

IBM's reliability and support make the company Fernholz's favorite PC vendor: A few months after IBM ships PowerPCs running NT, he'll buy a few for his power users. They'll test them using various applications, judging performance and ease of use. If the systems do well and prices are good, he'll buy more. "It's great to see the competition for Intel," Fernholz says. "It makes everyone innovate quickly."

▶ **Fernholz's tips for those considering PowerPC systems:**

1. Examine performance. See how PowerPC speed compares to Pentium speed for applications you use.
2. Assess needs. Which applications require high performance?
3. Think big. Buy from a big-name vendor to ensure good support.
4. Run trials. Test a few systems using your most demanding apps.

PHOTOGRAPHS: TOP LEFT, JIM HILDRETH; LOWER LEFT, ILENE EHRLICH

Windows NT PowerPC Applications Trickle In

The following programs should be available by fall, except for Visio and PerfectOffice, which are expected in the first half of 1996. At press time some key vendors, such as Lotus and Adobe, had no plans to introduce Windows NT programs for the PowerPC.

PRODUCT	VENDOR	DESCRIPTION	LIST PRICE	CONTACT
Backup Exec NT 6.0	Arcada	backup utility	$695	800/327-2232
Canvas 3.5 NT	Deneba Software	graphics	$500	800/733-6322
Elastic Reality	Elastic Reality	morphing	$795	800/642-4122
Enhanced Mosaic	Spyglass	web browser	$30	800/647-8944
Microsoft Office Standard	Microsoft	application suite	$499 (street)	800/426-9400
Multimedia Designer	AT&T Multimedia	image editor	$595	800/448-6727
PerfectOffice	Novell	application suite	$659	800/451-5151
PhotoMorph 2	North Coast Software	morphing	$400	603/664-6000
Visio 3.0	Visio Corporation	drawing	$249	800/466-3335

66, based on a 66-MHz 603 processor, lists for $2611, with 256K secondary cache, 16MB RAM, a 540MB hard drive, a 2X CD-ROM drive, three PCI slots, and ethernet. The DT604-100, based on a 100-MHz 604 chip, is $3911 in the same configuration. Server models built on the 66-MHz 603 and 100-MHz 604 cost $3996 and $5996, respectively. Motorola hasn't disclosed names of any system licensees.

FirePower has identified a few customers. IPC Technologies plans to ship in June a $3995 100-MHz 604 system, the Austin PowerPlay 604, with 256K cache, 16MB RAM, a 540MB hard drive, a 2X CD-ROM, and a 15-inch monitor. Canon is set to announce three systems—a 603-based notebook and single- and dual-processor 604 desktops—in mid-June for delivery this summer. Pricing was not available.

THE POWERPC 604 has 4 million transistors.

IBM is mum about its long-awaited PowerPCs, slated for June introduction, but sources promise a line of desktops and notebooks based on 603s and 604s, with configurations comparable to Pentiums. (IBM previewed a 132-MHz 604 in April.)

DTK has an entry-level 80-MHz 601 desktop; with 16MB RAM, a 1GB hard drive, and a 15-inch monitor, it will sell for $2400 and ship in June. DTK is working on a 100-MHz 604 system for third-quarter delivery but wouldn't disclose pricing.

Desperately Seeking Software

Windows NT 3.51 is set to ship in June, but little PowerPC software is announced. A PowerPC version of Microsoft Office Standard, combining 32-bit Word and Excel with a 16-bit PowerPoint, should ship by early August. Novell plans an NT release of PerfectOffice in early 1996, while Lotus has no plans now to port SmartSuite.

The paucity of PowerPC programs may be relieved by shipment of Windows 95, says Phil Pompa, director of marketing for Motorola's RISC microprocessor division in Austin, Texas, because Windows 95 applications are relatively easily ported to Windows NT for the PowerPC.

To win in the market, PowerPCs will need better price/performance than Pentiums, but they're starting at a disadvantage. For instance, the IPC Austin system costs $1288 more than a comparably configured Dell 100-MHz Pentium system (with a 4X CD-ROM drive), which means it would have to be nearly 48 percent faster to be cost-justified.

Most analysts predict the PowerPC is destined to be a niche product—suited for engineers and high-end–graphics users. Only when *PC World* has the chance to compare Pentium and PowerPC systems head-to-head will we know if the PowerPC turns out to be a Jaguar—or a jalopy.

—James A. Martin and Andy Reinhardt

Breaking News

(continued from page 65)

GET PAGED WHEN E-MAIL ARRIVES: CompuServe and your paging service may soon team up to improve access to E-mail. CompuServe plans a link to pagers that can notify you when CompuServe mail arrives. If this sounds gruesome, take heart: CompuServe also plans "smart rules" technology that lets you specify what mail is vital enough to trigger a page. A message from your boss or a client could reach you instantly, but that pest down the hall will have to wait until you log in. CompuServe has partnerships with pager companies MobileComm, PageMart, PageNet, and SkyTel. —L. M.

SOFTWARE EXPANDS USES FOR TAPE DRIVES: A new program from 3M and PGSoft lets you use a tape drive for more than data backup: The software fools your PC into thinking the tape is a CD-ROM drive. You can store and run multimedia applications from tape. (Because tape's data transfer is typically faster than with a 4X CD-ROM, some applications may actually play better.) Tape thus becomes a practical, affordable medium for manipulating large files, such as those in imaging, desktop publishing, and multimedia. And of course, unlike CD-ROMs, tapes are rewritable. The software, expected by December, should cost around $100. It will be compatible with leading operating systems and tape standards, including QIC, QIC-SCSI, and Travan. —L. M.

Edited by Randy Ross

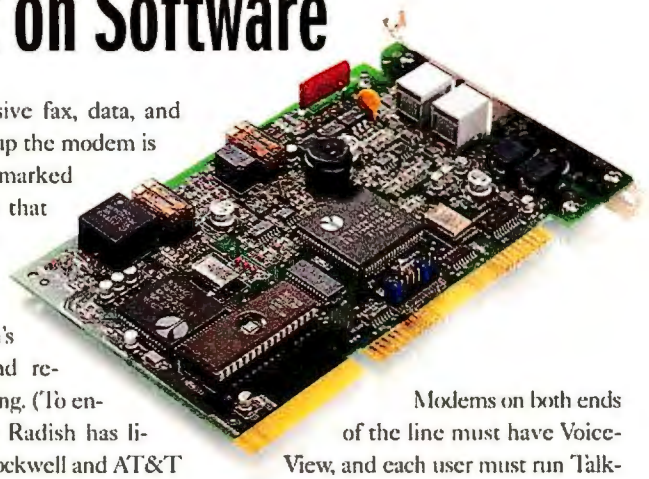
ILLUSTRATIONS: ABOVE LEFT, GORDON STUDER; ABOVE RIGHT, JEFFREY PELO; PHOTO: STAN MUSILEK

Voice/Data Modem Short on Software

TEST DRIVE ▶ Not all that long ago a modem was simply a modem. But times have changed. Built-in fax, voice mail, and speakerphone capabilities are becoming commonplace. Now, a new feature is making its appearance: the ability to handle both data and voice traffic.

The simplest and most inexpensive technology, VoiceView from Radish Communications Systems, will soon be standard in many modems. VoiceView lets a modem switch back and forth between voice and data during a phone call, promising uses in collaborative work, remote help-desk support, and online merchandising. But after testing the first modem that includes VoiceView, we find the technology's not all it's cracked up to be, at least for now.

We tested Boca Research's MultiMedia Voice Modem With VoiceView, an internal 14.4-kbps modem that lists for $154, including SofNet's FaxWorks 3.0 software, which provides extensive fax, data, and voice features. Setting up the modem is a breeze, with clearly marked jumpers and software that checks for free interrupts and COM ports. VoiceView capability is built into the modem's Rockwell chip set and requires no special enabling. (To ensure broad availability Radish has licensed VoiceView to Rockwell and AT&T for their widely used modem chip sets.)



Online Revelation

Switching between voice and data during a phone call sounds appealing. But off-the-shelf Windows applications don't work automatically with VoiceView. For now, you're limited to TalkShop, a program supplied by Radish and bundled by Boca and other sellers of VoiceView modems.

Modems on both ends of the line must have VoiceView, and each user must run TalkShop. We tried sending files back and forth while talking on the phone. Once a file was chosen and the Send button pressed, the earpiece went silent; when the transfer completed, we continued our conversation, both looking at the same document on screen. This capability is useful, but not dramatically more so than using conventional modems and two phone lines, or sending files first and then discussing them.

Nice Technology, But What Does It Do?

While VoiceView-capable modems open up numerous new types of applications, only one compatible software package is now available: TalkShop, from Radish Communications. TalkShop allows multimedia electronic commerce. You could, for example, call a company to order a product and view it on your PC screen before buying. As simple and low-cost as TalkShow is, however, vendors with limited resources may not implement both it and the Internet's red-hot World Wide Web and so may opt only for a Web presence.

Shop Till You Drop

On June 5 Radish announced that three companies had signed up for the VoiceView marketplace: Blockbuster Music, 1-800-Flowers, and RR Donnelley & Sons. Blockbuster appears as a button on the TalkShop menu; with a click you can call up a list of the top 20 albums in any music category, view an album cover, read the list of tracks, and even hear 30-second sound samples. And, of course, you can buy.

RR Donnelley offers Metromail, a 900-number service that lets you conduct small-scale demographic research. This sort of function makes VoiceView appealing to the small office/home office market, says Jeff Bork, vice president of marketing for modem maker Cardinal Technologies, because small businesses have had limited access to low-cost research.

VoiceView will be available in virtually all modems, but TalkShop is the only existing software to take advantage of it.

Coming Soon to Your VoiceView Screen

Besides electronic commerce, current uses for TalkShop include exchanging business cards, sending and receiving files, and playing a game called Salvo. Perhaps the most promising application is remote technical support, which Jerry Michalski, managing editor of the *Release 1.0* newsletter, calls "a perfect use of this new technology." Michalski expects that once VoiceView-capable modems begin shipping, the demand for applications will grow. Radish surely must hope that he's right, because it'll take more than today's TalkShop, technical support, and file and business card swapping to set VoiceView technology apart from other modes of interactive communication.

JOHN GREENLEIGH

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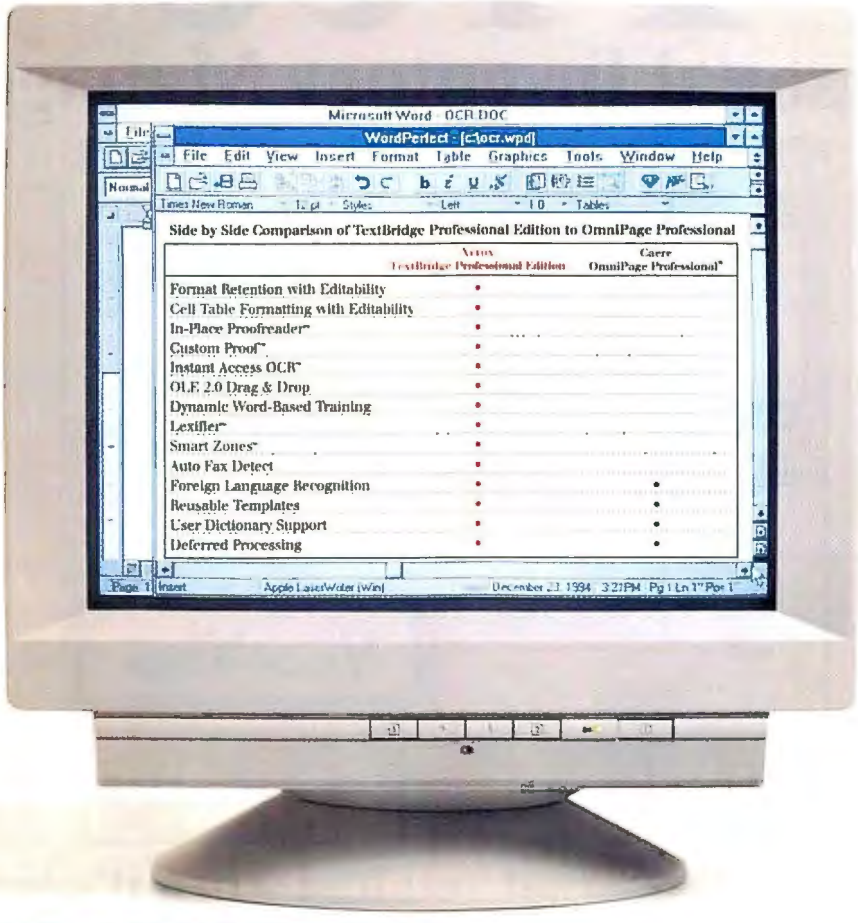

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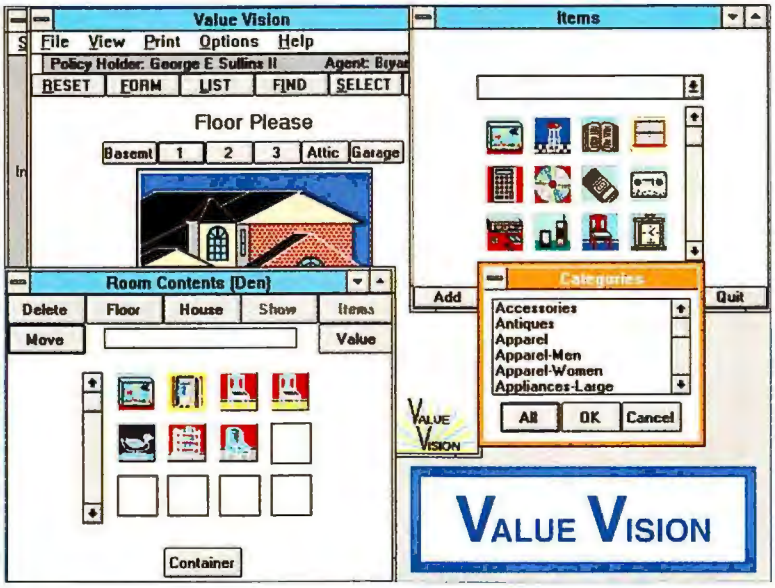

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Diamond Multimedia	TeleCommander 2500XL	Internal $249
U.S. Robotics	Sportster Vi 14.4	Internal $149, external $179
	Sportster Vi 28.8	Internal $339
Zoom Telephonics	VFP 14.4Vi Model 185	Internal $120

NUMEROUS MODEMS SUPPORTING RADISH'S VOICEVIEW TECHNOLOGY—In addition to the models listed above—will soon be available from a variety of vendors. Most of these devices will sell for the same price as today's comparable modems without VoiceView.

TalkShop focuses on what Radish hopes will be a burgeoning market for electronic merchandising, where you will dial in to online "stores" that use audio, text, and graphics to present their wares. But VoiceView needs more than just TalkShop software, and TalkShop needs more useful features. For instance, it would be handy to send slides directly from a presentation graphics package and then switch back to voice to discuss the presentation.

Developers who want to make applications VoiceView compatible must obtain a license from Radish and add code to their programs. This problem will lessen with Windows 95: Microsoft and Radish have agreed to build VoiceView support into the Microsoft Telephony Application Programming Interface (TAPI). But not all Windows 95 applications will have VoiceView compatibility immediately. A spokesperson for Delrina Technology, for instance, says the initial Windows 95 version of WinFax won't support VoiceView because "we have other things we need to do first."

Voice/Data Mélange

Collaborative applications may be better served by Digital Simultaneous Voice and Data (DSVD), a technology that lets you talk and exchange data *simultaneously*. Developed by a group of modem companies, DSVD goes beyond the technology used in analog voice/data modems already available from AT&T/Paradyne and Multi-Tech. Because DSVD is hardware only, it works transparently with any Windows application. However, it's comparatively expensive because it rides on a V.34 (28.8-kbps) modem foundation and requires the addition of a digital signal processor (DSP) or special custom circuits.

At press time U.S. Robotics (USR) announced the first DSVD modem, which lists for $399 and includes Intel's ProShare document conferencing software. By comparison, 14.4-kbps VoiceView modems will be street-priced at $100 to $250, and USR sells a 28.8-kbps model for $339.

VoiceView and DSVD don't compete head-to-head, says Dataquest analyst Lisa Pelgrim. She sees VoiceView as "very important to the industry," especially in electronic commerce and applications such as technical support. Because modem makers can add VoiceView inexpensively, Pelgrim expects it to be ubiquitous. "It's like faxing capability in existing modems. Some people use it all the time, some occasionally, and some don't even know that it's there."

—Anne Fischer Lent and Stan Miastkowski

MultiMedia Voice Modem With VoiceView

The first shipping modem with Radish VoiceView lets you switch from voice to data on the same phone line.

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Justice Suit Derails Intuit Sale

In the end, the price—in every sense of the word—may simply have been too high. To the surprise of analysts and competitors, Microsoft in late May called off its controversial merger with Intuit, maker of the popular Quicken personal finance package. Microsoft will go its own way with Money, which it would have spun off to Novell had the Intuit deal gone through.

Microsoft chair Bill Gates said the deal was chucked because the U.S. Justice Department's suit blocking the acquisition would delay it too long. "This is a fast-paced industry experiencing lots of change," Gates said. "Progress toward realizing our goals could not wait until the government's lawsuit was resolved."

But some observers saw Microsoft's uncharacteristic backing down in a different light. The Intuit merger, based on a stock swap, had risen in price from $1.5 billion to more than $2 billion since announcement of the deal. And although the software giant had squeaked through a three-year Federal Trade Commission and Justice probe into its business practices, the Intuit relationship elicited a more aggressive response from watchdogs in Washington.

In the wake of Justice's stunning decision to sue, Gates displayed typical confidence that he would not be thwarted. But the combination of Intuit's steep price and the potentially much steeper price in legal trouble for Microsoft tilted the balance.

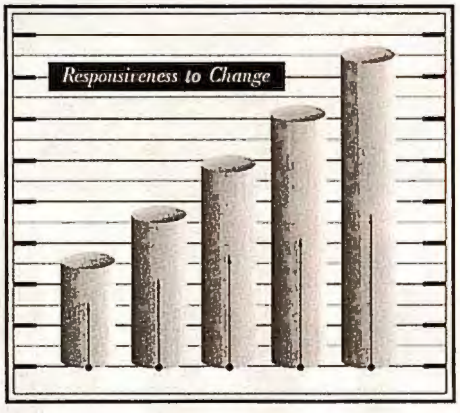
Money's small market share could postpone Microsoft's bid to become an integrated supplier of home banking services, via The Microsoft Network. And without Microsoft's backing and resources, Intuit has to sign its own deals with financial institutions—a process Intuit chair Scott Cook says is well under way.

ILLUSTRATIONS: GORDON STUDER

quickly and creatively to unforeseen circumstances have a significant advantage over those tied down by convention, bureaucracy and big-spending.

FLEXIBILITY

The varied demands of today's marketplace require small businesses to perform an increasing variety of functions.



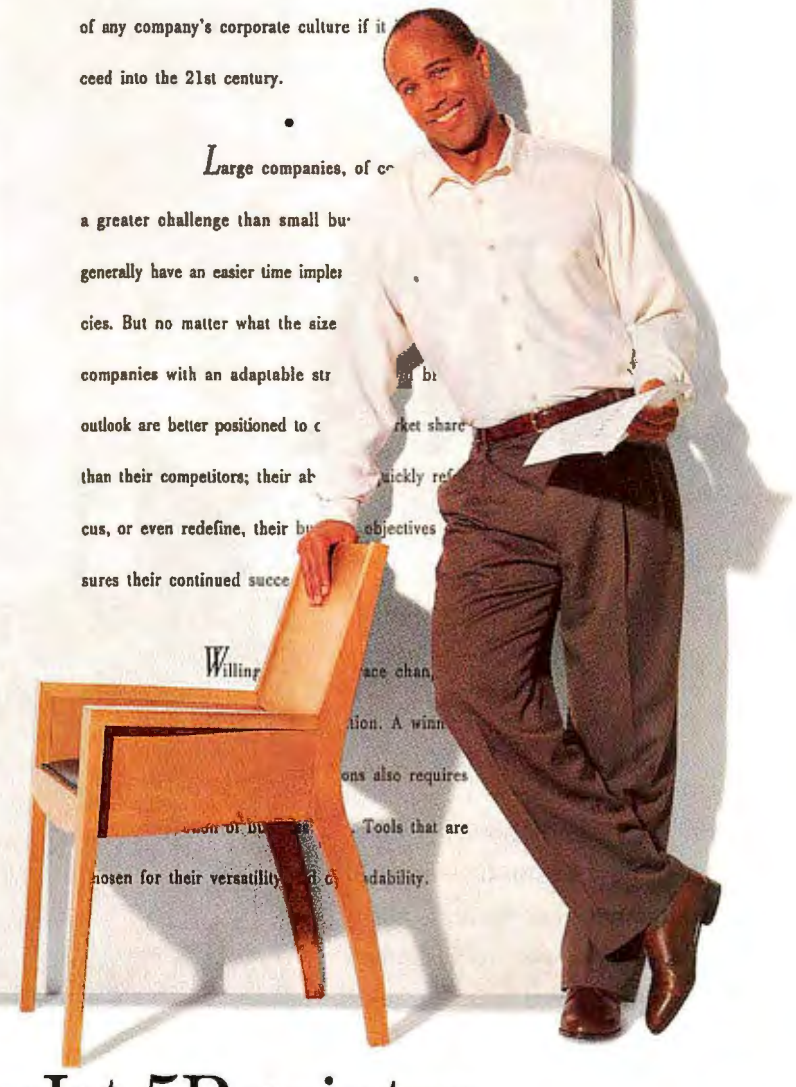
Whether it's in sales or finance, realty or retail, flexibility is the new key to long-term success. In these days of doing more with less, the way in which companies allocate resources has changed. In the past, financial clout often determined who came out on top. Today, faced with competitive and market pressures unimagined ten years ago, companies must now find

Flexibility and a sense of adventure must be a part of any company's corporate culture if it ceed into the 21st century.

•

Large companies, of c a greater challenge than small bu generally have an easier time imple cies. But no matter what the size companies with an adaptable str outlook are better positioned to c than their competitors; their ab cus, or even redefine, their bu sures their continued succe

Willing ace chan tion. A winn ons also requires . Tools that are hosen for their versatility dability.



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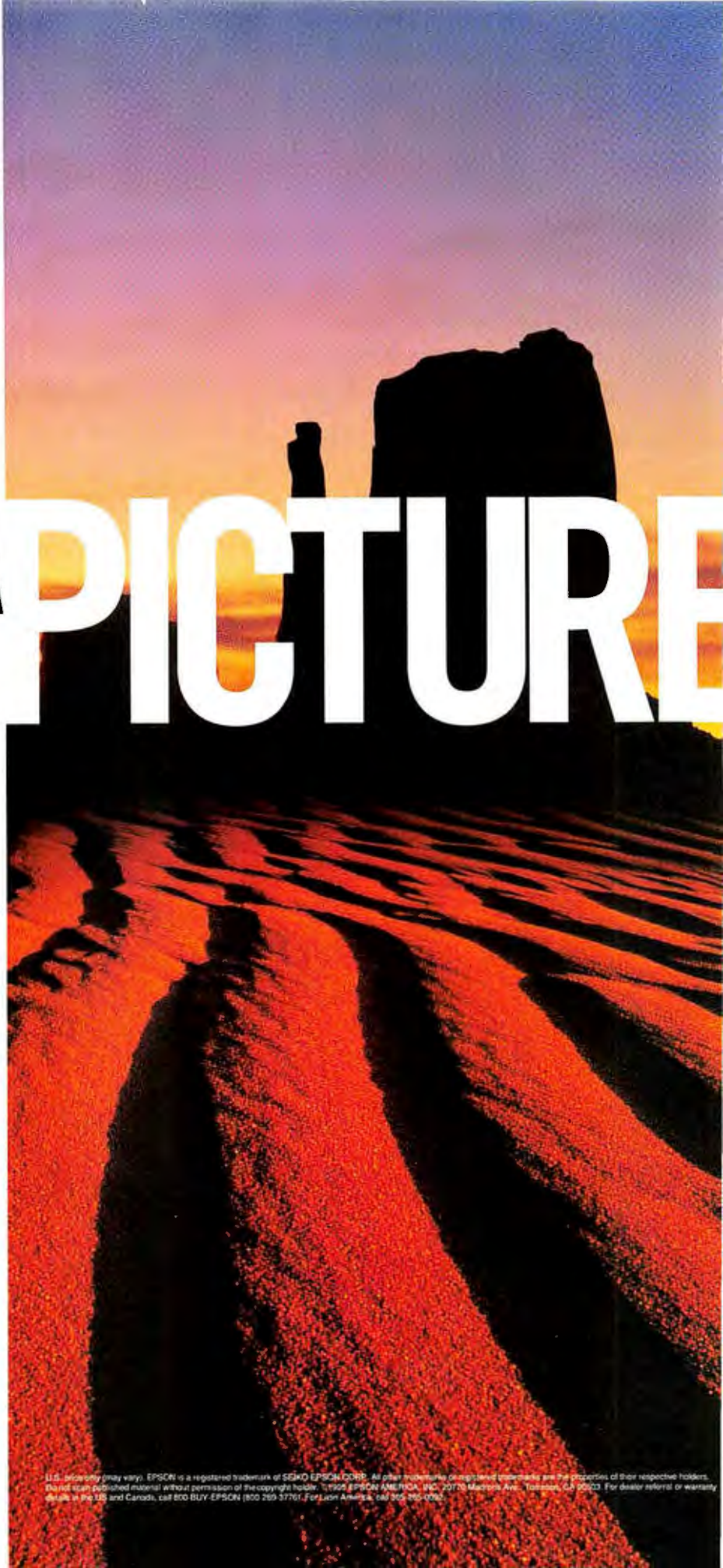

Here's a truly monumental idea: EPSON's new ES-1000C personal color scanner handles rich, colorful graphics as well as it handles lengthy, formatted text. For your words, powerful OCR and text enhancement capabilities ensure quick, easy and accurate text scanning. And, for your pictures, our 30-bit color scanner delivers amazing image detail and color reproduction. The ES-1000C comes with everything you need to connect to your PC, and we also have a version for Macintosh users. So call our toll-free number for the facts and the name of your nearest EPSON dealer. Because scanning isn't always a pretty picture.

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I have this vision of Monument Valley in my head. You see, I've never actually been to Monument Valley. I've read about it in books and magazine articles. I've seen it in the television commercials for pick-up trucks and in the movies; you know, the exciting, old westerns. The buttes and the mesas; it's funny how those words rarely come up in conversation, but I'm sure if you were face-to-face with a massive, towering butte, it would stop you in your waffle-footed tracks. That's what I like about nature—its ability to remind us all that we humans are merely short-term inhabitants of our mighty Mother Earth. It's the magnificent red-hued rocks that leap up towards the breathtaking

OR A THOUSAND WORDS.

Utah, and xico—the ronmer ows noti modern se, the always ment W s it l wajo ies ithi wn l he sc s o va e A It ough e al in tic se spon ing known a o Pla he noran Li ation 5 It the botto sea tha eded in resp anges in th crust and its climate. Most of the amazing natural monuments are remnants of sandstone eroded by the million-plus-year effect of wind and water. You can't not think about your insignificance in the cosmic scheme of things, standing amid a world that does not know hamburgers by their names, the year's top money-making films, or the most-valuable player in last year's Super Bowl. Places like Monument Valley, Yosemite, and the Grand Canyon are pure. Yes, that's the word: purity. The towering pinnacles, the volcanically-inspired buttes; they are there day after day, year after year, generation after generation. Yes, always changing, but slowly, subtly, almost imperceptibly. They are in no hurry to go anywhere. Where would they go? Why would they need to? No, they have already arrived. So it is we humans who go to them, we Mohammeds to our mountains. In our shiny new four-wheel drives and recreational vehicles. We go out from the towns and cities in droves. We go to sit at the foot of these geological icons of the American West. We go to touch our own Indians. To find some connection between what nature has carved out of this ancient place called Monument Valley and our own modern lives. Of course, I suspect most of those who come don't—or can't—see the connection. The monuments of our settled lives are made of concrete and steel; man-made monoliths that fool us into believing that we too can create in a moment what the gods of this arid world have taken forever to construct. There is a seventeen-mile drive that winds through the ragged heart of Monument Valley. I've read that the drive provides visitors with sweeping views of the valley from different vantage points. I suppose, if you were in a hurry, this would be the way to see this place. But it's not the method I would use (why would you come here if you were in a hurry?). I'd get on a strong horse and ride wherever I wanted to go. I'd ride right up to the big rocks and stare straight up to the sheltering sky. I believe a place like this

a ou re— can't it r bes t wa ar co ed a ca he sig ned blu cha graphs tha is gredient s of the m of the h wi F wh ha olors sm whic nto th rai ingly ltho kn exist, M Val ly place— 's d. W rtainly not world. Because it is of a world that needs absolutely nothing from us. It is a self-sufficient kingdom of layered sediment, simultaneously eternal and impermanent. Nothing we say or write about Monument Valley makes it more or less powerful. Yet we are moved to react to its noble beauty. And in reacting, we praise the purity—there's that word again—of this place. And, in appreciating Monument Valley, we learn to appreciate what is good and important in our lives. The immutable laws of nature remind us to stop and smell the flowers, to cherish our children, to revere our parents and grandparents, to love one-another as we love the majesty of these monuments. This place is a magical looking-glass through which we may see the true character of our souls. I have this vision of Monument Valley in my head. And when I see this vision, I feel closer to a world that embraces me; a world that invites me to share in the sovereign beauty of rocks that rise towards the heavens and dunes that run forever. They remind me that, no matter where I go and what I do, I will always feel these monuments in my heart. I will always hear the chattering wind in my head. I will always see the extraordinary silhouettes of the ages. And I will always find a reason to keep going forward. I have this vision of Monument Valley in my head...

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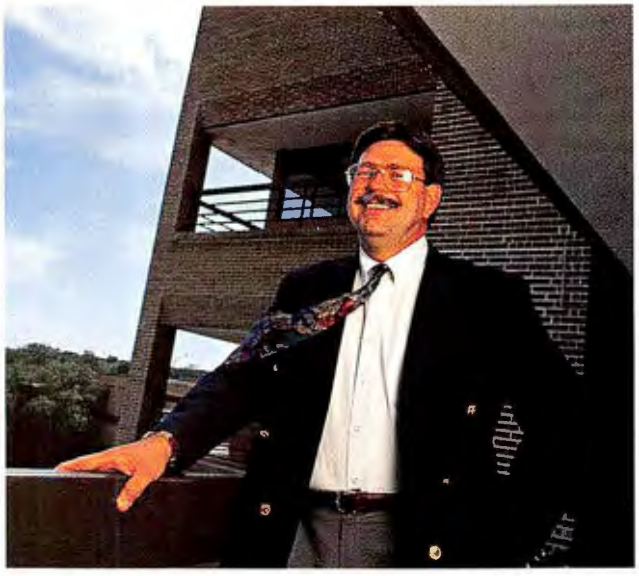


BUYING BUILT-TO-ORDER systems has worked well for Horace Green, purchasing manager for the Austin, Texas, engineering firm Radian.

Following in the footsteps of Dell and Gateway 2000, companies ranging from stalwart IBM to Taiwanese newcomer Tatung are now offering customers built-to-order PCs. They aren't necessarily less expensive than machines you buy at retail and customize yourself. But for buyers who need unusual configurations and have the purchasing power, several vendors will go the distance, even preconfigure PCs for a LAN. Buyers on smaller budgets who need custom configurations also may be able to use this approach to reduce in-house configuration, inventory, and testing.

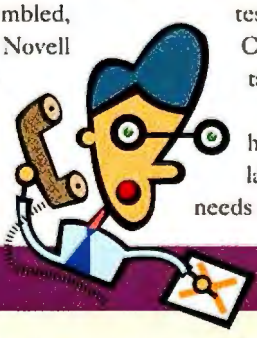
One such corporate buyer is Horace Green, purchasing manager for Radian, an environmental consulting and engineering firm in Austin, Texas. Radian engineers need powerhouse computers not readily available through retail channels and difficult to obtain even from custom vendors. So Green convened a group of suppliers to assess their ability—and willingness—to satisfy his specialized demands.

"We wanted a 100 percent assembled, networked computer, with both Novell [NetWare] and our software preloaded," Green says. The primary motivation, he adds, was to reduce the configuration and testing Radian had to do on new systems.

The price quotes Green received differed by as much as 20 percent between low and high bidders. The lowest prices came from CompuAdd, with IBM owning the high ground. More telling, Green says, were differences in attitude: "One or two [vendors] felt like we were just asking for too much." IPC Technologies (formerly Austin Computer), which Radian eventually selected for much of its desktop PC business, quoted prices in the middle of the range but offered "outstanding" service and a willingness to meet specific configuration requirements, Green says.

Who Needs It?

Built-to-order is suddenly a sexy marketing concept, but it's not for everybody. Even Radian, with its seven-figure annual PC budget, had trouble getting some vendors to address its needs. What if you're a small business or an individual looking for a custom configuration? Until now you had to assemble the pieces yourself or hire a consultant to configure and test your dream machine. Can build-to-order vendors take on this responsibility?



PC World set out to see how well a group of popular vendors could meet the needs of a pseudonymous buyer

Five Vendors Compared: Policies and Promises

When buying built-to-order, get everything in writing: delivery schedule, brand names for all components, return policy, shipping charges for delivery and repairs, and any restocking and credit card fees for returns.

	Dell	Gateway 2000	IBM PC Direct	IPC	Tatung
Daily support (hours)	24	18	24	24	10
Weekend support	●	●[1]	●	●	○
Warranty (years)	3 (first on site)	3 (first on site)	3 (first on site)	3 (first on site)	1 (not on site)
30-day money-back guarantee	●	●	●	●	depends on reseller
Restocking fee	○	○	○	○	5 to 15 percent
Credit card fee	○	○	○	○	depends on reseller
Quoted delivery time	7 business days	15 business days	12 business days if parts in stock	10 business days	4 to 5 business days

[1] Saturdays only. ● = Yes ○ = No

PHOTO: STEVEN PUMPHREY

Say, isn't it about time you did some weeding inside that hard drive of yours?
At last, a simple utility you can truly trust to clean things up. UnInstaller™ 3 is the newest version of 1994's No. 1 selling Windows® application.
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seeking a completely assembled, configured, and tested machine. We requested a configuration designed to push the limits of what suppliers typically offer. The high-end PC included a 100-MHz Pentium processor, 32MB of RAM, a 2GB SCSI hard drive, a 64-bit PCI graphics card with 4MB of VRAM, Microsoft Windows NT, and an assortment of multimedia boards and peripherals specified by brand name.

Our "buyer" called Dell, Gateway 2000, IBM PC Direct, IPC, and Tatung to request pricing, delivery, and support information. Vendors were not told the caller was from *PC World*.

Buying Smart: Consumer Tips

- **Plan for your needs six months or a year from now instead of choosing based only on today's best price.**
- **Get documentation for *your* system so it can be serviced even if the vendor cuts support or closes shop.**
- **Make sure the computer is *burned in*—tested at the factory with your actual configuration.**
- **Pay with a credit card so you're protected if trouble arises.**

Mixed Results

Vendors were asked to fax back firm price quotes the same day, and all promised to do so. But only Dell, IBM, and IPC sent the fax. Dell was the only vendor to meet the specification with in-stock parts, and even then, much of configuration would have been left to the buyer.

IBM had no trouble meeting our specs until it came to multimedia. IBM's 12-day delivery time also was near the longest. Tatung was willing to obtain most specified parts even if they weren't in stock, but said doing so would void its normal guarantee. Tatung also quoted the fastest delivery time but never returned a firm bid (an oversight a spokesperson attributed to growing pains). Gateway 2000 offered to remove unwanted components and reduce the price of the machine accordingly but never responded with a firm bid.

Most other policies were consistent among the vendors, with a few notable exceptions. Tatung has the shortest tech support hours and only a one-year warranty (not on-site), whereas the others offer three-year warranties with a year of on-site service. Tatung also charges a restocking fee of up to 15 percent for returns.

The ultimate test, of course, is price, but only three vendors gave us quotes, and these were for differing configurations. IPC's bid was $5521; Dell came in at $6613, but when you subtract the items Dell offered that IPC could not, Dell's price was lower. IBM came in with a $9236 bid, even without most of the advanced multimedia hardware we requested.

Other Options

To put our experiences in perspective, we shopped for a similar computer at Computer City, the Tandy-owned computer superstore chain, and at Hi-Com, a mom-and-pop Houston storefront dealing in no-name clone PCs.

Both Computer City and Hi-Com steered us to packaged configurations with significant feature trade-offs. If you're shopping for a high-end configuration such as ours, it may be cheaper to buy such a package and replace the cheap sound card and speakers than to build from the ground up. But this depends on your specific needs, technical skills, and time, because adding exotic components can create nightmarish configuration hassles.

Then there are the lucky businesses with the purchasing clout to establish closer ties with their computer manufacturers. Horace Green of Radian counsels that in addition to convenience, the quality of the relationship and ongoing service may be decisive issues. "Everybody is willing to beat the next price on the block," he says. "You have to look at other factors."

—Joe Abernathy

Five Vendors Compared: The Bids Are In

Vendors were asked to bid on a 100-MHz Pentium with a 256K secondary cache, a tower case, 32MB of RAM, a 2GB SCSI hard drive, a 64-bit PCI video card with 4MB of VRAM, a Reel Magic MPEG-2 motion video option, a Video Blaster video capture card, a PCI network interface card, a quad-speed CD-ROM reader, a recordable CD-ROM drive (CD-R), high-end speakers, a Sound Blaster AWE 32 or equivalent sound card, an HP LaserJet 5P printer, a 17-inch monitor with .26mm dot pitch and at least 1280 by 1024 resolution, and Microsoft Windows NT.

	Dell	Gateway 2000	IBM PC Direct	IPC	Tatung
Bid received	1 hour later	not received	2 hours later	2 hours later	not received
List price	$6613	unavailable	$9236	$5521	unavailable
Unavailable items (alternative)	SCSI drive (Enhanced IDE)	Windows NT, printer, CD-R	Windows NT (OS/2), printer (Lexmark), CD-R	Windows NT, printer, MPEG and video capture, CD-R	MPEG and video capture
Weak points	all options available but not preinstalled	2MB VRAM maximum, no-name monitor, .28mm dot pitch	2MB VRAM maximum	low-end speakers, clone sound card	most items not in stock
Strong points	128-bit graphics, configured with NetWare, .26mm dot pitch monitor	brand-name sound cards, including Sound Blaster	good monitor	SCSI-2 drive interface, .26mm dot pitch, low-radiation monitor	will locate and install items not in stock

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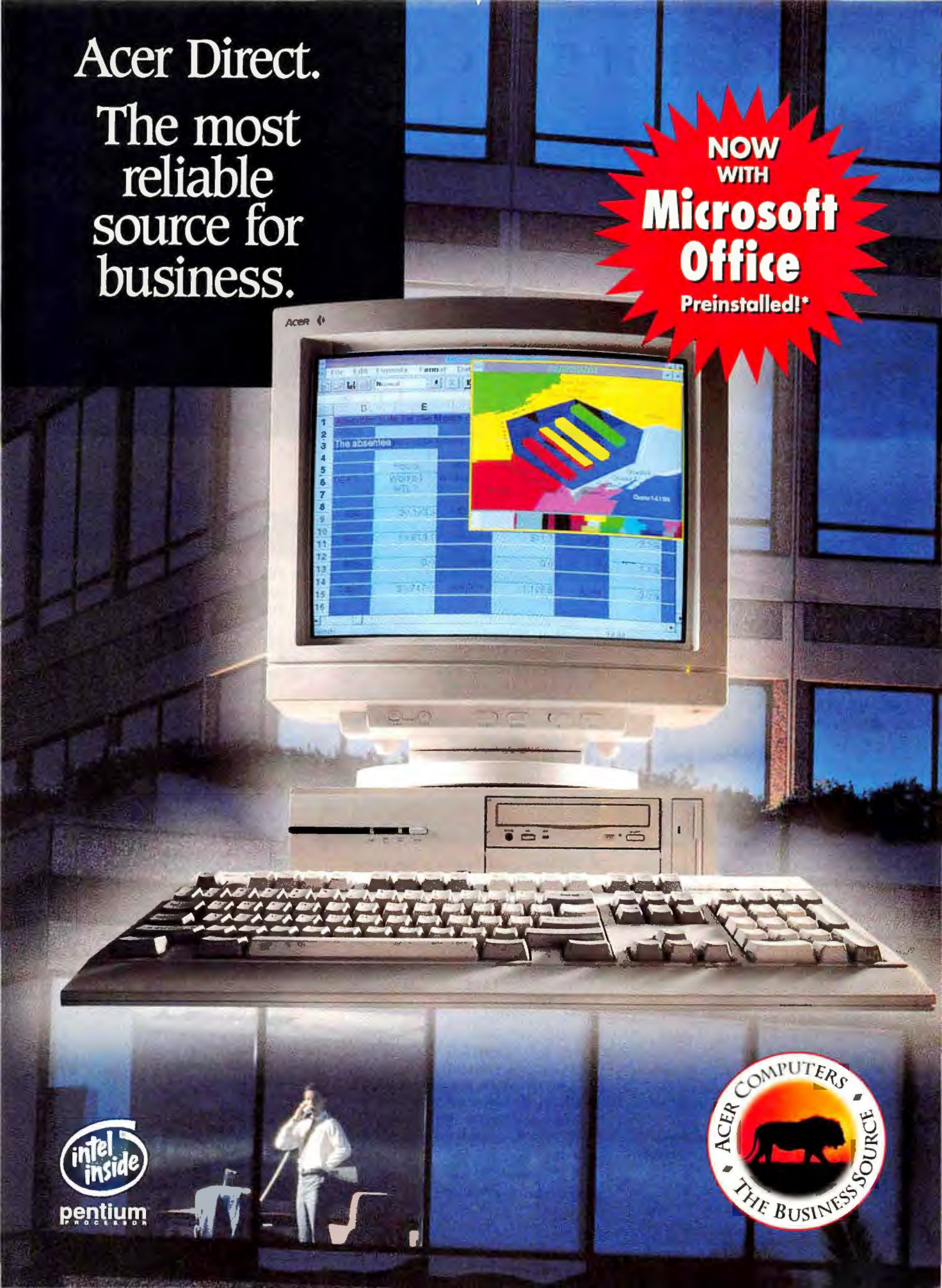

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pentium PROCESSOR

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intel inside pentium PROCESSOR

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- **2MB VRAM Diamond Stealth 64 PCI Accelerator Card**
- Flash BIOS
- High-Speed I/O Ports
- 1.44MB Diskette Drive
- 4 PCI 32-Bit Expansion Slots, 4 ISA 16-Bit Slots (1 Combination PCI/ISA Slot)
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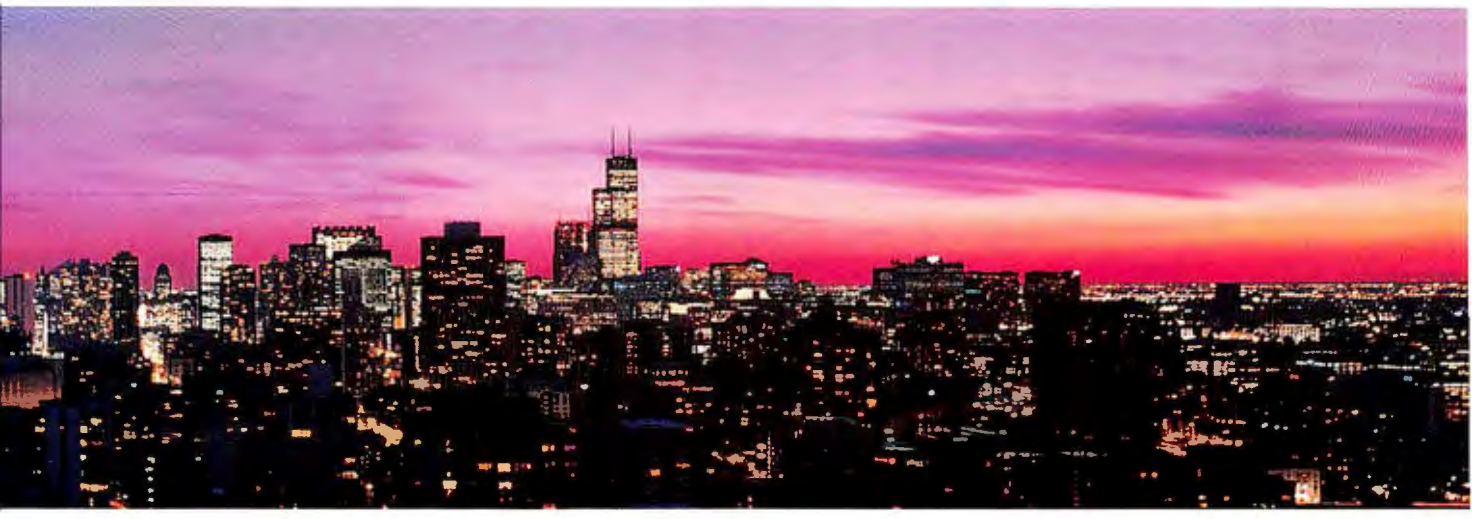

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All AcerPower desktops and minitowers from Acer Direct come with industry-standard Microsoft Office preinstalled.* Microsoft Office combines Word, PowerPoint,® Excel and a workstation license for Mail in one package. You're productive from the first time you boot up!

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When it comes to PCs you can count on, Acer Direct delivers the goods. Our commitment to quality and high manufacturing standards was rewarded with high marks in the *PC World Magazine Reliability and Service Ratings*, published in November 1994. While Acer PCs got an above average rating in product reliability, other direct PC companies didn't quite make the grade.

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PC World Magazine Reliability and Service Ratings

Source: PC World, November 1994

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Video CODECs Supported

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Video CD Playback	Indeo 3.2
CD-I Video Playback	MS Video 1

Hardware MPEG available for Stealth 64 Video VRAM

	Stealth 64 Video VRAM	Stealth Video
Controller:	S3 Vision 968	S3 Vision 868
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Max. Res:	1600 x 1200	1280 x 1024
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Plus if you need professional quality MPEG, or live video input, the Stealth 64 Video VRAM gives you the option to upgrade to our daughter card, the Motion Video Player.

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Compaq's New Lineup: Smarter Deskpros, "586" Processors

Compaq, with its largest product rollout, has introduced scores of new models in the Presario, ProLinea, and Deskpro series. Presario models, designed for small businesses and consumers, offer Pentium-class processors and quad-speed CD-ROM drives. The ProLineas buttress Compaq's midrange offerings. And the high-end Deskpros feature Compaq's new Intelligent Manageability technology, a collection of inventory and diagnostic tools designed to make the PCs easier to manage across a LAN.

The Smart PC

Compaq's Intelligent Manageability is a set of features that take much of the pain out of running a LAN. For instance, the AssetControl program creates a centralized database of all the hardware and software installed on your network's PCs—a boon to LAN administrators. AssetControl lets network gurus easily track device drivers and end-user programs running on the LAN, an important feature for monitoring software usage and ensuring that hardware drivers are upgraded in a timely fashion.

The Fault Management feature helps minimize system shutdowns due to faulty components. Working with a number of component manufacturers, Compaq has developed a technology that allows the new Deskpros to monitor themselves for impending problems. For example, a hard drive can sense when it's about to fail, and trigger the PC to send a message to the network administrator and perform an automatic tape backup to preserve its data. Fault Management also detects problems with network adapters and monitors ambient conditions such as a PC's internal temperature.

The Deskpro XL models feature Pentium processors ranging from 60 MHz to 100 MHz. (One Deskpro model will have a 66-MHz 486DX2 processor and an optional hard drive.) Standard features include 8MB to 16MB of RAM; Compaq's QVision graphics subsystem with 2MB of video RAM; a 32-bit SCSI-2 adapter; integrated Business Audio with Sound Blaster compatibility; a quad-speed CD-ROM drive; and a Vocalyst keyboard with integrated speakers. The Deskpros also have built-in networking—either an ethernet adapter integrated onto the motherboard, or an IBM token ring adapter in an ISA bus slot.

While the new ProLineas lack the built-in networking and Intelligent Manageability features of the Deskpros, they're a solid value for business or home use. For instance, $1999 buys a ProLinea 575 with a 75-MHz Pentium processor, 8MB of RAM, and a 420MB hard drive (the monitor costs extra).

The ProLineas (like the Presarios and Deskpros) offer hard drives that range in size from 420MB to 1GB. You can choose from three system designs: A three-slot, three-bay desktop; a four-slot, four-bay desktop; and a five-slot, five-bay minitower.

"586" for Consumer Market

In the Presario line, popular among home and small-business users, the big news is the addition of Pentium-class processors. While presumably the first new Presarios will use the Intel Pentium, future systems may use processors from NexGen and AMD. Interestingly, Compaq will not distinguish between a Presario equipped with an Intel Pentium and one equipped with another company's chip, simply using the "586" moniker for the Pentium-class Presarios, the 586/75, 586/90, and 586/100. Although NexGen's chips run at slower clock speeds than their Intel counterparts, they offer similar performance. AMD's Pentium-class chip—code-named K5—is scheduled to ship in 1996.

Standard features include a quad-speed CD-ROM drive and 8MB of RAM. Other CPU options include the 66-MHz 486DX2 and 100-MHz DX4.

Street prices for Presarios start in the vicinity of $2000. For $1849 you get a 66-MHz 486 system with 8MB of RAM, a 420MB hard drive, a quad-speed CD-ROM drive, and no monitor. At the high end, $2999 buys you a Pentium-100–class computer with 16MB of RAM and a 1GB hard drive.

—Joe Abernathy

INTELLIGENT MANAGEABILITY: The new Compaq Deskpro includes features that make it easier to manage on a network.

Compaq Deskpro, Presario, ProLinea

Compaq's latest PCs boast advanced management features and Pentium-class processors.

Compaq Computer Corp.
800/345-1518
Street price: $1849 and up
Reader service no. 766

Hot Multifunction Printers From HP, Brother, and Lexmark

With multifunction printers, some vendors promise you everything but a set of steak knives. Although not perfect, the newest multifunction products work considerably better than previous models and save space and money in a small or home office. Hewlett-Packard's OfficeJet LX boasts a low price. Brother's MFC-4500ML provides a fast 6-page-per-minute (ppm) printer. Lexmark's Medley 4sx is the first multifunction unit to deliver color.

These devices include a printer, a plain-paper fax machine, a very low end scanner, and a convenience copier. If you bought the components separately, you'd need more desk space, and you'd spend an additional $300 to $400.

For faxing and copying, the three machines work similarly. You can use them with a dedicated fax line or with one line for both calls and fax. The HP unit's fax-modem transmits at 9600 bps; the other fax-modems transmit at 14,400 bps. You can send faxes from paper or directly from the PC. Likewise, you can store received faxes in your PC or print them. You can also set up speed-dial numbers and program the device to fax documents at a specified time. All the units provide helpful copier features, including multiple copies. The chief differences between the units are price, print speed, and color capability.

Brother MFC-4500ML

Fast in its price range, with 6-ppm laser printing at 300-dpi resolution.
Brother Int'l
800/284-4357
Street price: $999
Reader service no. 767

HP OfficeJet LX

A low price gets you ink jet printing with 600-by-300-dpi resolution.
Hewlett-Packard
800/752-0900
Street price: $799
Reader service no. 768

Lexmark Medley 4sx

First multifunction color ink jet printer.
Lexmark Int'l, Inc.
800/358-5835
Street price: $950
Reader service no. 769

HEWLETT-PACKARD'S NEWEST OFFICEJET offers a low price, excellent print quality, and improved fax features.

HP OfficeJet LX

Hewlett-Packard's OfficeJet set the low price for multifunction products last year, at $799 on the street. The OfficeJet had two drawbacks: It didn't let you send faxes directly from your PC, and you couldn't scan documents into it. The new OfficeJet LX corrects those deficiencies but costs the same. Price is its major advantage.

As you'd expect from HP, print quality is excellent. The OfficeJet LX uses ink jet technology and prints at 300 by 300 dpi, or at 600 by 300 dpi with resolution enhancement to smooth edges. However, the printer works slowly, from a top speed of 3 ppm to 1 ppm in top-quality mode. An input tray holds 100 sheets. The HP has 1MB of RAM for printing and faxing and holds 24 fax pages in memory.

The OfficeJet LX scanner, intended primarily for use with logos and signatures, supports resolutions up to 200 by 200 dpi. The convenience copier may save you a trip to Kinko's, but copies look fuzzier than those from office copiers.

OfficeJet owners can upgrade to LX functionality for $119.99. Older units will require a hardware upgrade by HP. Call 800/772-4329 for details.

Brother MFC-4500ML

The Brother's speed is its biggest advantage. Expected to sell for $999, Brother's MFC-4500ML provides a 6-ppm, 300-dpi laser printer. Print quality is comparable to the HP's. The Brother has a 200-sheet tray and 512K of memory, which acts like 1MB with enhanced memory management. The unit holds 20 fax pages in memory, 70 pages with a memory upgrade.

The Brother's scanner supports 200-by-400-dpi resolution. On the downside, at 18 by 17 by 11 inches, it's the largest of the three multifunction units.

Lexmark Medley 4sx

Lexmark's Medley printer provides color for virtually no price premium. The Medley 4sx, which is expected to sell for $950, measures 17.3 by 15.4 by 12 inches. (Lexmark will also offer Medleys in the $850-to-$900 range; one will be color upgradable.)

I wasn't able to test a Medley 4sx, but based on tests of Lexmark's ExecJet IIc, which uses the same print engine, I'd expect excellent print quality. The Medley 4sx prints at 600 by 300 dpi with smoothing technology in monochrome at 3 ppm. Color printing at 300 by 300 dpi takes 2 to 7 minutes per page. A paper tray holds 150 sheets. With 1MB of memory, the Medley 4sx stores 60 fax pages in memory; a $229 upgrade to 4MB boosts fax storage to 258 pages. Its scanner supports 300-dpi resolution.

—Laurianne McLaughlin

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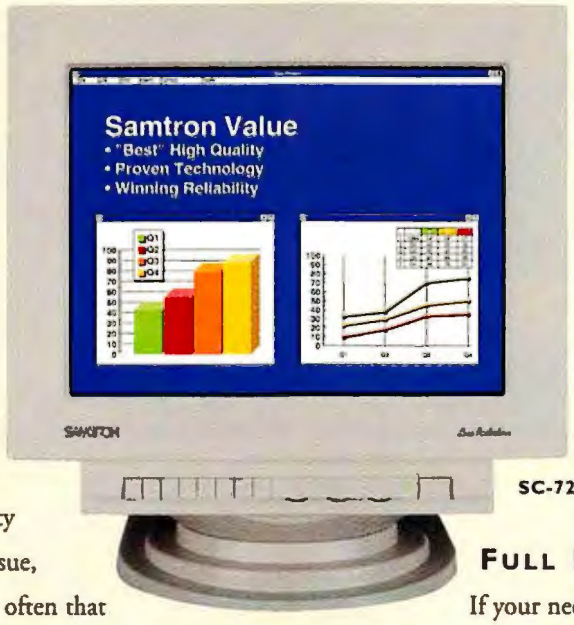
Producing high quality monitors is our only business. In fact, our commitment to quality has been recognized by the leading testing facilities in the U.S. According to the NTSL lab report in the January 1995 issue of BYTE magazine, "The Samtron SC-728SXL earned the best overall image quality rating". In their December 1994 issue, Windows Magazine wrote "It's not often that high quality comes at a midrange price. But Samtron's SC-728SXL, with its truly flat 17-inch screen is an exception. Right out of the box, the quality of this 17-inch monitor was apparent."

JANUARY 1995 BYTE BEST HIGH-QUALITY 17-INCH COLOR MONITOR

WINDOWS



SC-728SXL

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FULL LINE SELECTION

If your needs call for the impact of a 20" display, or the versatility of a 15" flat screen, our product line offers a full selection of high-quality monitors ideal for use in any application.

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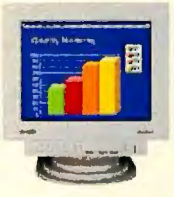
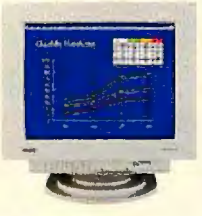
15" 0.28 Dot Pitch
1280 x 1024 (60 Hz)
MPR II



SC-726DXL
17" 0.26 Dot Pitch
1600 x 1280 (60 Hz)
MPR II Mac Compatible



SC-208DXL
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MPR II Mac Compatible

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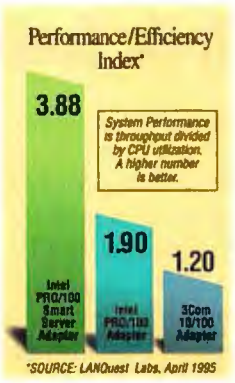

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Fly Me: Creative Labs' AeroMouse and AeroPen

Creative Labs' $170 AeroDuet could easily be mistaken for a new Cirque du Soleil act: It's sleek and wireless, and it flies in 3-D. AeroDuet's two ergonomic pointing devices, a mouse and a pen, work wirelessly by transmitting infrared signals to a desktop receptor, which resembles a radar dish and plugs into the PC's serial port. The receptor calculates the position of the mouse or pen, which you can use on a horizontal or 3-D plane.

The AeroDuet pointers work with a wide range of business and other applications such as WordPerfect, 1-2-3, and Excel. With 3-D mode enabled, you can lift the mouse or pen 6 inches above the desk to create sophisticated CAD drawings or play one of your favorite computer games. AeroDuet's software bundle includes the game Spectre VR, Fractal Design's Dabbler painting tutor, HSC's Digital Morph, and Kai's Power Tools.

This Duet isn't perfect, however. Since the infrared receptor requires a line-of-sight wireless link—much like a TV's remote control—desktop objects prevent the pointers from working properly. (Remember to move your coffee mug to the *other* side of the PC.) And if your work area has an ergonomic two-tiered design, you'll have to place the receptor and mousepad on the same level—probably on the keyboard tray—to maintain the infrared link. Finally, although the AeroDuet's pen may be handy for working with CAD, drawing, and presentation applications, it's not pressure sensitive. That means you can't smear dense brush strokes in Dabbler or apply a realistic signature to an electronic file.

On the flip side, AeroDuet's magnifying-glass feature is a cool way to study the fine type on a document.

—John Goddard

AeroDuet

Wireless mouse and pen.
Creative Labs, Inc.
408/428-6600
Street price: $170
Reader service no. 770

CORDLESS MOUSE AND PEN: Creative Labs' AeroDuet uses an infrared link to bring its tangle-free pointers to the desktop.

QMS Ships Lowest-Priced Color Laser

At a groundbreaking $4999 list price, the QMS magicolor LX brings color laser printing within reach of many previously deprived offices. This color laser costs significantly less than its main competitors, the $7295 HP Color LaserJet and the $8495 Xerox 4900 Color Laser.

The QMS magicolor LX makes a practical addition to a networked corporate office. Color lasers work up to nine times faster than color ink jets and produce better quality. Thermal-wax and dye-sublimation printers still provide optimal color quality, but they are either too slow for high-volume use or too expensive. When you're printing a 15-page presentation in color, you need speed. This QMS zips out color at 3 to 6 pages per minute, and it prints monochrome pages at 12 ppm.

QMS has addressed the problems of print quality that plagued the magicolor printer last year. It worked poorly with photographs, but new screening technology helps the magicolor LX produce bright, sharp images. With 12MB of RAM (expandable to 64MB), the magicolor LX supports 600-dpi resolution in monochrome, 300 dpi in color. With 24MB of RAM, a $5699 model supports 600 dpi in color. Like Xerox and unlike HP, QMS includes PostScript Level 2 standard.

Cost per page is about 3 cents for monochrome, 6 cents for pages with small color graphics, 20 cents for pages with larger graphics (say, a quarter-page scanned image), and up to 74 cents for pages with 100 percent color coverage (for example, a presentation page on a colored background). Cost per page is comparable to costs with Xerox's color laser and slightly higher than with HP's. The QMS laser holds up to 500 sheets.

One drawback is that QMS provides only a 90-day on-site warranty, while Xerox and HP warranties run for a full year. Because the magicolor LX uses four toner cartridges and four developer cartridges, it requires a fair amount of maintenance. Still, color lasers make a lot of sense. And with this QMS, the price is right.

—Laurianne McLaughlin

QMS magicolor LX

Lowest-priced color laser prints 3 to 6 ppm in color, 12 ppm in monochrome.
QMS Inc.
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Reader service no. 771

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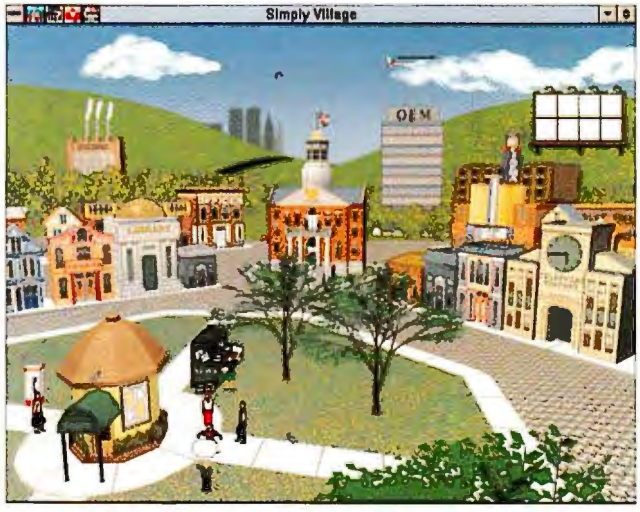
Bob Alternatives: Shells That Make Windows Friendlier

Poor Bob. His only goal is to make you feel at home in that sometimes daunting wilderness called Windows. But Bob has just begun his mission of mercy, and already a handful of competitors hope to wipe the floor with him.

4Home Productions, SmartDesk, and Berkeley Systems have developed new Windows shells that, like Microsoft's Bob, place a layer of friendly, familiar images on top of Windows.



A TOWN SQUARE FOR WINDOWS: 4Home Productions' Simply Village helps novices use Windows, and includes links to online services.

Simply Village

4Home Productions' Simply Village is a glitzy, interactive multimedia environment that transforms your 33-MHz 486 or faster Windows PC into the main street of a small town. With its animations, voice recognition software, and online connections, Simply Village is the most ambitious of the new Windows shells. When you click, say, the library, an animation zooms you into a close-up of the building. Simply Village also employs IBM's VoiceType technology to let you perform basic commands, like opening and saving a file, by speaking into a microphone.

WINDOWS FOR KIDS: Berkeley Systems' Launch Pad creates a colorful computing environment for children.

Using Simply Village's online connections, you can click on a newsstand to get the day's top stories. Simply Village automatically dials an online service you select, and downloads the news to your PC.

You can also send E-mail messages with text and graphics to other Simply Village users via an online service. At press time, however, 4Home Productions could not yet say which service or what the charges would be.

The Taskmaster, one of Simply Village's most useful features, places icons for all open Windows applications on the left corner of the menu bar, making it a breeze to jump between programs.

VirtualDesk

SmartDesk's VirtualDesk hides Windows commands, files, and applications behind an interface that resembles a well-equipped executive office. Click on the notepad, for instance, and a pop-up menu appears, allowing you to choose Windows Write, Notepad, or another word processor. You can also play Video for Windows files on the virtual office's television monitor, and associate video, sound, and graphics files with VirtualDesk actions or commands.

VirtualDesk is an add-on for the SmartDesk Desktop Management System, which is included with the shipping version of VirtualDesk. The SmartDesk engine provides a handy Windows shell that gives you fast, easy access to a variety of Windows utilities, applications, and files. For instance, SmartDesk automatically places a row of icons representing Windows utilities across the top of your screen. Advanced users can customize the program's features by means of SmartDesk's scripting capability.

Launch Pad

Berkeley Systems' Launch Pad Kid-Safe is a colorful, entertaining Windows shell designed to let parents share a computer—but not files or applications—with their kids. You can set up a separate Launch Pad environment for each child—an enchanted castle, a prehistoric setting with dinosaurs, a haunted house, an undersea world, and so on. Within each environment, the child uses the dashboard of a rocket-propelled car to access parent-approved apps, open files he or she created, and make voice recordings using the cassette player. And like Bob, Launch Pad has a friendly dog—Bingo—to show kids around.

—James A. Martin

Launch Pad

Windows shell for kids.
Berkeley Systems
510/540-5535
Street price: $30
Reader service no. 856

Simply Village

Windows shell with online connections.
4Home Productions
800/773-5445
List price: $49.95, SmartDesk $9.95 or free from BBS
Reader service no. 857

VirtualDesk

Windows shell with an executive office theme.
SmartDesk Inc.
800/582-4022
List price: $49.95
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**The VeriTest Cross-Country v2.0 test simulates typical executive use of Microsoft Office® applications in Microsoft Windows® 3.11 during an airplane flight. Power management was enabled and 8MB RAM was installed. VeriTest, Inc. is located in Santa Monica, CA. Promotional pricing featured is not discountable. ‡Offer expires 7/31/95. *Guarantees available in the U.S. only for registered owners of Dell Latitude systems purchased after 8/8/94. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Building 3, Austin, TX 78758. ◊Business leasing arranged by Leasing Group, Inc. ★Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks and IntelDX4 is a trademark of Intel Corporation. ©1995 Dell Computer Corporation. All rights reserved.

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Keycode #03036

dBASE for Windows: New Name, More Tools for Database Mavens

The latest version of Borland's dBASE for Windows has expanded nicely in all directions, including its new name: Visual dBASE 5.5. The program has more Experts—step-by-step guides that simplify creating tables, generating labels, and other tasks. The programming language includes many additional commands, and dBASE offers enhanced support for SQL databases. A new compiler and the added Install Builder feature make it easier to package and distribute dBASE applications. The program will run under Windows 95.

The three new Experts for creating tables, reports, and labels ran quickly in our prerelease version. The Labels Expert has a time-saver called Quick Address: Click a button, and dBASE searches for fields such as name, address, and city and automatically places the fields in your label form.

Although the Forms Expert isn't new, it's much more flexible than the one in version 5.0. You can create tabbed, multipage forms, as well as customize the objects on a form and reuse them in other designs. On the cosmetic side, you can select fixed font and color schemes for your forms, or let these settings conform to the default color settings in Windows' Control Panel.

New database administrator tools make it easier for LAN managers to control data integrity and security. Enhanced password protection with eight privilege levels lets you limit access to sensitive data.

For SQL and Paradox data files, you can set up referential integrity rules that determine whether values that link files can be changed. For instance, you can protect values such as customer numbers, which link orders and customer files. You can also include SQL commands in dBASE programs.

For dBASE programmers, the new Visual dBASE compiler may be the most interesting feature. While you're editing code, you can access the compiler from the dBASE menus. It creates an .exe file, searches the program being compiled for calls to other programs, and automatically adds code from those programs to your .exe file. You can also associate an icon and a greeting screen with the program.

The compiler comes with other helpful tools, including a Help compiler that lets you create context-sensitive help for programs. The new Install Builder lets you create installation programs quickly for your dBASE applications, with interfaces that resemble those of other Borland products. Install Builder compresses files for distribution and lets end users create a Windows program group for your dBASE apps.

—Celeste Robinson

Visual dBASE 5.5

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List price: 349.95, Visual dBASE Compiler $299.95
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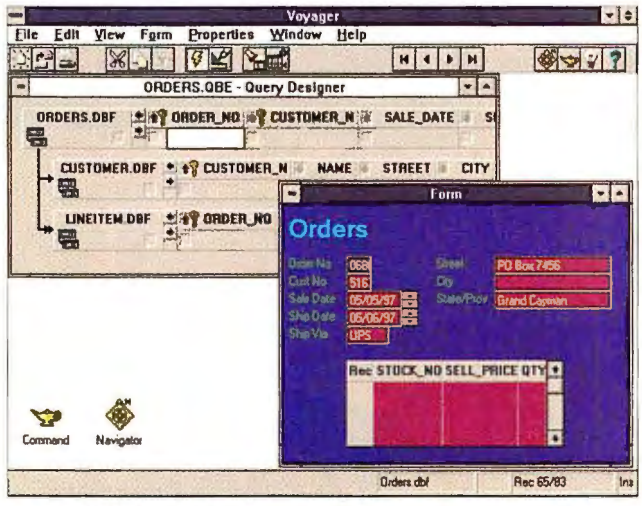

VISUAL dBASE 5.5, code-named "Voyager" in prerelease versions, includes an improved forms-creation process.

DrawPlus 2.0: Bargain Drawing

Serif has built its reputation as a maker of inexpensive, easy-to-use applications that sell for a fraction of the cost of competing packages. Its PagePlus desktop publishing program, for instance, is street-priced at just $60 in a category where the big-name competitors typically cost hundreds of dollars.

Serif's new DrawPlus 2.0 follows this winning formula. Priced at $99, the package includes PagePlus Lite, Serif's entry-level desktop publisher; and PhotoPlus 1.0, a helpful image-editing utility. Version 2.0 also includes OLE support, up to 99 levels of undo, and two user-selectable interfaces—one designed for beginners and one for graphics experts. The beginners' interface includes hand-holding features such as Assistants that guide you through specific tasks and tool hints that describe icons and other graphical tools.

DrawPlus 2.0 ships with a CD-ROM containing thousands of clip art images and 400 fonts. You can use the program's predefined shapes and object-warping tools to create interesting font effects.

DrawPlus imports and edits CorelDraw images, as well as JPEG, PCX, GIF, and TIFF files. You can export files in nearly a dozen formats, too.

—Joe Peschel

DrawPlus 2.0

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List price: $99
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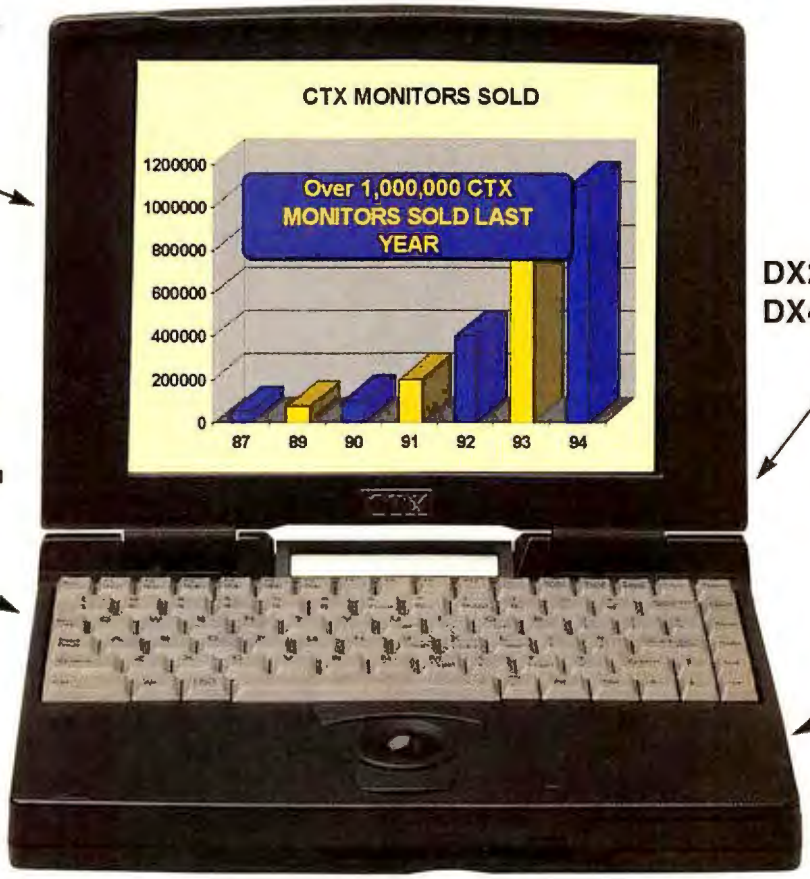

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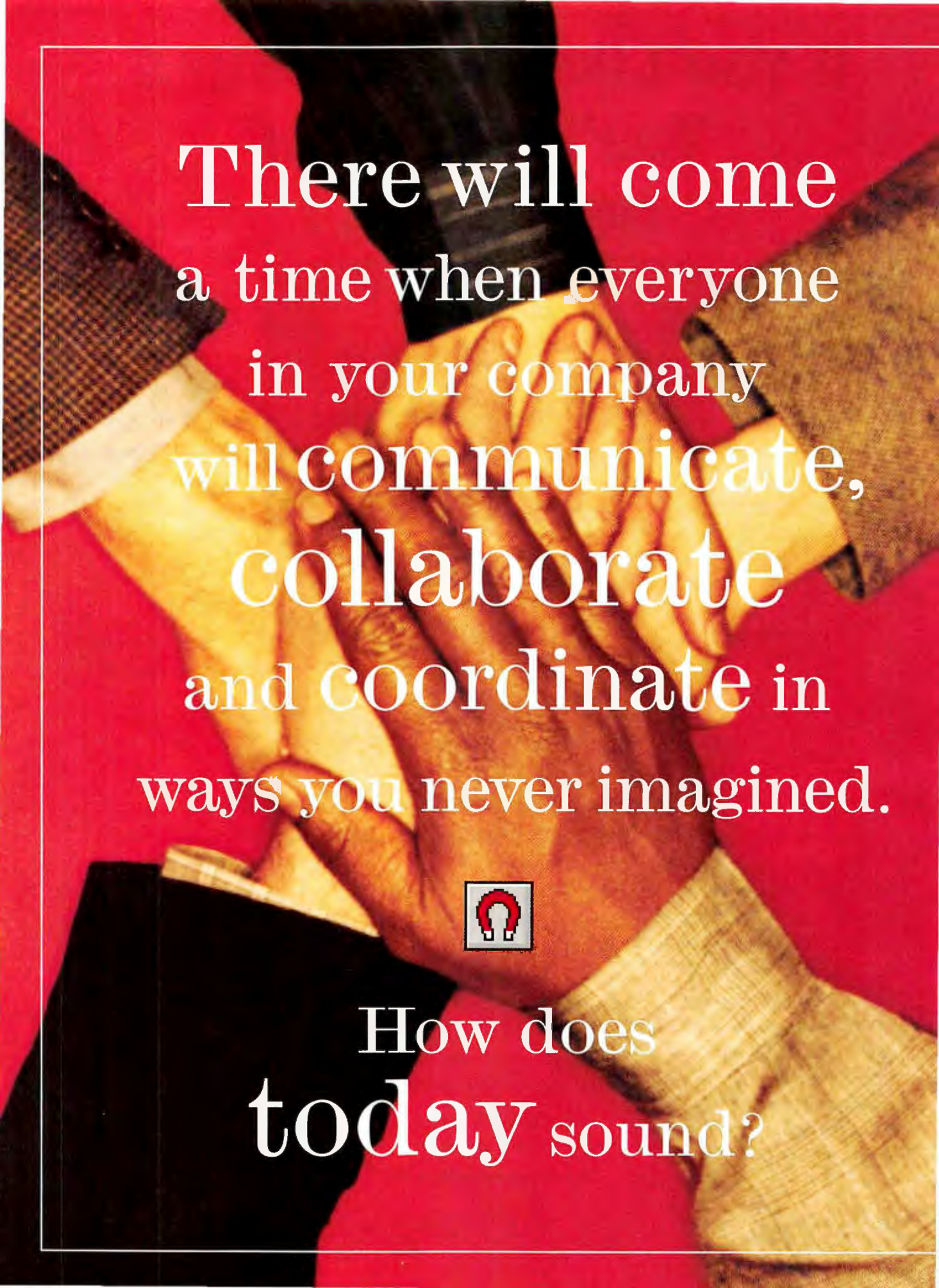
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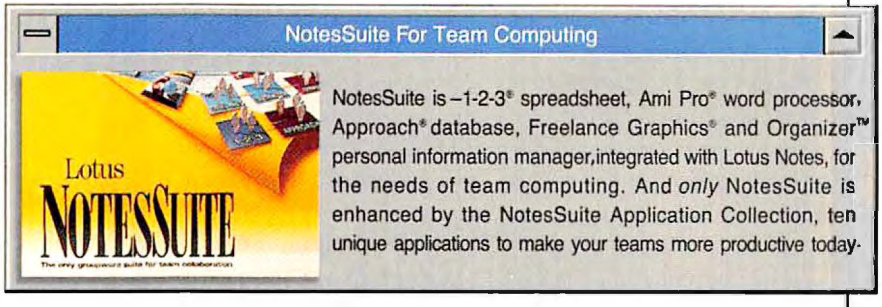

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SOFTWARE SPECTRUM	Softmart	CORPORATE SOFTWARE	ASAP
800-824-3323	800-835-3725	800-718-4749	800-248-ASAP

Ability Windows 1.0 Battles the Big Kids

If you have a soft spot for underdogs, you won't be able to resist rooting for Ability Plus Software's Ability Windows. This suite of office productivity programs is entering a market where even Lotus SmartSuite and Novell PerfectOffice struggle to compete against the dominance of Microsoft Office. But Ability Plus Software hopes to carve out a niche with a suite that offers features similar to those of the big-name products at a lower price.

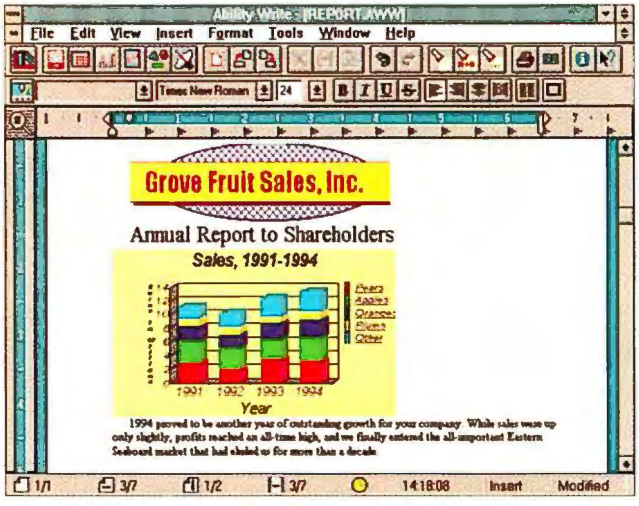
Judging from our experience with a prerelease version of the suite, Ability's lineup of program modules actually falls somewhere between those of entry-level works packages such as Microsoft Works, and those of full-fledged suites. You get a word processor, a spreadsheet, and a flat-file database, plus simple drawing, forms, charting, and communications modules.

Each module offers all the basic tools you need to be productive, something that can't always be said of works packages. Thanks to convenient icons and menu choices, you can exchange data quickly between Ability's applications—for instance, adding a spreadsheet to a word processing document, or creating a form based on a database. The package also includes a library of helpful online tutorials.

You'll be disappointed, however, if you expect Ability to match the major suites' advanced features. For instance, the spreadsheet module lacks 3-D capabilities, and the word processor doesn't have a grammar checker. Only the communications program offers a scripting language, and none of the modules let you create your own icon bars or menu configurations.

Of course, not every user needs to take advantage of such power tools, and Ability's midrange capabilities make it a sensible choice if you've got an aging 386 or low-end 486 system. A full installation requires just 25MB of hard disk space (the big office suites use over three times as much), and all of the suite's modules perform respectably with only 4MB of RAM.

—Harry McCracken



ABILITY WINDOWS' WELL-INTEGRATED MODULES let you easily add graphics to a word processing document.

Ability Windows 1.0

Moderately priced suite of office productivity programs.
Ability Plus Software
800/358-8261, 704/364-3346
List price: $229
Reader service no. 861

TextBridge Brings New Competition to OCR Market

Tired of searching through piles of paper for important information? The paperless office is slowly becoming a reality, but the optical character recognition (OCR) programs that let you scan printed matter into searchable, editable text files aren't cheap. The top OCR program, Caere's Omnipage Professional 5.0, lists for $695, and the company recently absorbed number two OCR manufacturer Calera, effectively removing competition that could help lower prices.

Sensing an opportunity, Xerox has stepped in with a comparative bargain: The $349 TextBridge Professional Edition offers most of Omnipage Professional's powerful features. The program also offers two unique capabilities. The Instant Access OCR utility lets you launch TextBridge Professional from your favorite Windows applications, and the In-Place Proofing feature calls up your choice of Word 6.0a or WordPerfect 6.1 (Windows versions) for editing scanned documents, allowing you to tap those programs' extensive spell-checking dictionaries. If you get reports in a variety of European languages, TextBridge Professional can perform document recognition in several, including French, Spanish, Italian, and German.

Xerox is also updating its budget-oriented TextBridge product. The $99 TextBridge 3.0 includes an improved OCR engine (the same one used in the Professional Edition) but omits many of the high-end bells and whistles, including table and chart recognition and in-place proofing.

—Scott Spanbauer

TextBridge Professional Edition 3.0

High-end OCR package converts printed images to computer-editable text.
Xerox Corp.
800/248-6550
List price: $349, TextBridge 3.0 $99
Reader service no. 862

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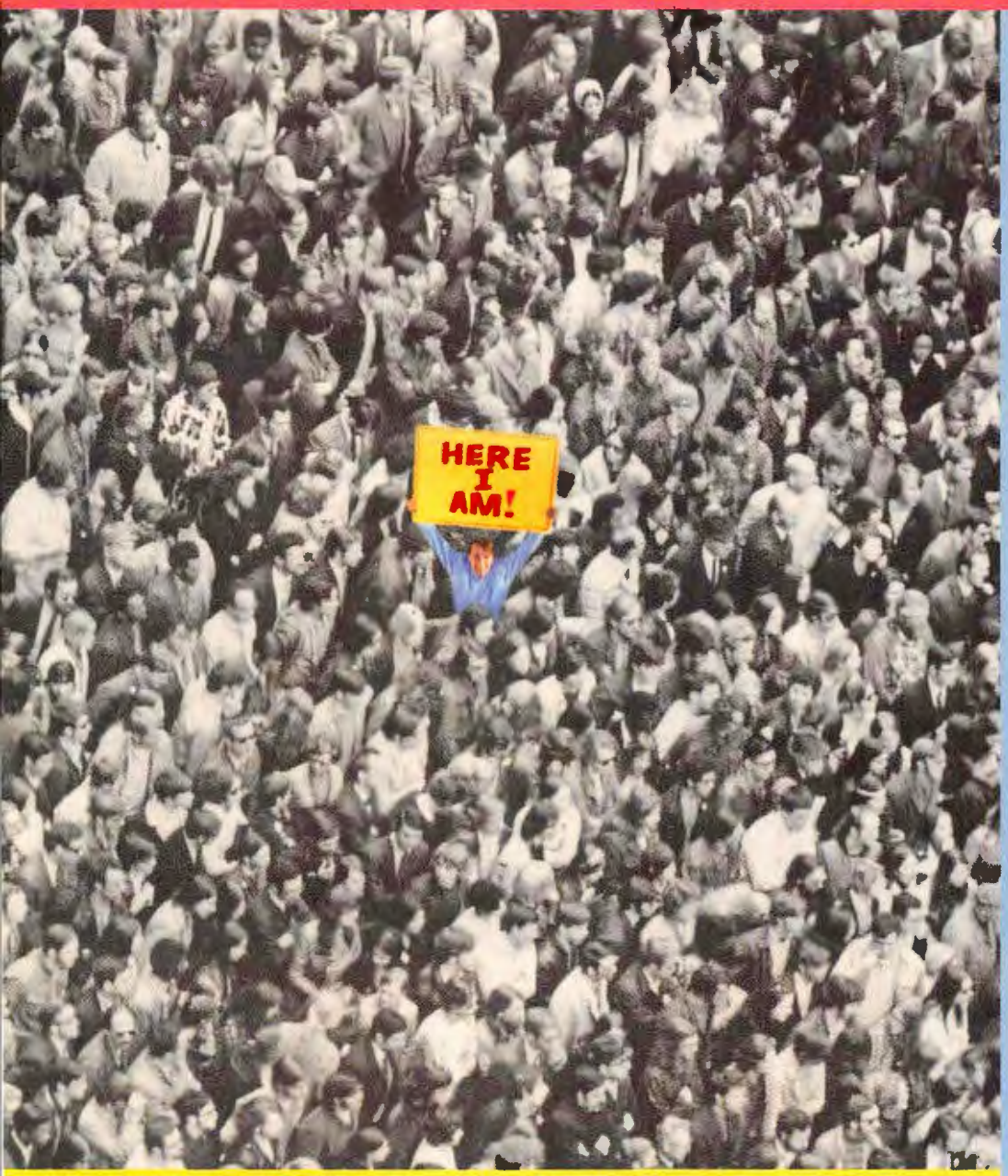

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Gold Medal - Communications Software Division 1993 Geneva International Invention Show

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3D FAX™ Software for Windows® lets you transfer full digital files faster and for far less money via the global fax network. You can send a 30-page document as a 1-page fax! 3D FAX eliminates complex modem setup. And the cost of shipping documents or diskettes overnight.

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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.
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†3 years - parts; 1 year - labor.

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For all those who say you can't have everything, we say nonsense. Magnavox monitors offer a full range of smart features. In screen sizes of 14, 15, 17, 20 and 21 inches (12.86", 14.33", 16.22", 19.5" and 19.96" viewable image sizes respectively) – there's one available to meet your needs. Each crafted for outstanding reliability from one of the world's largest monitor manufacturers. And backed by a 3-year warranty†. When you see what we've put into them, Magnavox monitors are a very smart buy. To get what you've always wanted, visit your retailer or call 1-800-835-3506.

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Alexandre Patty had a rather distinctive approach to descending a staircase. Since he obviously preferred doing things the hard way, he probably wouldn't have been interested in faxing with Delrina WinFax PRO.

Given the choice between using an elevator or your head to go down a flight of stairs, you'd probably opt for the easier way, right? So if you're not already faxing with the award-winning WinFax™ PRO 4.0 fax software, you should be. Because it is, quite simply, the easiest and most convenient way to send and receive faxes. By faxing with your PC, you'll save countless trips walking to the fax machine. And WinFax PRO makes sending a fax from within any Windows application as easy as printing a document.

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Organizing sent and received faxes takes just a couple of mouseclicks, and you can even schedule a fax transmission for a specific date and time in the future. So visit your local dealer today, or call 1-800-664-2543 to upgrade or to order WinFax PRO, the world's best-selling fax software. Anything less is sure to be a headache.

Year after year, Delrina WinFax PRO has won nearly every major industry award – for features like fax autoforwarding, remote retrieval and handy graphics tools, including one that lets you add your own signature. You also get dozens of ready-to-use cover pages, OCR, group faxing, drag-and-drop addressing, and you can even have a document faxed to some and e-mailed to others. No wonder *PC/Computing* recently said, "The best fax software just got a whole lot better."

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Lotus ScreenCam Movies Now Have Captions

When you have to introduce 80 people to unfamiliar software, you can always develop a hands-on training program. But there's no way to train everyone at once, and individual lessons can eat up most of a week.

The solution: Lotus ScreenCam 2.0, an easy-to-use Windows-based alternative to the training film. This utility will record a series of screen activities and save them as a movie you can play back on demand. You can create captions, too—small text boxes that describe what's happening on screen.

ScreenCam will also record your voice if you want to narrate on-screen activity. Lotus's new sound compression technology shrinks ScreenCam files with narration by about 50 percent. Or, for even smaller files, skip the narration—Lotus says a silent 15-minute ScreenCam movie can fit on a single floppy.

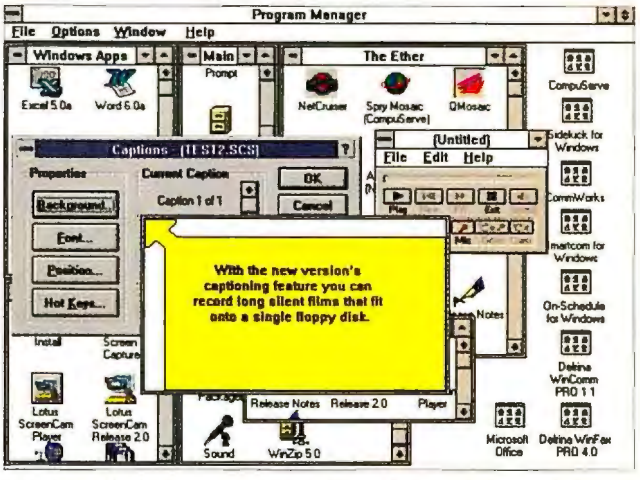
ScreenCam 2.0's OLE support also gives desktop filmmakers surprising flexibility: You can embed ScreenCam movies in other documents.

One weakness is the program's lackluster editing commands. For example, you must create captions in advance and use hot-keys to insert them during the recording process.

–Richard Overton

Lotus ScreenCam 2.0 for Windows

Records on-screen activities with narration and captions.
Lotus Development Corp.
800/343-5414
List price: $99, upgrade from release 1.0 $49
Reader service no. 863

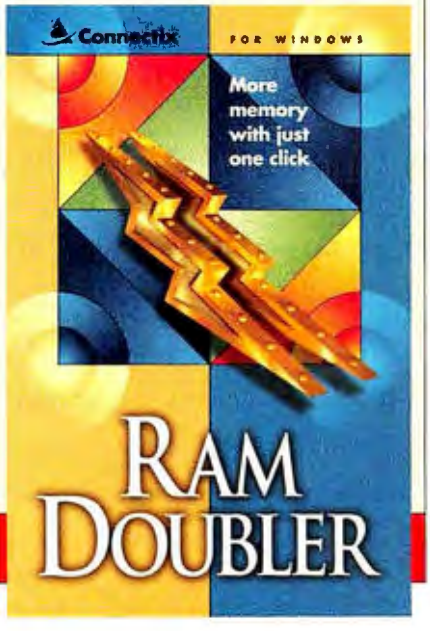


SILENT MOVIES: Lotus's ScreenCam 2.0 lets you record Windows screen activity with text captions that provide a play-by-play.

How Do You Run More Applications In Windows?

RAM Doubler For Windows.

Introducing RAM Doubler™ for Windows! It's software that makes your existing RAM work harder. Forget about buying more memory. Adding more memory to a Windows system doesn't let you run more applications simultaneously. That's because Windows doesn't use your RAM efficiently. With RAM Doubler on your PC you'll get rid of the "insufficient memory" message forever. And you don't have to open your machine. Just run RAM Doubler's 15 second installation and you can run more Windows applications – instantly. Buy RAM Doubler for Windows today, your satisfaction is guaranteed. RAM Doubler is available at CompUSA, Egghead, Computer City and wherever great software is sold (SRP $99).



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, 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.

More Memory With Just One Click.

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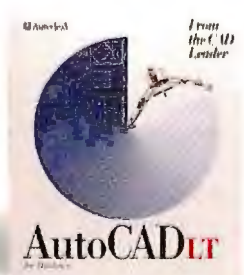
The success of AutoCAD has inspired dozens of cheap imitations.

Unlike those "bargain" packages, AutoCAD® LT Release 2 is based on AutoCAD, the world standard, so it gives you features the others can't. In fact, its features and their ease of use have made AutoCAD LT the best selling 2D CAD package in the world. And now with Release 2, AutoCAD LT is even easier to use and learn, with tool-tips and on-line help at every level. If you're new to CAD from pencil-based drafting, *Orientation* can guide you step by step through the transition. To get you started quickly, AutoCAD LT automates the drawing setup process, defining drawing space and title blocks in one easy step. For occasional help with specific tasks, cue cards give you the on-screen answers you need without interrupting your work. And here's something else the others can't match. AutoCAD LT Release 2 reads and writes data just like AutoCAD software, so your work will be compatible with over a million AutoCAD users worldwide. Add to this free 90-day product support and available pre-drawn symbols packages for architectural, mechanical and electrical applications and you can see why you should beware of cheap imitations. So visit your local retailer or authorized AutoCAD dealer today and ask about our special offer for GenericCADD users. Or for a free demo disk, call 1-800-228-3601* and ask for Demopak A216.

And one inexpensive one.



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Fauve xRes Edits Huge Images Fast

Need to edit giant image files? Fauve xRes lets you do it fast, without heavy-duty hardware. On a 66-MHz 486, xRes took 5 seconds to open a poster-size 153MB TIFF image (300 dpi at 30 by 20 inches). By comparison, Adobe Photoshop took 10 minutes to load the same image.

How is this possible? xRes creates a copy of the original image (with the .lrg extension), which looks the same on screen as the 300-dpi original—but at 96 dpi, it's just a fraction of its size. Since Photoshop and other image editors work with the original full-size image, they're much slower.

With the $799 xRes, image editing tricks such as blur, sharpen, skew, and rotate take seconds rather than minutes. Once you've made changes, you can apply them to the original 300-dpi TIFF image or save them in xRes's .xrs format until you're ready for them.

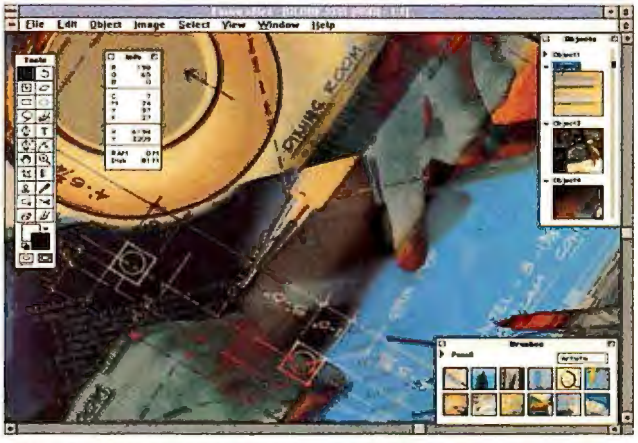
xRes frees up time to experiment with large-scale images. You can float and rearrange any number of image objects, undo as far back as 120 commands, record macros, and use special-effects utilities, such as Kai's Power Tools. The full palette of tools and brushes is similar to those in Photoshop.

To use xRes, you need at least a 486 PC with 16MB of RAM and 20MB of available disk space.

–John Goddard

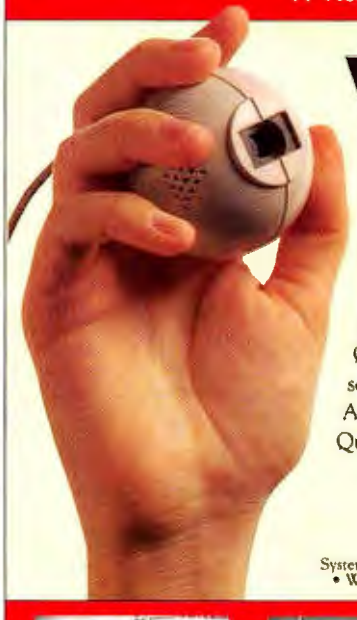
Fauve xRes

Lets you edit huge image files quickly.
Fauve Software, Inc.
415/543-7178
List price: $799
Reader service no. 864



FAUVE'S XRES LETS YOU EDIT IMAGES FASTER. We applied special effects in less than 6 seconds to this massive 153MB poster image.

What Would You Call A $100 Digital Camera?

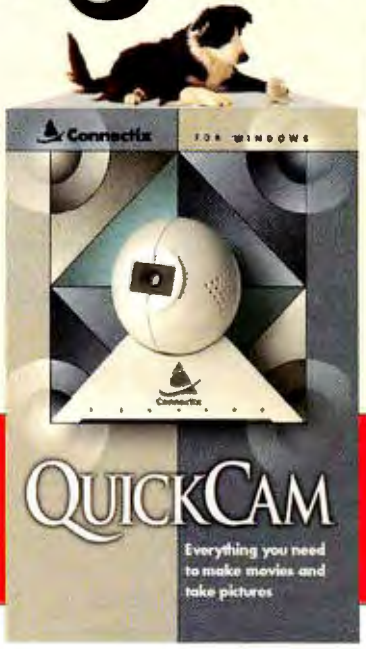


Video Magic.

QuickCam™ includes all you need to make movies and take pictures with your PC. Plug one cable into your parallel port, install the software and shoot. It's simple. Make training films, video conference, inventory valuables. It's easy to take pictures, too. Add photos to newsletters, documents, reports. QuickCam comes with Movie AVI for Windows, QuickMovie software, QuickFrame templates and QuickPicture image saver. All for around $100. Your satisfaction is guaranteed. Buy your QuickCam today wherever fine computer products are sold.

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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Market Share
Windows Illustration
Software
PC Data,
December Sales, 1994

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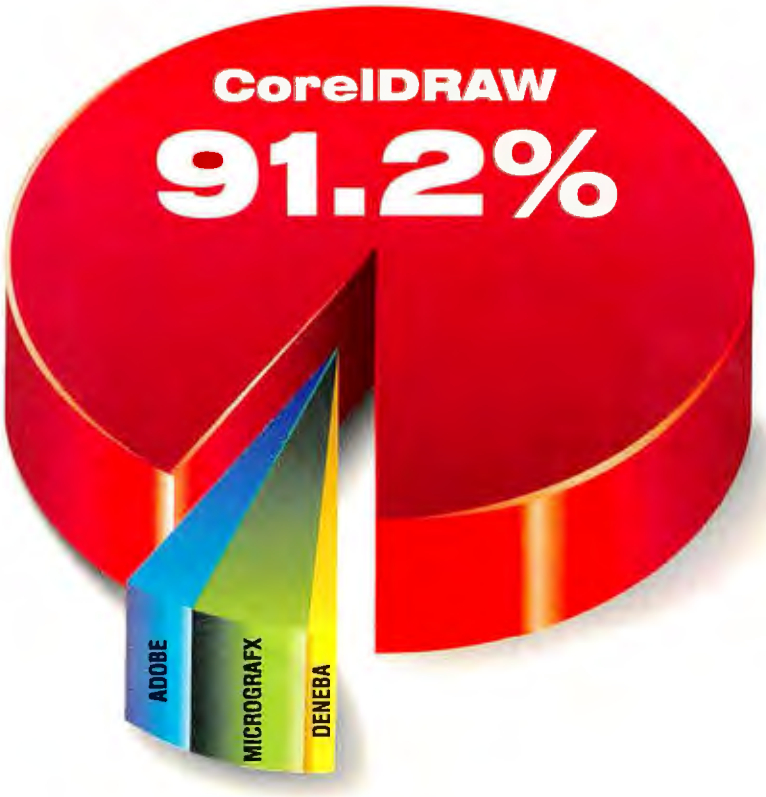
NUMBER ONE in ILLUSTRATION

Company	Units	Sales
Corel	7,609	1,586,519.83
Adobe	257	73,968.64
Micrografx	380	36,696.38
Deneba	98	15,899.24
Totals	8,344	1,713,083.90



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CorelDRAW is the #1 choice for PC users. Year after year, survey after survey, CorelDRAW continues to dominate the illustration market with the best graphics software available.

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Corel VENTURA*
NUMBER ONE in PUBLISHING

Product	S.L.P. (US$)	Score
Corel VENTURA 5	$595	6.8
QuarkXPress	$895	6.7
Aldus PageMaker	$895	6.2

3.5" disk version

INFOWORLD
Report Card Rating,
Desktop Publishing Software
March 20, 1995

Corel PHOTO-PAINT*
NUMBER ONE in IMAGE-EDITING

Product	S.L.P. (US$)	Overall weighted score
Corel PHOTO-PAINT 5 Plus	$249	44
Micrografx Picture Publisher 5.0	$595	42
Adobe PhotoShop 3.0	$895	39
Fractal Design Painter 3	$499	38

3.5" disk version

PC World,
Best Buy Award,
April, 1995

*Available as standalone products.

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Document #1071

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Business 500 Links to Prodigy but Needs Work

Anyone who's used *Hoover's Handbook of American Business* knows how useful it is for getting the skinny on major U.S. corporations. Allegro New Media brought the book, which offers financial and marketing information, to CD-ROM with last year's Business 500 1.0. Now it's bringing the CD-ROM to cyberspace.

You access Multimedia Business 500 2.0 through the Prodigy Information Service: Click a button and the program logs on, letting you download news and current and historical stock prices for a specific company.

If you already subscribe to Prodigy, Business 500 uses your existing membership. If you don't have a subscription, you can install the Prodigy software from Business 500 and take a test drive of the service.

Business 500 isn't all cake and ice cream. Every time you load the program, it plays a song that loses its charm after the second or third run-through.

And while the Prodigy link is nice, stock prices aren't always updated immediately. You'll spend quality time twiddling your thumbs, waiting for prices to appear. Furthermore, the program's performance was sluggish, and I was running it on a 90-MHz Pentium.

Though the theory behind it is good, the implementation leaves much to be desired.

–John P. Mello Jr.

Multimedia Business 500 2.0

Supplies current and historical information on 500 major companies but runs slowly.
Allegro New Media
800/424-1992, 201/808-1992
List price: $49.95
Reader service no. 853

MULTIMEDIA BUSINESS 500 now lets you download financial data from Prodigy but suffers from sluggish performance.

Class Act Interactive: Help for the Windows Challenged

Faced with countless icons and an instruction manual as big as a Manhattan phone book, it's no wonder people are intimidated by today's Windows word processors and spreadsheet programs.

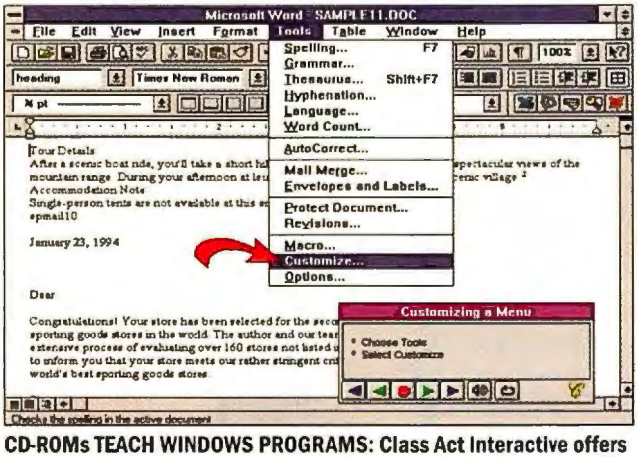
But before you spend $1000 on seminars and *Word Processing for Wimps* books, you might want to check out Class Act Multimedia's Windows interactive training CD-ROMs.

Class Act Interactive covers popular Windows programs such as WordPerfect, Word for Windows, and Excel. The discs combine video clips, interactive demos, and audio walkthroughs; Class Act promises that, with its help, even the most inexperienced user will learn programs quickly.

The Class Act CD-ROM on Word 6.0, for instance, includes 30 hours of lessons that explain everything from basic Word functions, such as scroll bars, to more complex tasks, like creating macros. If you're already familiar with WinWord, you can go to the Class Act glossary to find a lesson on a specific topic.

And unlike a training video, the Class Act CD-ROM lets you try the functions it explains; you're walked step-by-step through specific features. If you're still confused after hearing the audio explanations or reading the on-screen instructions, a big red arrow tells you where to click.

–Shane Mooney



CD-ROMs TEACH WINDOWS PROGRAMS: Class Act Interactive offers a variety of instructional discs, including one for Word for Windows.

Class Act Interactive Training

CD-ROM series shows how to use popular Windows programs.
Class Act Multimedia
800/235-3276
List price: $149.95 each
Reader service no. 854

THE MICRON MILLENNIA

"A full 20% faster than the average 100-MHz Pentium system."
PC World, February, 1995

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P100 MILLENNIA

- Intel™ 100MHz Pentium™ processor
- 256K Micron SyncBurst Cache
- 4X EIDE CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 with stereo speakers
- PCI 64-bit graphics accelerator (2MB)
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- Microsoft® Mouse, 101-key keyboard
- MS-DOS® & Windows® for Workgroups

A
- 8MB Micron EDO RAM, 540MB EIDE hard drive
- 15" Micron 15FGx, 1280NI, .28mm
- Microsoft Works Multimedia CD

$2,499 (Business Lease $89/month)

B
- 16MB Micron EDO RAM, 850MB EIDE hard drive
- 15" Micron 15FGx, 1280NI, .28mm
- Microsoft Office Pro 4.3 CD & MS Bookshelf CD

$2,999 (Business Lease $107/month)

C
- 32MB Micron EDO RAM, 1.2GB EIDE hard drive
- 17" Micron 17FGx, 1280NI, .28mm
- Microsoft Office Pro 4.3 CD & MS Bookshelf CD

$3,999 (Business Lease $136/month)

With 120MHz Pentium Processor..... add ***$300***

"The Millennia is nothing short of the best all-around PC available on the Market today."
PC Magazine, April 25, 1995

PC MAGAZINE EDITORS' CHOICE
May 30, 1995
P120 MILLENNIA

According to PC Magazine's most recent Windows based tests, the Micron P120 Millennia is a "star performer". The Millennia garnered the highest Graphics WinMark score ever seen, in addition to a top notch Winstone score.

MICROSOFT WINDOWS NT READY-TO-RUN

intel inside pentium

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P75 HOME MPC

- Intel 75MHz Pentium processor
- 256K write-back cache, Flash BIOS
- 8MB RAM, 540MB EIDE hard drive
- 4X EIDE CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 with stereo speakers
- 14.4 Fax/ Modem & WinFax Lite
- PCI 64-bit graphics accelerator (2MB)
- 14" Micron 14FG, 1024NI, .28mm
- *Tool-Free* desktop or mini-tower
- Microsoft Mouse, 101-key keyboard
- MS-DOS & Windows for Workgroups
- Microsoft Bob CD
- Microsoft Scenes: Sports Extremes
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$1,999

P75 POWERSTATION

- Intel™ 75MHz Pentium™ processor
- 256K write-back cache, Flash BIOS
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- SoundBlaster 16 with stereo speakers
- PCI 64-bit graphics accelerator (2MB)
- *Tool-free* desktop or mini-tower
- Microsoft® Mouse, 101-key keyboard
- MS-DOS® & Windows® for Workgroups

A • 8MB RAM, 540MB EIDE hard drive
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• Microsoft Works Multimedia CD
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B • 16MB RAM, 850MB EIDE hard drive
• 15" Micron 15FGx, 1280NI, .28mm
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C • 32MB RAM, 1.2GB EIDE hard drive
• 17" Micron 17FGx, 1280NI, .28mm
• MS Office Pro 4.3 CD & MS Bookshelf CD
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- Intel 120MHz Pentium processor
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- **6X SCSI-2 CD-ROM drive**, 3.5" floppy drive
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- PCI 64-bit graphics accelerator (2MB)
- *Tool-free* desktop or mini-tower
- Microsoft Mouse, 101-key keyboard
- MS-DOS & Windows for Workgroups
- MS Office Pro 4.3 CD & MS Bookshelf CD

A • 16MB EDO RAM , 1GB SCSI-2 hard drive
• 15" Micron 15FGx, 1280NI, .28mm
$3,999 (Business Lease $136/month)

B • 32MB EDO RAM, 2GB SCSI-2 hard drive
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PC MAGAZINE EDITORS' CHOICE — June 28, 1994 P90PCI POWERSTATION
PC WORLD — October 1994 P90PCI POWERSTATION
PC MAGAZINE EDITORS' CHOICE — April 26, 1994 MAGNUM
PC WORLD — February 1995 P90 HOME MPC
PC MAGAZINE EDITORS' CHOICE — May 16, 1995 P90 HOME MPC

- With 90MHz Pentium processor ---- add $100
- With 100MHz Pentium processor -- add $200
- With 120MHz Pentium processor -- add $500

4100 MAGNUM

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- MS-DOS & Windows for Workgroups

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- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Fast SCSI-2 controller
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- PCI 64-bit graphics accelerator (2MB)
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- MS-DOS & Windows for Workgroups

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B • 32MB RAM, 2GB SCSI-2 hard drive
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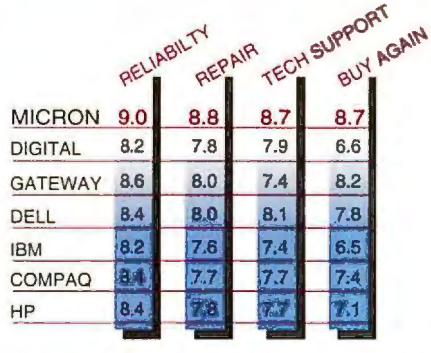
$4,999 (Business Lease $170/month)

- With second 90MHz Pentium processor...add $799



In PC Magazine's latest Service and Reliability survey, Micron received the highest scores in all four categories: Satisfaction with Reliability, Satisfaction with Repair Experience, Satisfaction with Technical support, and Future Likelihood of Buying. (PC Magazine, January 1995.)

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Circle 57 on reader service card

Phone Blaster or Disaster? Modem–Sound Board Installation Turns Ugly

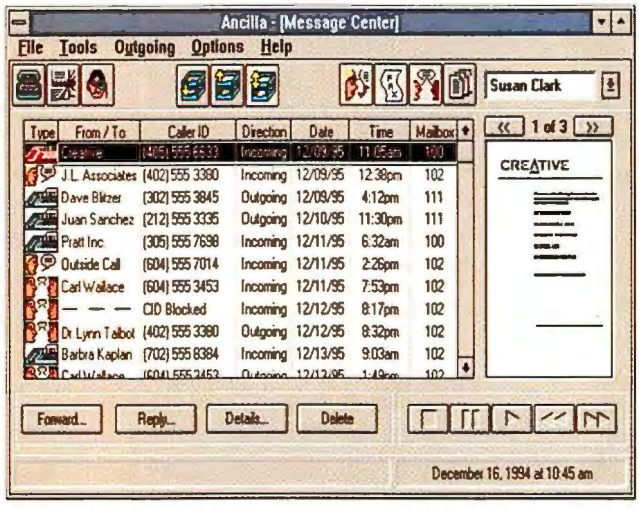
Creative Labs, maker of the popular Sound Blaster series of PC sound boards, is without a doubt the most reputable name in computer audio. That's why I was looking forward to installing the company's new Phone Blaster product, a combination fax-modem/sound card that uses a single ISA bus slot. Unfortunately, I found installing Phone Blaster a nightmarish journey into my PC's heart of darkness. I spent an entire Saturday afternoon pulling and plugging jumpers on the Phone Blaster board, calling Creative Labs' tech support, fiddling with IRQ and DMA settings, and cursing the bozos who designed the IBM PC.

If you've installed a sound board, you'll understand.

Yes, I followed the manual's instructions carefully: Remove the PC cover, plug in the board, turn on the PC, and install the software. Naturally, it wasn't that easy. After I plugged in the Phone Blaster board and turned on the PC, the system wouldn't recognize my Adaptec SCSI adapter. Next I made a long-distance *toll* call to Creative Labs' technical support, listened to elevator music for about 10 minutes, then explained my installation troubles to a polite tech person. He said the likely culprit was an IRQ or DMA address conflict and suggested I change the default settings on either the SCSI or Phone Blaster board.

I devoted the next several hours to studying the Phone Blaster and Adaptec manuals for IRQ, DMA, and I/O address settings, reconfiguring jumpers on the Phone Blaster board, and plugging the board in again after each change. After several tries, I isolated the problem: The SCSI and Phone Blaster boards were trying to use the same I/O address. I changed the default setting on the Phone Blaster... and it worked!

Well, almost. Although my PC now recognized the SCSI board, Windows occasionally crashed when I played a sound file. I used Phone Blaster's Windows configuration utility to change the board's hardware settings, but the problems persisted. For instance, when I adjusted Phone Blaster's IRQ setting from 2 to 10, Windows appeared to be more stable—that is, until I attempted to use the modem, which apparently wanted IRQ 10 all to itself. Unfortunately, Phone Blaster's configuration utility does not list the system components that are assigned to specific IRQ and DMA settings, an omission that makes reconfiguring the board a trial-and-error proposition. And while third-party utilities such as TouchStone Software's WinCheckIt can determine IRQ and other hardware settings, they're far from perfect.



DESKTOP MESSAGE CENTER: Creative Labs' Phone Blaster includes Windows software for organizing voice, fax, and E-mail messages, but DMA and IRQ conflicts could make it hard to install.

Modem Works Better

I had better luck with Phone Blaster's integrated 14.4-kbps fax-modem, which assigned itself to COM port 3 and worked properly right away. Phone Blaster includes a variety of software programs to help a home-office or small-business user set up a PC-based voice-mail system. You can create up to 9000 password-protected mailboxes for each employee, and each in-box can store a mix of fax, voice, and pager messages. And Phone Blaster supports Radish Communications' VoiceView protocol, which lets you send data files during a voice conversation (but not voice and data simultaneously).

Wait for Plug and Play

But the big question is whether or not most end users will be able to get past the $250 Phone Blaster's complex and potentially confusing setup procedure to appreciate its communications features. Certainly, not everybody will come up against the same problems I did. The fewer add-in boards your system has, the lower the risk of hardware conflicts. But considering that Phone Blaster is targeted at millions of 386 and 486 PCs (many with preinstalled CD-ROM and tape drives, internal modems, SCSI boards, and so on), a substantial number of Phone Blaster customers will likely share my frustrating experience.

If you own or plan to buy a high-end 486 or Pentium PC that supports the industry-standard Plug and Play specification, you might want to wait for the new breed of Plug and Play sound boards that should reach the market this summer, promising easy installation. (Creative Labs should offer one too.) But for the rest of us with older PCs, the DMA/IRQ shuffle remains an unfortunate fact of upgrade life.

–Jeff Bertolucci

Phone Blaster

Modem–sound board proves hard to install.
Creative Labs Inc.
800/998-5227,
408/428-6600
Street price: $250
Reader service no. 763

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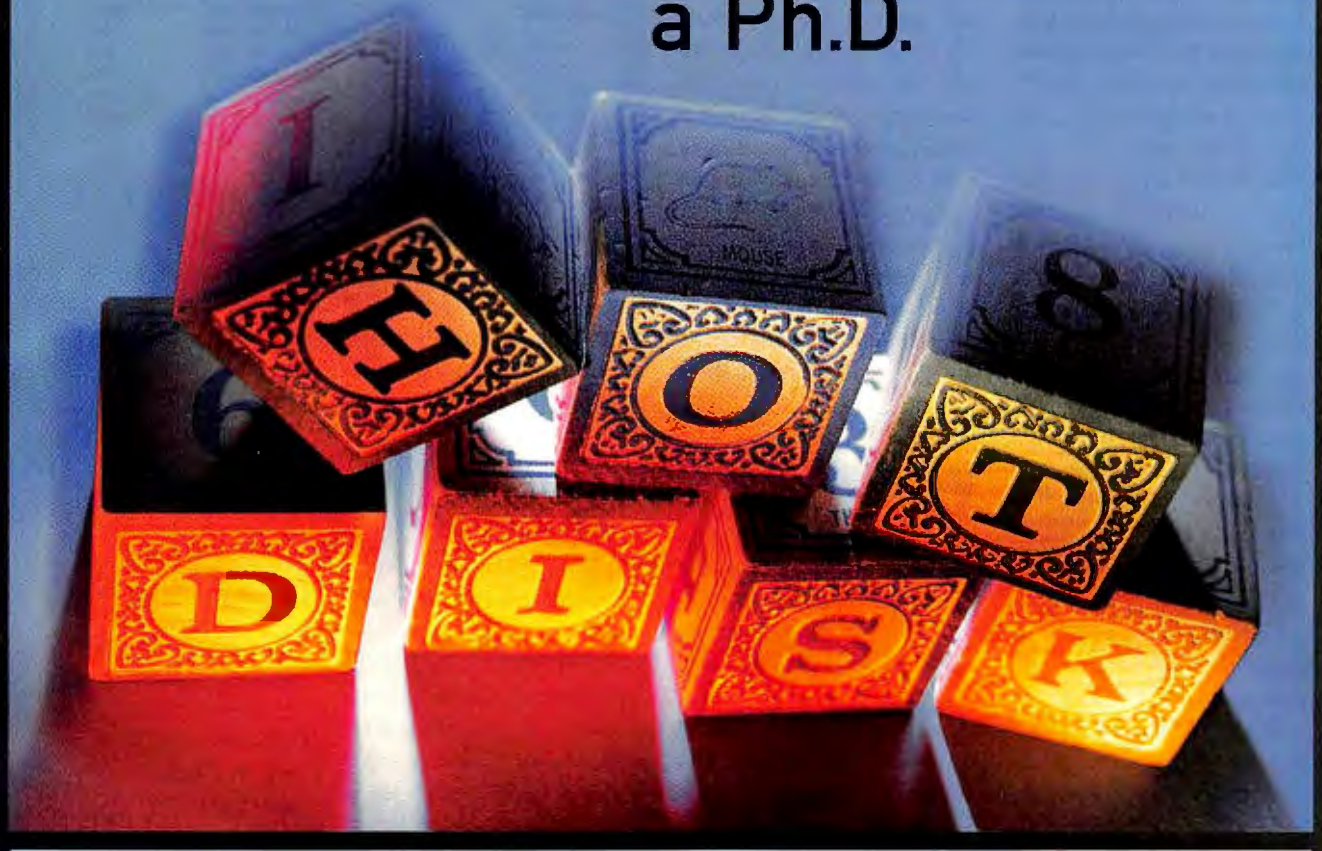

If all you want to do is get files from your desktop to your laptop, you shouldn't have to go through college to do it. Which is exactly why we made HotDisk® a no-brainer.

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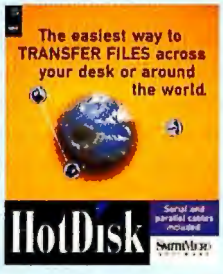
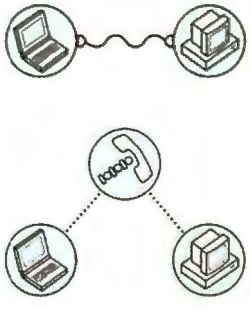


Since you're using the programs you have with you, it's a lot faster than remote control. And because HotDisk operates silently in the background, someone can still use the other computer.

So call Smith Micro at **800.964.SMSI*** or visit your nearest computer superstore today to get HotDisk. It comes complete with software and both serial and parallel cables.

After that, accessing data from another computer will be mere child's play.



Now anyone can transfer files by modem or cable.

SMITHMICRO SOFTWARE

*Or 714.362.2345. HotDisk is available now at CompUSA, Computer City, Micro Center, Egghead Software and elsewhere. HotDisk is a registered trademark of Smith Micro Software, Inc. All other product names are trademarks or registered trademarks of their respective companies. ©1995 Smith Micro Software, Inc.

Circle 256 on reader service card

Relay/Control: Telecommuting Gets Real

The telecommuter's dream is not only a reality, it's fast becoming practical. With a 28.8-kbps modem (see our June review of V.34 fax-modems) and a current-generation remote-control package such as Relay/Control, you can comfortably run your office PC from your home system. Yes, even in Windows.

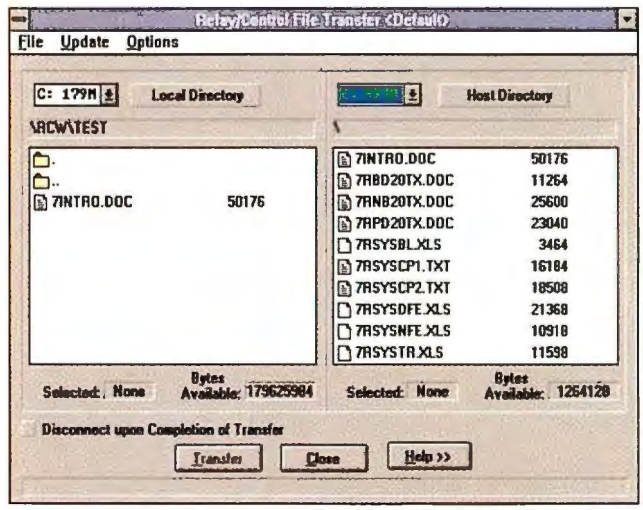
But Relay/Control does more than run Windows remotely. Want to grab a spreadsheet from your office PC to work on at home? Relay/Control makes file transfers a snap by letting you drag and drop files between drives on local and remote PCs. If your remote system is on a network, you can access the network drives. And retrieving large files is feasible, since you can move on to other tasks while Relay/Control transfers data in the background. You can even drag and drop entire directories.

Despite Relay/Control's low $139 price, it has some abilities often reserved for more expensive products. You get security features such as automatic callback, case-sensitive passwords, screen blanking, keyboard locking, and data encryption during transfers. Chances are good the program is preoptimized for your modem, since Relay/Control directly supports more than 150 common models. Another cool feature is the ability to connect to a group of PCs at the same time, provided you use a multiline modem. This is useful when, for example, you need to give a presentation to people located at different sites. You can even switch between speaking on the phone and using the program without disconnecting—a great convenience for interactive events such as training remote users.

—Bryan Hastings

Relay/Control

Use your remote PC as though you were sitting right at it, even in Windows.
Relay Technology Inc.
800/795-8674,
703/506-0500
List price: $139
Reader service no. 764



EASY AS FILE MANAGER: Relay/Control's File Transfer Utility lets you drag and drop files between connected PCs.

Print With No Strings Attached

Plenty of products on the market let you share a single printer among several PCs. But what you invariably end up with is an unmanageable mess of cables. A plug-and-print alternative from AeroComm offers an innovative solution. GoPrint is an easy-to-install, wireless printing system for single users and workgroups.

Using spread-spectrum radio technology found in many wireless LAN products, GoPrint connects a printer to a PC that's up to 500 feet away in a typical office environment. You can use two GoPrint adapters to connect a single PC to a distant printer, or use several to build a network of up to eight printers shared by an unlimited number of PCs. (However, if you're sharing more than a few printers, you'll probably want to install a full-fledged LAN for features such as E-mail and file sharing.) GoPrint's spread-spectrum radio waves can penetrate standard office walls, so you don't need a wide-open, warehouse-type environment to use the product. However, thick steel beams and concrete walls will limit GoPrint's transmission range.

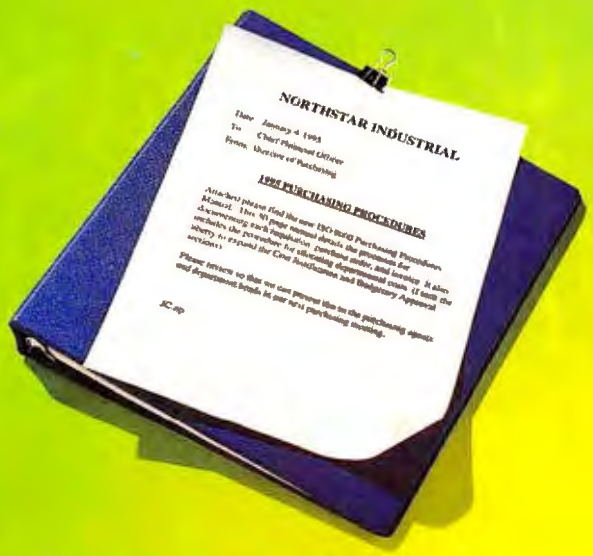
Installing GoPrint couldn't be easier. If you're just connecting one PC to one printer, there are no confusing hardware DIP switches or software drivers to fuss with. Just hook up a GoPrint adapter to the printer, connect another unit to the PC's parallel port, plug in the AC adapters, and you're done. You don't even have to worry about which adapter connects to the PC and which goes to the printer—they're exactly the same.

If you want to use the optional security feature, or if you're using GoPrint to connect multiple printers, installation is only slightly more complicated. Before you connect GoPrint to a printer, you must first connect it to a PC and load GoPrint's DOS or Windows software. Then you assign the printer a name, a unique channel number, and an optional password. The documentation walks you through all the steps needed to get GoPrint up and running quickly.

—Jeff Noxon

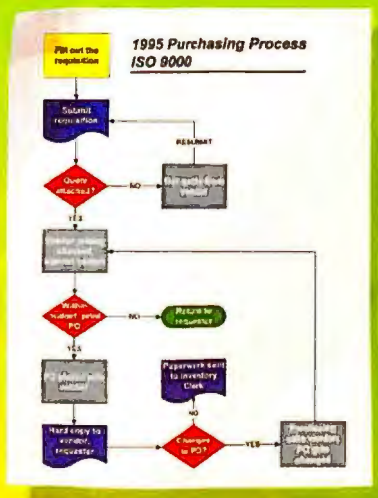
GoPrint

A wireless printer-sharing system for small offices.
AeroComm Inc.
800/492-2320,
913/492-2320,
913/492-1243 (fax)
List price: $449 for two adapters
Reader service no. 765



(Sort through a fifty page plan to get to the point.)

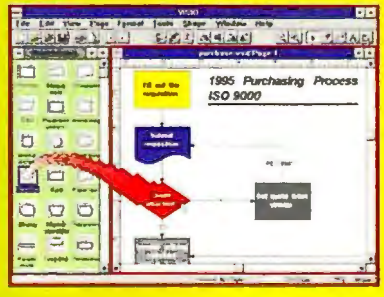
or



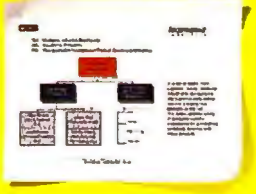
(Get to the point with a single Visio diagram.)

AND NOW A FEW WORDS ON WHY *WORDS ALONE* ARE NOT THE MOST EFFECTIVE WAY TO CONDUCT DAY TO DAY BUSINESS.

With over 20,000 words in the English language at our disposal, why do we have such a hard time expressing ourselves? Some things are just better seen than described. Try explaining how the purchasing process works in your company in a hundred words or less. You get the picture. Until now, however, it wasn't practical to work with drawings and diagrams. You either needed an artist or talent. Not anymore. Visio® is the first software that enables everyone to effortlessly work with drawings and diagrams. In fact, Visio is so practical that companies like Motorola, Smith-Barney and many others consider it an essential desktop tool.

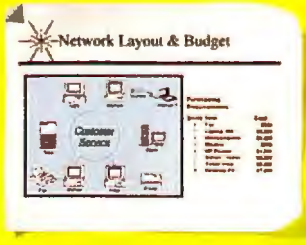


Packed with 22 stencils and over 750 business SmartShapes®, Visio 3.0 can do it all. You won't have to draw a thing to create quality management diagrams, flow charts, organization charts, network diagrams, floor plans, and more. Just drag and drop shapes from stencil to page, add text. You're done. Visio automatically connects the shapes for you. And you can customize or create SmartShapes to meet your unique drawing needs. Nothing could be easier.



The world's top Windows™ engineers made it simple. In fact, it's the only drawing software specifically designed for Windows. So it even looks easier. Visio's toolbars and menus can change to mimic either Microsoft® Office or Lotus® SmartSuite. And only Visio fully supports OLE 2.0 so you can create and edit drawings within your favorite Windows packages.

MVP PC Computing voted Visio 3.0 as one of their MVPs of the year.



We're not suggesting you give up word processors and spreadsheets. No way. You just shouldn't be limited by them. If you want to conceive and convey ideas in the fastest, simplest way known, you need a third tool in your toolbox. Visio.

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Circle 18 on reader service card

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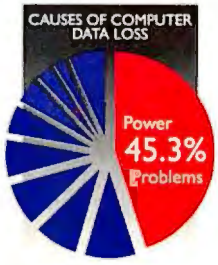
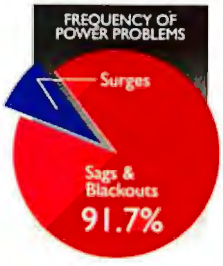


Source: Contingency Planning



Source: Bell Laboratories

IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

Who needs power protection? If you use a computer, you do. A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every PC plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than of escaping the sting of power problems. One study found a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your PC (which is at far greater statistical risk) vulnerable to loss or damage.

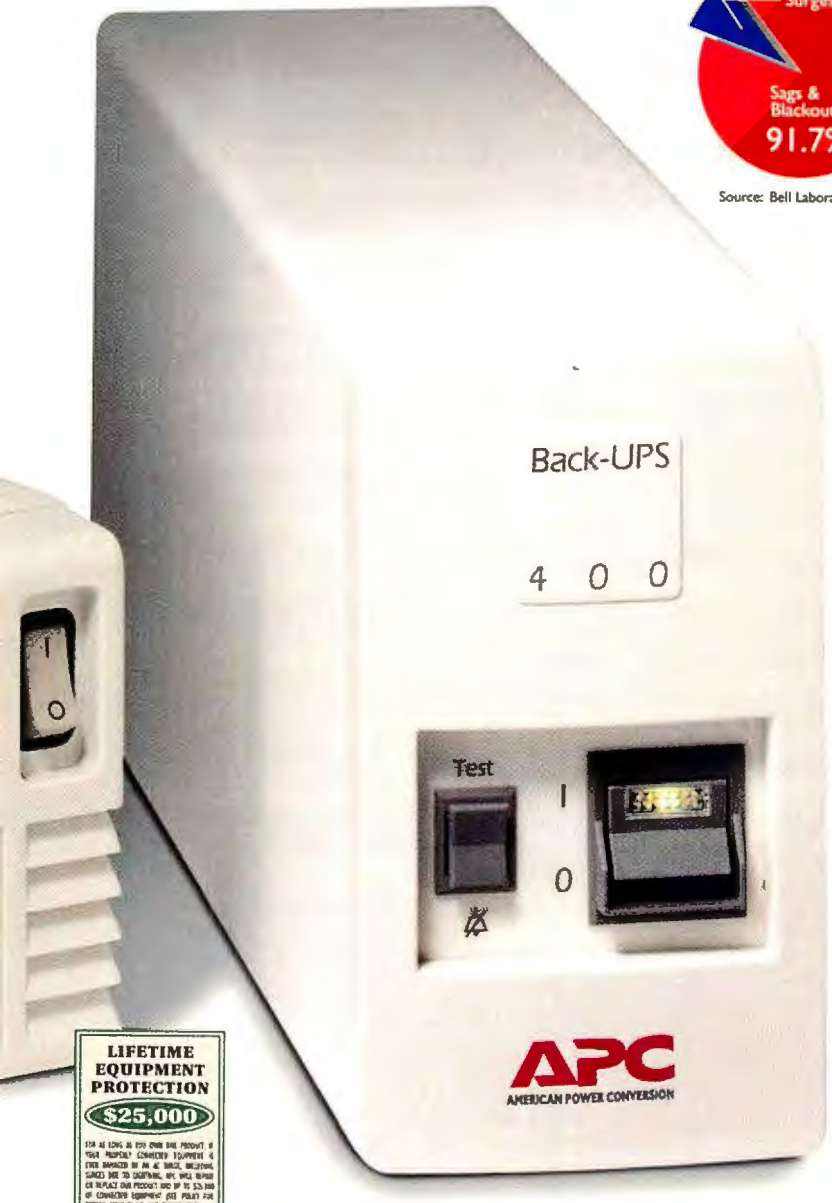
WHY A $119 APC UPS COSTS LESS THAN A $9.99 "SURGE PROTECTOR"...

Contrary to most people's belief, a PC alone already has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without any protection is just as good as underspending on one of the most important PC decisions you'll make.

For extended brownout protection for advanced PC workstations call about APC's New Back-UPS Pro!

And since sags and blackouts represent more than 90% of power problems likely to hit your computer, even quality, high-performance surge suppressors are literally powerless to protect you from data loss.

That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent



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protection against and other trials by fire

More than 3,000,000 satisfied customers count on APC reliability that goes above and beyond the call of duty

After a raging fire which took 18 trucks to subdue, Michael Benolkin, director of the Systems Division at Correa Enterprises, Inc. didn't expect much. "While rummaging through the ashes, we heard something beeping. Our four APC units were still in action, while two UPSes from another brand were history. We're still using these same APC units at our new office location - they still work like a charm! We're impressed with the ruggedness, reliability, and product support offered by APC."

Trial by Fire

Brian Krause, Network Manager for Goodyear Airship Operations, knows how critical APC protection can be." The night of the All-star game a tornado came through our blimp hanger and took out our roof. Our airships demand absolute communication so I protect our local and remote servers with the most reliable protection I can find: APC. APC's PowerChute software shut our server down in an orderly way... closed out all files nice and neatly. When we reconnected, everything came back up perfectly, without a hitch."

Trial by Air

Doug Welch learns his reliability lessons well: "While still a Computer Science student, I was at home preparing a large spreadsheet for a final project when Anchorage experienced an all too common 5+ Richter earthquake. If not for my Back-UPS 400 it would have been back to square one! I'm now the Network Systems Manager at Charter College, in charge of three networks. I learned my UPS lesson well back in my student days. I've never been disappointed with APC and the product has had quite a work out."

Trial by Earth

Faced with a water main break, Mark Conley, Regional Manager of Novell's remote sales office in Detroit was amazed at APC's reliability. "The APC unit was sitting in an inch and a half of water, working just fine, as though nothing was unusual and we lost no data to this disaster. We've used APC here now for at least four years - more than a dozen units are all around the office, and we're well satisfied, so we were even more impressed to learn that the units are amphibious!"

Trial by Water

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- $25,000 lifetime Equipment Protection
- 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

Model	Application	Sugg.List
200 **NEW**	"Green" PCs	$119
280 **NEW**	LAN Nodes	$139
400	Desktop 486/386 systems	$199
450	Tower 486/386 systems	$254
600	CAD/CAM workstations	$359
900	Longer runtime	$529
1250	Multiple systems	$689

keyboard lockups, data loss, and crashes. With an APC UPS, you get six times the protection of a high-end surge protector for little more than twice the price. And $119 is much less expensive than false peace of mind. APC UPSs carry up to a $25,000 lifetime guarantee against surge damage to your properly connected equipment, and are available to suit any application, from network servers and PCs, to fax and satellite systems.

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It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PC's with the most reliable protection they can buy: APC UPSes. So ask for APC at your favorite reseller. At just $119 an APC UPS is serious protection no serious computer user should be without.

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Advanced Turbo Browser 4.0

How many times have you stared at a long list of file names in Windows' File Manager and asked yourself, "What are these?" Advanced Turbo Browser gives you an easy way to view these files, whether they're spreadsheets, word processor documents, or graphics. It supports most popular file formats and is particularly helpful for working with multimedia files. For instance, Turbo Browser can convert a single frame from a video file into a bit-mapped image. And unlike file browsers that make you view one file at a time, this program lets you view multiple files at once. It can also link files scattered across a hard disk, allowing you to create a virtual directory of related files for easy access. Turbo Browser also converts file formats; for instance, it can turn an Ami Pro file into a Microsoft Word file—or a JPEG image file into a GIF file. Advanced Turbo Browser lists for $89.95. Pacific Gold Coast Corp., 800/732-3002, 516/759-3011.

Reader service no. 718

IntelliView MPS-100, MPS-200

Giving a PC-based presentation to a large audience usually involves carrying around three bulky, heavy components: a notebook PC, an LCD projection panel, and an overhead projector. But IntelliMedia's new line of LCD presentation systems can lighten your load a bit. The IntelliView MPS-100 and MPS-200 projection panels each include an integrated 66-MHz 486 PC, and they therefore require no video input from an external computer. They also include 16-bit digital audio, two internal speakers, and software for audio mixing. The MPS-100 features an 8.4-inch-diagonal color LCD panel and lists for $7995, while the MPS-200 uses a 10.4-inch-diagonal color LCD panel and lists for $14,995. IntelliMedia, 800/706-0077.

Reader service no. 719

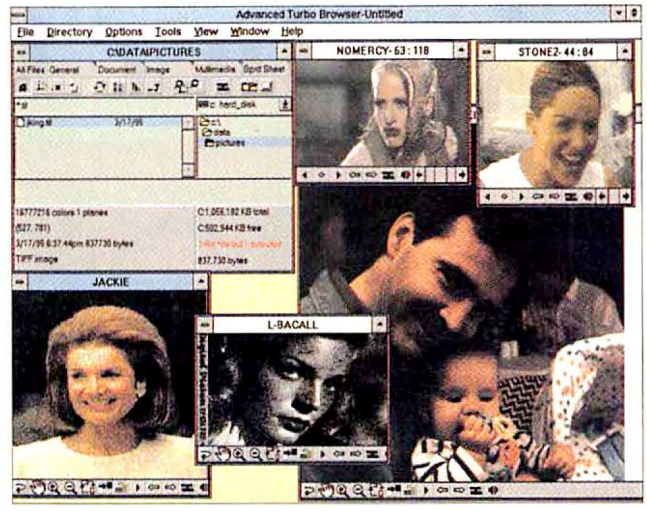
NewsBase

Information and technology junkies will likely appreciate NewsBase, an online news service that provides access to more than 300,000 news articles from over 1500 publications worldwide, as well as press releases from major corporations across the globe. NewsBase contains detailed business news about thousands of companies, industries, markets, and products. And unlike with most online services, browsing through NewsBase headlines is free and easy with the product's indexed keyword search tool. You use the NewsBase CD-ROM to search for stories, and you can download any article, regardless of length, for $1.89 per story. Currently, the CD-ROM is updated quarterly, but it will soon be released monthly. Price: $24.95 plus $3 shipping and handling (and sales tax in New York and California). MAID (Market Analysis Information Database), 800/ 335-6243.

Reader service no. 722

Commence 3.0

The $295 Commence 3.0 costs more than most personal information managers, but it also provides more customization



ADVANCED TURBO BROWSER LETS YOU VIEW a number of files in different formats at the same time, such as PCX, AVI, TIFF, and BMP.

options. Version 3.0 offers more databases (1000) and more items per database (32,000) than earlier versions. The software's manufacturer, Jensen-Jones, has also revamped the interface: You'll find tabbed folders and pop-ups such as a calculator (double-click on a numeric field) and a clock (double-click on a time field). Commence 3.0 has new phone features, too. For example, if you have Caller ID service, Commence can automatically display an incoming caller's record. The single-user version of Commence 3.0 lists for $295; the network version is $395. Jensen-Jones, 800/688-7080, 908/530-4866.

Reader service no. 720

AutoCAD LT Release 2

This Autodesk product is intended to make computer-aided design easier for beginners. The CAD package's user interface includes a variety of novice-friendly features, such as toolbars that you can customize and move around on the screen. The Tool Tips feature makes it easier to determine an icon's function; when you move the cursor to a toolbar or toolbox button, Tool Tips displays the command's name. AutoCAD LT lets you insert predrawn borders and title blocks into new drawings, and has "cue cards" that offer helpful tips for specific tasks. AutoCAD LT Release 2 is list-priced at $495. Autodesk, Inc., 800/964-4632, 415/507-5000.

Reader service no. 721

Acrobat Capture 1.0

Adobe's Acrobat software makes it possible for electronic documents to retain their original formatting, type fonts, and graphics—regardless of whether you're viewing them on a PC or on a Mac. Now Adobe is doing the same thing for printed documents. Acrobat Capture takes a scanned page, analyzes its layout, typefaces, and graphics, and recreates it in Acrobat's PDF format. You can then distribute the document across a network or publish it online (on your Web site, for instance). Capture can also out-

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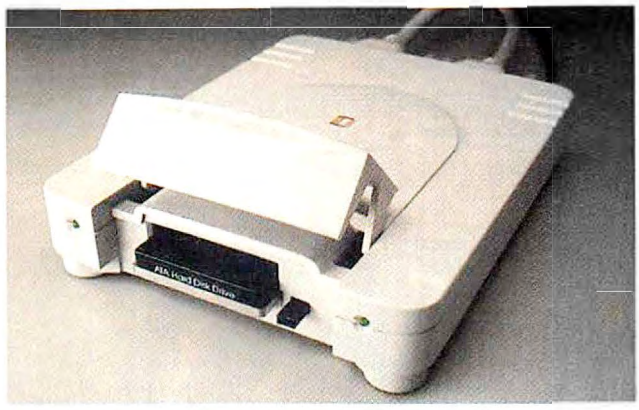
put files in other formats, such as Microsoft Word (PC or Mac), WordPerfect (PC or Mac) or Lotus Ami Pro. Adobe estimates that Capture can process 100 pages per hour on a high-end Pentium PC. When you buy Capture, the full Acrobat product is thrown in; Capture retails for $2995. Adobe Systems, 800/833-6687, 206/628-2749, 206/343-3360 (fax).

Reader service no. 723



PC CARD SLOT FOR THE DESKTOP: The Databook TMD-650 lets you use PC Card storage devices with your computer.

Databook TMD-650

If you've been looking for a way to use PC Card (formerly PCMCIA) data storage cards with your desktop or portable PC, your wait is over. Databook's newest desktop card slot adapter brings PC Card capabilities to any PC equipped with a parallel port. The TMD-650 supports all Type I, Type II, and Type III mass storage and memory cards, making it easy to share data with other computers having a PC Card slot. But the TMD-650 supports only storage cards, so other PC Card devices, such as modems and LAN adapters, will not work with the product. The TMD-650's parallel interface supports the faster Enhanced Parallel Ports that are found on newer PCs and includes a pass-through port for your printer. The $189 TMD-650 comes bundled with Databook's CardTalk software for formatting storage cards and transferring files. Databook, 716/292-5720.

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Prosper

Personal finance programs such as Quicken and Managing Your Money have become highly successful over the years by providing simple and inexpensive financial management tools. Prosper—which comes from the giant accounting firm Ernst & Young—promises to up the ante by offering more powerful personal financial planning tools than other programs do, without busting your budget or sacrificing ease of use. Prosper consists of 26 software modules that let you define financial goals and strategies, calculate budgets, optimize benefit plans, determine suitable insurance coverage, and play financial what-ifs. Prosper lists for $79.95. Ernst & Young L.L.P., 800/277-6773, 212/773-1089.

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WINNER 1000TRIO

Who says a high-performance graphics adapter can't be economical? Elsa's latest entry into the graphics accelerator market is rich with features, yet it's truly affordable. The WINNER 1000TRIO combines a 64-bit graphics chip with relatively inexpensive DRAM, providing flicker-free images and performance close to that of pricier VRAM-based graphics boards. Software installation is as easy as picking your monitor's manufacturer and model number from a list. You also get a wide assortment of software utilities, including on-the-fly resolution switching, color gamma correction, power management, an on-screen magnifier, and more. The product is available in PCI and VESA bus versions. The WINNER 1000TRIO lists for $189 with 1MB of memory, or $249 with 2MB. Elsa, 408/565-9669.

Reader service no. 726

The Computer Support Directory

Calling technical support for software or hardware assistance is often a bigger headache than the reason you picked up the phone. You're invariably transferred numerous times to different "specialists" until you finally reach the person with the solution to your problem—and are often charged for the call. *The Computer Support Directory*, by Bill Adler, Jr., and Kristy Fraser, is a $12.95 paperback that might save you from making a bunch of phone calls—or at least prevent those multiple call transfers. It lists the phone, fax, and TDD (text telephone) numbers of specific technical service departments for just about every personal computer hardware and DOS or Windows software company in the United States. It also lists the companies' addresses and their computer bulletin board and online service numbers. The book even includes an excellent step-by-step troubleshooting guide that can help solve your problem *before* you make that urgent phone call to tech support. McGraw-Hill, 800/722-4726.

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Links 386 CD

Now available in CD-ROM, Access Software's popular Links 386 CD computer golf game features simulated aerial fly-bys that give you a bird's-eye view of two internationally renowned golf courses. Golf addicts can check out the bunkers, greens, and other key features of the Harbour Town Golf Links on Hilton Head Island, South Carolina, and the Banff Springs Resort Course in Alberta, Canada. For simulated games, Links 386 CD also has an updated sound system that features comedian Bobcat Goldthwait as your audio caddie. Make sure your that PC has plenty of available storage capacity before loading Links 386 CD, however—the product requires 16MB of hard disk space. It's street-priced at $39.95. Access Software, 800/793-0073, 801/359-2900.

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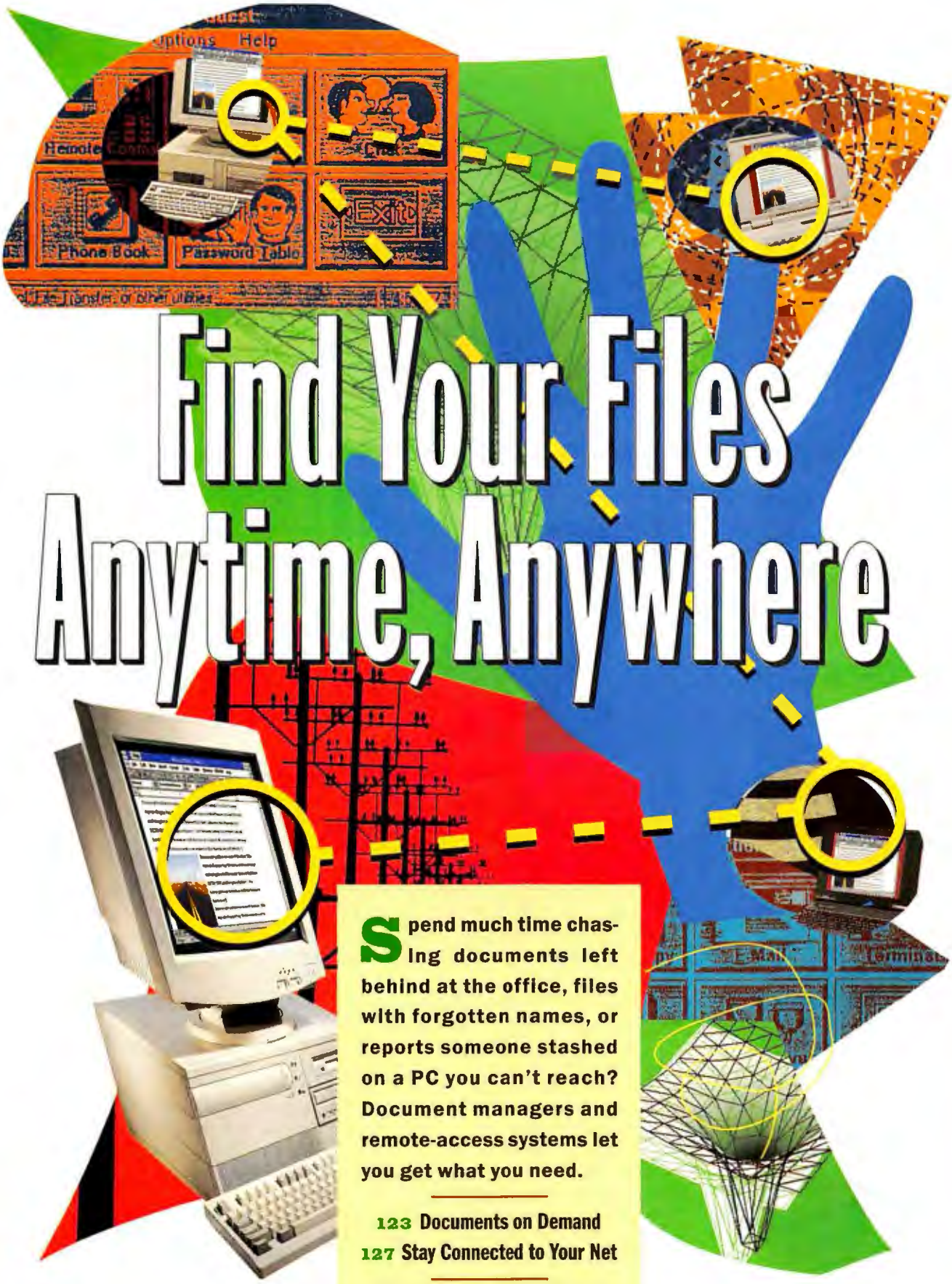
For more information about any product, contact the manufacturer or circle the number on the reader service card.



Find Your Files Anytime, Anywhere

Spend much time chasing documents left behind at the office, files with forgotten names, or reports someone stashed on a PC you can't reach? Document managers and remote-access systems let you get what you need.

123 Documents on Demand
127 Stay Connected to Your Net

Edited by Eric Bender

ILLUSTRATION BY GIACOMO MARCHESI

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New Low Price.

There are many ways to address letters.

And to make labels.

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Featured in Fortune Magazine
March 6, 1995

Pocket your pen. Toss your typewriter. And leave your laser printer alone. Because if you're using any of them to address envelopes or make labels, you're making things hard on yourself. After all, you could be using a Smart Label Printer.

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Smart Label software can automatically capture an address or other text and graphics from your computer screen. Print it instantly, or save it to the built-in database. It even lets you personalize labels with graphics, bar codes, digital images, and a selection of over 50 fonts. In short, this unique software makes Smart Label Printers the time-saving, hassle-free, fool-proof solution for labeling everything from envelopes to name tags, file folders to floppy disks.

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Documents on Demand

Collect your files in a flash with the right document management tool.

If you've ever saved an important document and then spent hours trying to find it again, you're not alone. "Without a strategy, storing a document on a network can be like putting it in a black hole," says Marie Hardiman, system administrator for John Hancock Life Insurance's legal department in Boston.

Hardiman needed a way to let users find documents quickly while remaining shielded from the complexities of DOS's file- and directory-naming conventions. World Software's Worldox, she says, was the answer. "Our users don't know directories or servers—they just want to find documents quickly. They can now do so, even when they forget document names."

Today's Windows programs make creating documents easier than ever before, and it's a snap to swap files on a network. But the simplicity and efficiency end when you need to track down a file in a hurry. Many programs—from simple file indexers and finders to sophisticated enterprise-wide document/image management systems—can help you crack the code. Here's a sampling of the powerful tools now available to help you find what you need.

MARIE HARDIMAN CHOSE WORLDOX TO MANAGE FILES and shield users from DOS's complexities at John Hancock's law department.

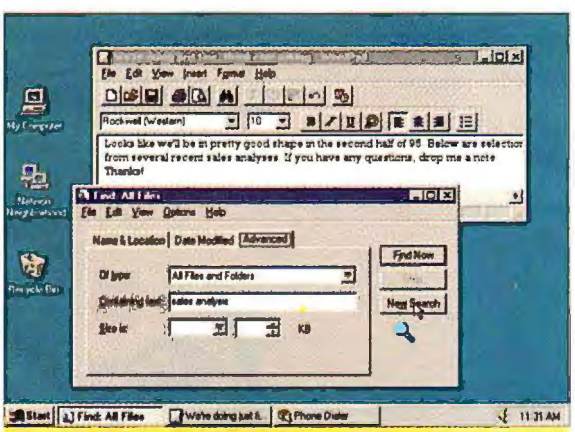
1 A Windows Solution

Symantec's Norton Desktop for Windows and PC Tools, two popular replacements for Windows' Program Manager and File Manager, offer substantial tools for locating and retrieving files. Both have enhanced file managers that enable you to search for documents not only by name and type but also by time of creation, so you can select all the files created within a specific time period.

In addition, you can search within documents for a particular word or phrase. You can then view the contents of a file without opening it. Both products also allow you to organize your documents in file folders and display them right on the Windows desktop for easy access.

Later this year Windows 95 should solve at least some aspects of the document management dilemma for many users.

The new operating system lets you save your files with long, descriptive names, rather than the standard eight-character names, and organize these documents in folders that you can access from the desktop. If you're working on a project with others, you can create a shared folder and assign each member access. A dedicated file finder utility lets you search for files and folders anywhere on the network by file name, date, specified text, file size, location, or other such criteria. Windows 95 also lets you save the results of a complex search as an icon that you can use over and over again.



FINDING FILES ACROSS A NETWORK IS A SNAP in Windows 95, which lets you search for files by name, date, size, or location.

2 Word Processors as Word Finders

If you mostly just need to manage files you create with a Windows word processor or spreadsheet, then you don't need to look far for help. Both Microsoft Office and Novell PerfectOffice, for example, provide advanced file management tools.

In both suites, you can create file-listing filters (called Saved Searches in Office and QuickLists in PerfectOffice) that automatically list files according to the name, pattern, and directory you specify; you can then view the contents of a file before you open it. You can also create document summaries to record vital information—such as the doc-

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Replace your tired, old mouse with a Logitech trackball and put new life into your PC performance. Not only will you get greater accuracy, you'll save desk space. That's because to move the cursor you just use your palm or thumb while the trackball stays still. And thanks to clever MouseWare software, you can assign routine commands to individual buttons, and make double-clicking a thing of the past. Saving you time and effort. Plus, all our high performance TrackMan trackballs have a unique design for total comfort and, unlike most transplants, come with a 3 year warranty.

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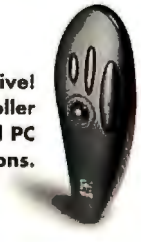

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LOGITECH

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ument's author, the creation date, and a description of its contents—then include this information in the search criteria. PerfectOffice also lets you build indexes that track the occurrence of words in a document. Once you've built an index, you can create and launch sophisticated search requests that return results almost immediately.

3 Notes for Documents

Lotus Notes comes with a document database template that lets you track a document by author, creation date, and category. You can store an entire document within a Notes field, or you can embed the document as a file attachment. If you do the former, you can use Notes' formidable text indexing capabilities to locate documents based on the words they contain.

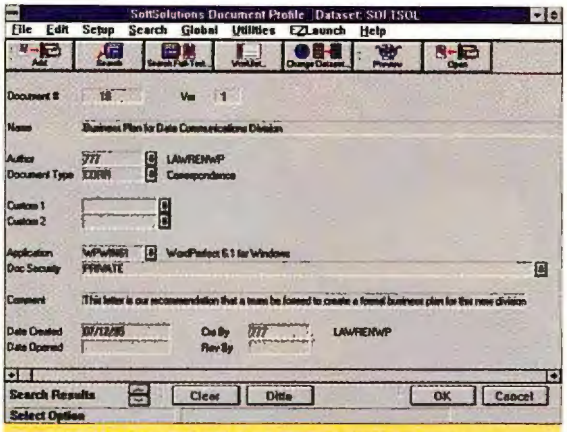
4 Dedicated Document Managers

The tools we've mentioned above are great in the hands of experienced DOS or Windows users. Fortunately, there are other tools for offices where not everyone has an extensive knowledge of PC file and directory structures. World Software's Worldox and Novell's SoftSolutions are good representatives of these types of solutions.

Both Worldox and SoftSolutions come to the rescue just when document management problems usually begin. These programs intercept the File•Save and File•Open commands of popular Windows applications and replace them with their own dialog boxes for controlling the document storage and retrieval process.

Both products let you save and retrieve documents using full-name descriptions (up to 70 characters) instead of 8-character DOS names. Like Norton Desktop and PC Tools, both SoftSolutions and Worldox include a full array of document viewers that let you quickly see a document's contents as you browse. And like PerfectOffice, they both index documents so you can easily locate files based on their content.

A document is easiest to find if you save it with a document profile, and an organization can use SoftSolutions or Worldox to enforce this practice. You can store standard information in the profile, such as the document creator and the date, or you can opt to create a custom profile that includes the department name or a description of the document's contents.



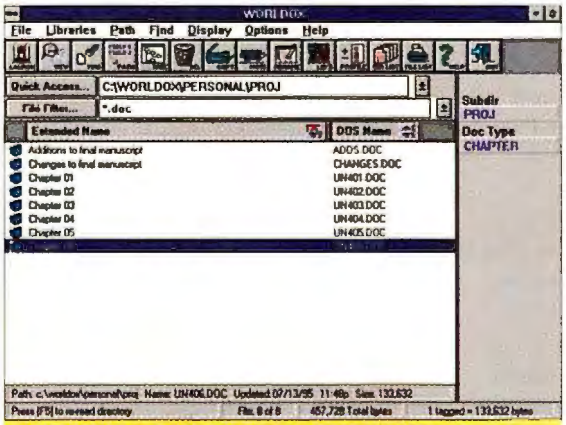
SOFTSOLUTIONS LETS YOU CREATE PROFILES for each document, making it easy to pinpoint the document at a later date.

Both products can be run from either a stand-alone PC or a network server. But while Worldox and SoftSolutions perform similar functions, they differ significantly in their ease of implementation, scalability, and administrative requirements.

Worldox offers the most intuitive interface of the two and is by far the easiest to implement. It's the better solution when you need to manage documents on a file-laden individual PC or in a small or medium-size workgroup and you don't have the services of a full-time administrator.

SoftSolutions also runs on a stand-alone PC or in a small workgroup, but in a larger multiuser environment it requires the ongoing and assertive hand of a knowledgeable administrator. In return it delivers enough power to handle document management needs for a large enterprise.

Both products let the net administrator control access to documents, and both can be set up to save each revision of a document, thereby reducing the chance that an outdated version of a file will supersede the latest version. SoftSolutions also includes a Remote Document Server, which allows for remote document access via E-mail.



IN WORLDOX, YOU CAN CREATE LONG FILE NAMES and categorize documents by type for easier access.

Fortunately, you don't have to look very far to find tools that make document retrieval and management easier. You just have to decide what's appropriate for you and your group. **—Bill Lawrence**

Bill Lawrence is a network engineer for a major western utility company and the author of Using NetWare 3.12 *and* Using NetWare 4.1 *(both published by Que Corporation, 1994, 800/428-5331).*

For more information about all products in this article, circle reader service no. 901.

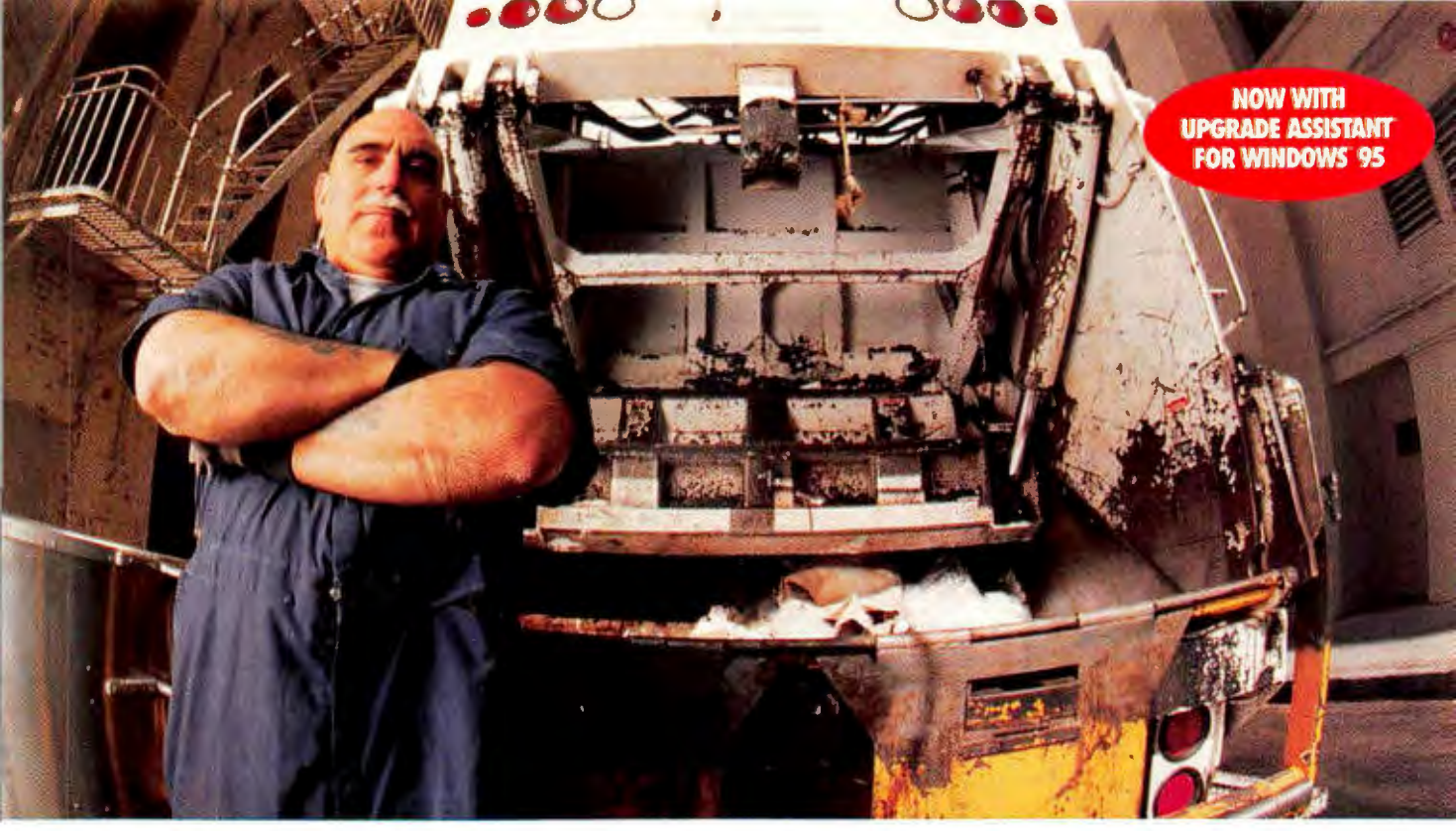
WHERE TO BUY

Norton Desktop
List price: $179
Symantec
800/441-7234
Reader service no. 601

Novell SoftSolutions 4.1
List price: $495 per file server, $295 each additional license
Novell, Inc.
801/226-6000
Reader service no. 602

PC Tools
List price: $129.95
Symantec
800/441-7234
Reader service no. 603

Worldox
List price: $249.95
World Software Corp.
800/962-6360
Reader service no. 604



REMOVE-IT NEVER FORGETS TO TAKE OUT THE TRASH.

Oops. You let your guard down and now your hard disk is a mess. And the old applications, fonts, and files littering your PCs landscape are more than just unsightly—they can fill up your hard disk and sabotage system performance. Wouldn't it be great if someone could clean the garbage out of your computer, or even your entire network? A trusted friend who could do the job automatically, safely, and thoroughly?

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Stay Connected to Your Net

Remote access products let you keep in touch with your office network—from wherever you work.

FROM HIS OFFICE IN MINNEAPOLIS, HÄAGEN-DAZS'S DAVID WAGNER TAPS INTO SALES DATA and other central resources at the Teaneck, New Jersey, headquarters via ReachOut and his notebook PC.

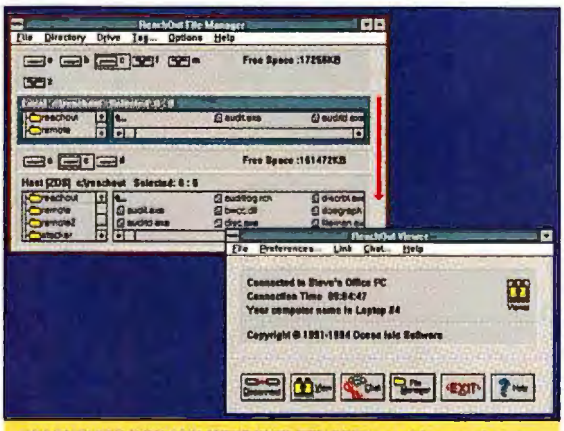
Local area networks are great—as long as you're local. But these days, you're likely to spend lots of time working without actually being *at* work. And you don't want to lose touch with your crucial files and applications just because you're working from a hotel room or your home office.

Good news: Leaving the office doesn't mean leaving the network behind—as long as you have the proper remote access system installed. You can quickly dial in to your net to pick up the sales figures you left on your office PC, check the latest customer information posted on the net, or grab whatever else you need. You won't get instant gratification—a typical remote connection runs at a maximum of 28.8 kilobits per second (kbps), compared with 10 megabits per second (mbps) on your office PC—but it can be plenty gratifying when the alternative is no access at all.

If this sounds like something your group needs, it's time to talk with your net administrator and start working on a plan for remote access. Today's selection of products ranges from $99 software packages to hardware devices that cost thousands.

Remote access products come in two basic types: remote control and remote node. Each approach has its own set of virtues and flaws.

With remote control, you use your remote (off-site) PC as a long-distance clone of a PC back at the office. Applications appear to be running on your remote PC but actually execute on the office PC. Remote control software has been around for more than a decade; the new twist is that you can run it on a dedicated server, making it far more practical and cost-effective for most organizations.



REACHOUT'S DOS AND WINDOWS UTILITIES provide remote control tools such as a file manager and a real-time chat mode.

With remote node software your remote PC itself becomes a workstation on the net, connected over phone line by modem rather than with a network card.

We'll explore remote access options by examining four products: Symantec's Norton pcAnywhere Access Server, Stac Electronics' ReachOut Remote Control, Microcom's LANexpress, and Funk Software's WanderLink—and we'll look at how some users profit from such products.

Taking Remote Control

How does Häagen-Dazs get Triple Brownie Overload, Cappuccino Commotion, and other chilly temptations to your grocer's freezer? In part, by collaboration between the Häagen-Dazs employees at offices nationwide—and those employees who don't really *have* an office.

"We have people scattered all over the country," explains David Wagner, division sales manager for the Minneapolis–St. Paul area. Wagner works out of a sales and distribution center in suburban Minneapolis, but some of his colleagues have home-based offices, and still others spend nearly all their time on the road.

Häagen-Dazs turned to Stac Electronics' ReachOut Remote Control. Installed on a modem-equipped portable PC, it lets these disparate workers tap into the company's

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net from almost anywhere, giving them access to sales data and other central resources located at Häagen-Dazs headquarters in Teaneck, New Jersey.

Like Symantec's pcAnywhere and other remote control products, ReachOut lets off-site users seize control of a modem-equipped PC at the office, giving them access to the software and data files on its hard disk. If that PC is connected to a network, ReachOut can also access E-mail, retrieve files from the server, and perform other network-related tasks.

Unlike some remote control products, ReachOut lets you use all its features from within both DOS and Windows. To initiate a remote access session, you first specify the number you want to dial (a phone book helps you manage multiple numbers); the program then makes the connection with the office PC and prompts you for a password. You can also set up the program so the office PC calls back the off-site system, enhancing security and cutting long-distance charges on the remote PC's phone line.

ReachOut relays your keystrokes and mouse clicks to the office PC and updates your remote system's screen as the office PC's display changes. This technique is pleasingly snappy for most DOS applications. However, transmitting a Windows screen across a phone line can make a 486 remote PC feel more like a 286.

Fortunately, ReachOut provides other features for handling graphics-intensive applications. For instance, the package's DOS- and Windows-based file managers make it easy to download files to a remote PC. The program also provides drive-mapping features that let you treat the drives on the office PC and network as local (albeit very slow) disks that can be used from within programs running on your remote PC. The result is much like what you get with the costlier remote node products we'll look at

Choose Your Remote Access Approach

Remote access products fall into one of four general categories: stand-alone remote control, shared remote control, remote node using hardware and software, and software-only remote node. Here's a sampling of products and what to expect from the different approaches.

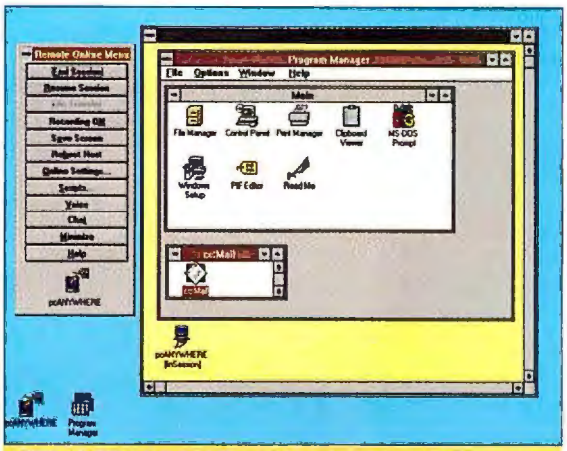
	STAND-ALONE REMOTE CONTROL	SHARED REMOTE CONTROL	REMOTE NODE (HARDWARE AND SOFTWARE)	REMOTE NODE (SOFTWARE ONLY)
Sample products	Carbon Copy (Microcom), Close-Up (Norton-Lambert), pcAnywhere (Symantec), ReachOut (Stac Electronics)	pcAnywhere Access Server (Symantec), WinView for Networks (Citrix)	LANexpress (Microcom), LanRover (Shiva), NetHopper/P (Rockwell), RLN (Attachmate)	Lan Distance (IBM), NetWare Connect (Novell), WanderLink (Funk Software)
Performance	Very good in DOS; sluggish in Windows, whether you're working with large or small amounts of data	Very good in DOS; sluggish in Windows, whether you're working with large or small amounts of data	Excellent when not performing network-related tasks; can be very slow with large data-file transfers	Excellent when not performing network-related tasks; can be very slow with large data-file transfers
Cost	Inexpensive for a single remote user, but price doesn't decline sharply for multiple users	Requires a well-equipped PC to act as a server, but a single server can handle multiple users	Highest price per remote line, but each line can serve multiple remote users	Less expensive than a hardware-based remote node, since it piggybacks onto your net server
Ideal applications	Most DOS applications, databases, and programs on your office PC that you access only rarely from off-site	Most DOS applications, databases, and programs on your office PC that you access only rarely from off-site	Applications that don't require heavy data transfer; programs you use primarily off-site	Applications that don't require heavy data transfer; programs you use primarily off-site
Troublesome applications	Desktop publishing, graphics, CAD, and other applications that create complex displays, including many Windows programs	Desktop publishing, graphics, CAD, and other applications that create complex displays, including many Windows programs	Non–client-server databases and other applications that transmit heavy data loads between remote PCs and the server	Non–client-server databases and other applications that transmit heavy data loads between remote PCs and the server
Keep in mind	Look for a product that goes beyond remote control to offer drive mapping, a file manager, and other remote node–like features	Look for a product that goes beyond remote control to offer drive mapping, a file manager, and other remote node–like features	Consider combining a remote node product with remote control software for added versatility	Consider combining a remote node product with remote control software for added versatility

later. (Note, however, that each ReachOut user needs to dial in to an individual PC, rather than directly to the net.)

At press time, Stac planned an upgrade to ReachOut—version 5.0—for release during the summer. The new version will include additional network-related features and more security options, and will speed data transfers by using Stac's LZS compression, the same technology used in its Stacker disk compression utility.

Sharing Remote Control

For a single user, a remote control program like ReachOut may be the cheapest and simplest way to tap into the network. But outfitting a group of people with remote control software, an analog phone line, and a modem at every office PC can be expensive and hard to manage.



MULTIPLE USERS CAN GAIN REMOTE CONTROL ACCESS TO THE NET through a single pcAnywhere Access Server.

To avoid these problems, Häagen-Dazs runs ReachOut on a dial-up server made by Cubix Corporation. This is a specialized hardware device that contains multiple PCs and modems in a single box. Rather than dialing in to their own computers, the company's workers are really connecting to the Cubix server, which is attached to the network to provide access to E-mail and other group applications.

Remote control packages that are tailored for multiple users, such as Symantec's pcAnywhere Access Server and Citrix Systems' WinView for Networks, provide another solution. These programs, which run under OS/2, let multiple remote users dial in to virtual Windows PCs running on a single computer.

We set up the pcAnywhere Access Server on a net PC running OS/2 Warp. Our test computer had two serial ports and could therefore support two simultaneous remote users; you can add additional serial ports to handle more users. The computer you use as a remote server needs a fair amount of hardware muscle: Symantec recommends a 486 or Pentium system with 8MB of memory, plus an additional 4MB for every simultaneous remote user.

WINDOWS 95'S BUILT-IN REMOTE ACCESS USES WIZARDS to handle the technical details of dial-up networking.

Your remote PC runs the same capable software as the regular single-user Windows version of pcAnywhere. You get features similar to those in ReachOut, plus extras such as a file manager that synchronizes directories so that both the remote and the office PCs always contain the most current versions of your files. One limitation: You can map your remote PC's drives to the office PC, but not vice versa, so you don't get the remote node–like ability to load files directly from the office system's drives into applications that are running on your remote PC. OS/2 also contributes some drawbacks of its own. It restricts you to a 640 by 480 display, for instance, and it can't take advantage of OLE 2.0 data exchange.

More important, connecting to a shared, virtual Windows session doesn't provide quite the level of comfort afforded by dialing in to your own PC. It's difficult to configure the applications you run to your exact preferences, since other remote users may dial in at other times and make changes. You do get your own private Windows desktop, however, and your network administrator can set up security groups to ensure that your private files stay confidential.

Remote Node: Nothing but Net

For the 15 attorneys at the Boston law firm Jager, Smith, Stetler & Arata, the workday rarely ends at 5 p.m. In the past, that routine frequently had meant missed meals and neglected families.

Today, the firm's lawyers are still toiling as hard as ever, but thanks to Microcom's LANexpress they can have a shot at a private life, too. LANexpress is a remote node system that turns the attorneys' home computers into long-distance network workstations, giving them access to all the important files they need. "We can go home at 6 or 7," explains partner Bruce Smith, "have dinner with the family, then work for a couple more hours."

The firm also uses LANexpress to distribute computer-based documents to other offsite users, including employees of other

Windows 95 Does Remote Access

Once Microsoft finally ships Windows 95, remote access should become much easier for most end users—because it will be built right into Windows.

You'll be able to dial in to remote access servers such as Shiva's LanRover from any mainstream network, without installing special software on your remote PC. A setup Wizard will help you configure your PC for remote access (see screen at top). Windows will even suggest a remote connection whenever you try to use a network resource but aren't attached to a net. Microsoft is also working on software that lets any Windows 95 PC act as a single-connection remote access server. —*H. M.*

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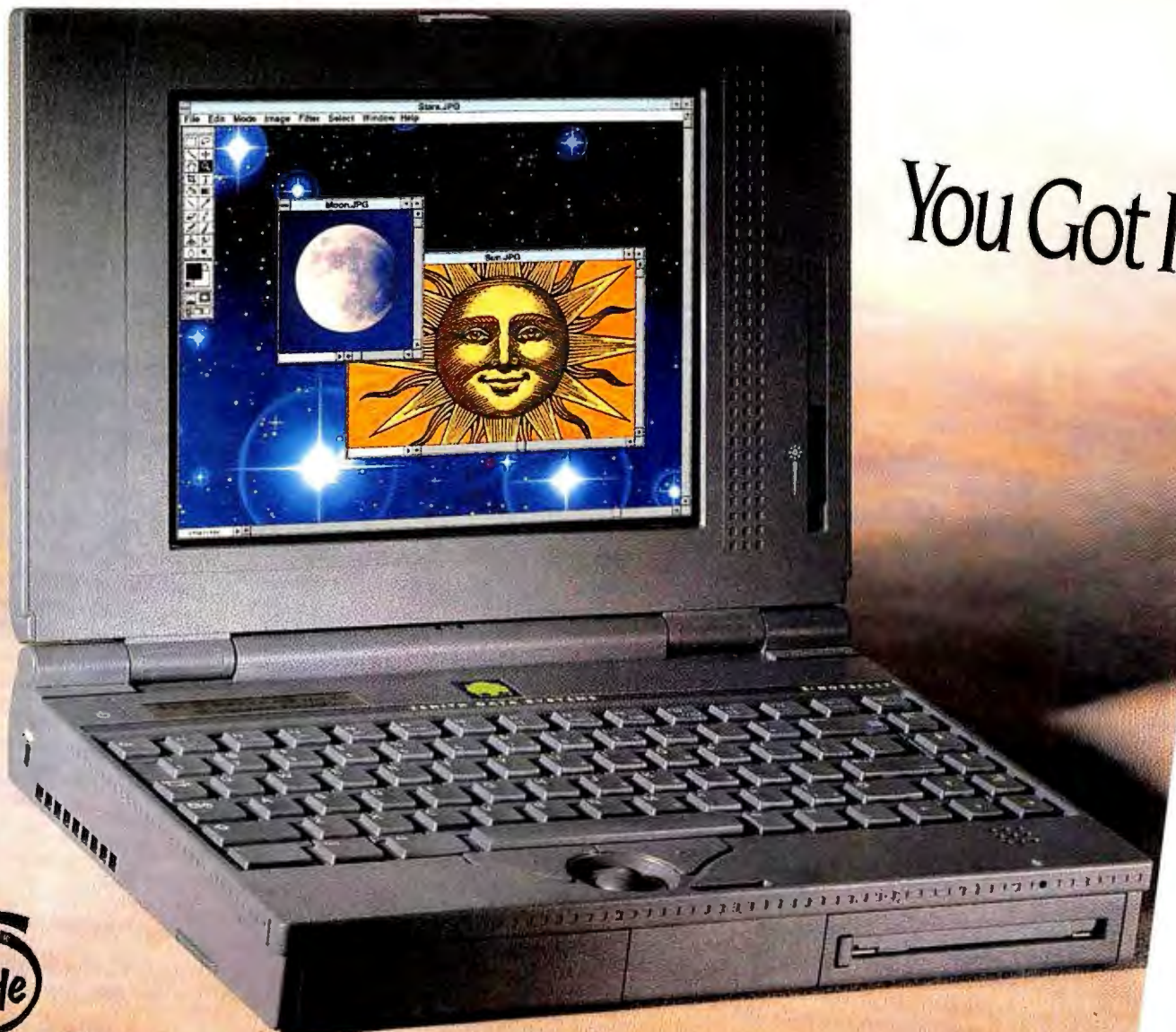

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intel inside

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AMY YACHIMSKI WILL HELP USERS LIKE BRUCE SMITH at her Boston law firm via LANexpress while on maternity leave.

companies. System Administrator Amy Yachimski, a mother-to-be, is so sold on the product that she plans to continue helping the staff with their PC problems via remote node access while she's on maternity leave.

Like Shiva's LanRover, Rockwell Network Systems' NetHopper/P, and other remote node products, LANexpress is a hardware device that attaches to your net and accepts your dial-in calls. It produces the same effect as the drive-mapping and file-manager features offered by remote control packages, except that as a remote node device it doesn't require a PC on the network to serve as an intermediary. (See "Take Your Net With You," *PC World*, April 1995, for reviews of LanRover and NetHopper/P.)

LANexpress is an all-in-one solution complete with internal 28.8-kbps modems. That may seem like a disadvantage if you already own other modems, but it does make for a tidy, self-contained box that's as close to being a plug-and-play remote product as anything we've tested. (The remote PC can use any standard modem, but a Microcom model gives you special security features.)

When you boot up a PC with the LANexpress client software installed, it asks if you want to connect to a remote network or a local one (or no net at all), then loads the appropriate drivers. Once in Windows, you can initiate a remote connection, log in to the network, launch your E-mail program, and perform other tasks by clicking large, easy-to-understand icons. (DOS users must connect through a less friendly set of utilities.) When you're not performing a network-related function, your remote PC is every bit as responsive as if you weren't connected to the LAN at all.

There's a catch, however. When you need to pass data across your remote network connection—for example, to load a word processing document from the server—remote node is markedly slower than remote control. Loading large, non–client-server databases may leave you twiddling your thumbs for minutes. In our tests, copying a 500K file with a 28.8-kbps connection typically took 2½ minutes.

But you don't have to give up remote control when you use LANexpress. The package comes with Carbon Copy, a utility that lets you control any local PC on the net via a LANexpress connection. That's how the attorneys at Jager, Smith access the office's Keyfile document management system, whose images would bog down an ordinary remote node session.

Net administrators like remote node packages better than remote control ones, because they're usually easier to manage. LANexpress, for instance, includes a sophisticated utility that sets privileges for authorized remote users, monitors traffic across the remote connection, and performs other administrative tasks. Network users can also employ the LANexpress and LanRover modems to dial out, making the modems serve double duty; however, neither package supports all communications programs.

LARGE, EASILY DECIPHERED ICONS make it simple to find your way around LANexpress's remote access features.

LanRover also allows Macintosh users to have remote access to the network, something that the version of LANexpress we tested can't do. LANexpress 3.0, which Microcom was readying for summer release at press time, will support Mac users.

The Serve-Yourself Approach

If you're on a tight budget, you might also consider a software-only product, such as Funk Software's WanderLink or Novell's NetWare Connect. These programs cost a fraction of the roughly $1000-per-port price of systems such as LANexpress.

Five Tips for Remote Access

1. **A hidden bottleneck in many PCs is an aging serial-port communications chip. For quick, reliable connections, you need a 16550C UART chip. Run msd.exe (a DOS utility that comes with both DOS and Windows) to determine which type of chip your PC has. If it uses an 8250 or a 16540 UART chip, you can upgrade it easily and inexpensively with a new serial board.**

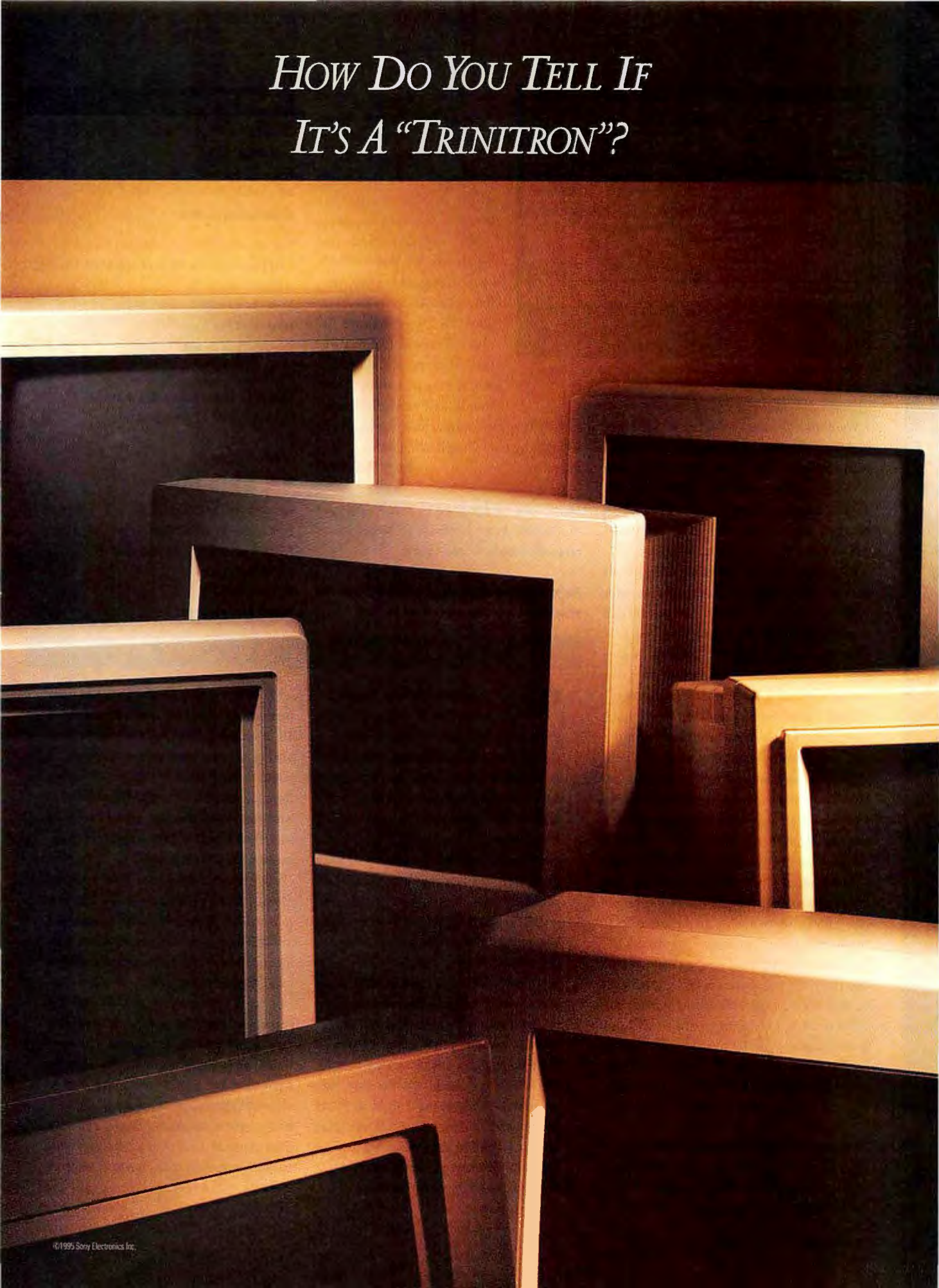
2. **Stick with 28.8-kbps V.34 modems from a reputable vendor. Using the same brand of modem on both ends can reduce the likelihood of unsuccessful connections. Don't bother with V.FC 28.8-kbps modems.**

3. **To minimize phone costs, plan your work so that you're connected only when you need to be.**

4. **With remote node products, make sure that as much of your software as possible is installed on the remote PC's hard disk rather than the server.**

5. **Remote node and remote access programs can make subtle changes to your PC's configuration files. Before you install any remote package, be sure to back up those files.**

How Do You Tell If It's A "Trinitron"?



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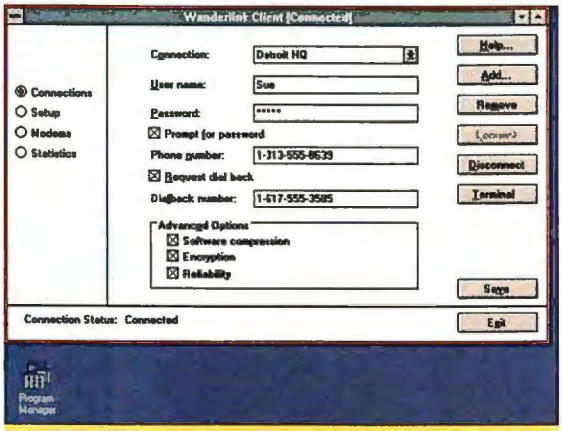

WANDERLINK OFFERS REMOTE ACCESS without the specialized hardware required by LANexpress and LanRover.

WanderLink costs as little as $168 per node (for a version supporting 16 ports) and uses hardware you probably already own. The package runs on any NetWare 3.*x* or 4.*x* file server, works with standard modems plugged into the server's serial ports, and lets you dial in from DOS or Windows.

While the setup at the office differs from that of LANexpress, WanderLink provides you with a similar experience when you dial in to the network. Besides giving you a remote node capability, the package comes with Proxy, a remote control application that can be run over a WanderLink connection.

Does running on the server slow things down? With little or no other traffic on the net, our WanderLink test sessions were slightly faster than our LANexpress ones. However, when there was a bit of local activity on the network, WanderLink was slightly slower than LANexpress—though it was still fast enough to keep us productive.

The package does suffer from a few rough edges and some missing features. For example, if you want to initiate your remote node connection from Windows, your remote PC must have an up-to-date NetWare driver that many organizations haven't implemented yet. WanderLink also doesn't provide the software that local users need to dial out from the net using its modems. (For more on WanderLink, see "Five Great Workgroup Packages That Boost Your Productivity," *PC World*, January 1995.)

Making the Right Connection

With all these options, choosing the best remote access solution for your needs can be daunting. We've summarized the product categories in the chart "Choose Your Remote Access Approach." Check it out, and talk with your network administrator to determine which solution provides the best overall fit for your group.

Also keep in mind that Windows 95 will include built-in remote communications capabilities (see "Windows 95 Does Remote Access"). If these features live up to their potential, remote access may become a cheap, simple, and irresistible strategy for any organization whose workers can't afford to be out of touch when they're out of the office. **—Harry McCracken**

Harry McCracken is an associate editor for PC World. *Peter Loshin is a Boston-based network consultant and writer.*

For more information about all products in this article, circle reader service no. 912.

WHERE TO BUY

ReachOut Remote Control 4.04
List price: $199
Stac Electronics
407/770-4777
Reader service no. 865

Norton pcAnywhere Access Server 1.0
List price: eight-user package $329, two-user add-on pack $129
Symantec Corp.
800/441-7234
Reader service no. 866

LANexpress 2.0
List price: 2 ports $3499, 4 ports $4999, 8 ports $7999, 12 ports $10,999
Microcom
800/822-8224
Reader service no. 867

WanderLink 1.0
List price: 1 port $295, 2 ports $395, 4 ports $595, 8 ports $995, 16 ports $2695
Funk Software
617/497-6339
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I'm Shooting Data Now

The biggest weakness of remote access systems is lack of speed; even when using software with built-in compression and a 28.8-kbps modem, you can feel grass growing under your feet. Integrated Services Digital Network promises a better alternative for telecommuters and other remote workers: high-speed, high-quality data and voice transmission for a relatively small price premium over that of ordinary telephone service.

ISDN provides digital rather than analog communications on twisted-pair wires like the ones that carry telephone service to your home. Standard ISDN service offers two 64-kbps channels that work together for raw transmission speeds of 128 kbps or that can be split for attaching other ISDN devices, such as phones or fax devices. When ISDN is coupled with the data compression techniques that will be built into Windows 95, effective transmission rates may approach 500 kbps, according to Angelo Santinelli, senior director of marketing at remote node hardware vendor Shiva.

Monthly charges for ISDN service have fallen steadily and are now typically about 15 to 35 percent higher than for regular analog service, says Sanjay Mewada, a telecommunications analyst at the Yankee Group in Boston. Prices for the necessary hardware have dropped significantly as well, from a high of $2000 last year to between $400 and $800 now.

Hooking up ISDN can still be a chore, though. Some phone companies now provide nearly 100 percent ISDN coverage, but availability in other regions lags, and finding phone company representatives who are familiar with the technology can be a challenge. You need to equip the ISDN line with specialized hardware: a Network Terminator Type 1 and a terminal adapter. You must tweak each installation for its specific equipment and type of connection, and installation glitches are common. In addition, many remote access hardware and software products don't offer full-fledged ISDN support, although that should change by year-end. *—Peter Loshin*

By The Picture On The Screen.

The best monitors have something distinctly different. The Trinitron® Inspiring Vision Logo.

Monitors with this logo have state-of-the-art Trinitron technology inside. Including a vertically-flat screen that minimizes image distortion and light reflections from corner-to-corner. And the revolutionary Aperture Grill. It virtually eliminates the doming and scan-moiré effect. Together, the Aperture Grill and unique electron gun system provide you with a crisper, clearer, sharper, brighter picture.

For the highest quality, look for the Trinitron Inspiring Vision Logo. Then you'll know it's truly a Trinitron monitor.

SONY

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• 75 MHz Pentium processor • Two Lithium ion battery packs • Serial infrared port • 10.4" Active Matrix or 10.5" Dual Scan displays • 524 million bytes (=500MB) or 810 million bytes (=772MB) Hard Disk Drives • 8MB RAM, expandable to 32MB • 2MB Video memory • Multimedia package: Built-in 16-bit sound, internal speaker & dual mode microphone*

intel inside
pentium PROCESSOR

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When the rush was on to introduce a notebook with a Pentium™ processor, Texas Instruments decided to do what others thought couldn't be done.

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And for flexible connectivity, we designed a way to allow external access from the PCI bus to the latest peripherals.

It was a challenge we addressed for two simple reasons: to give users true desktop Pentium performance for *faster running software and expansion capabilities* for investment protection.

So now you have a notebook with smoother full-motion video and enhanced 3-D graphics. In addition, we designed the TravelMate 5000 to take advantage of the "plug and play" capabilities of Windows 95® when it becomes available.

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In addition, wireless communication with other notebooks and desktops is very quick and easy with our integrated infrared capabilities.

The TI TravelMate 5000. For more information on what others thought you couldn't do with a notebook, simply call 1-800-TI-TEXAS (e-mail: 2ti@msg.ti.com).

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Circle 244 on reader service card

BEST PRODUCTS of 1995

Our panel of experts chooses PC World's 13th annual World Class Award winners—outstanding PC hardware, software, and services in more than 60 categories.

FORGET THE EXCEDRIN. CANCEL THAT shrink appointment. Skip the deep-breathing exercises. We know buying new hardware and software usually induces headaches, stress, and anxiety, but we have a cure.

Welcome to the 13th annual World Class awards. For this year's go-round, we polled hundreds of consultants, market researchers, user group presidents, writers, and editors, as well as a select group of longtime *PC World* subscribers, and asked them to choose their favorite hardware, software, and online or Internet services in 67 categories. In addition, we asked them to pick the companies that stand resolutely by their customers during and after the purchase. This year our experts' preferences produced some surprising turnovers, and some not-so-surprising long-term winners. In the hardware arena, several newcomers ousted longtime favorites.

Though Gateway 2000 has taken both the desktop category and our panel by storm for several years running, competitors such as Dell and Micron gained ground in 1995. Dell's no-nonsense Dimension XPS P90—our number one Top 20 power system six months in a row last year—took the honors for best business desktop system (though it actually sits on the floor). And Dell's win was paired with a top billing for hardware service and support (sharing

BY SCOTT SPANBAUER

PRODUCT PHOTOGRAPHY BY ROBERT CARDIN

AND THE WINNERS ARE...

Product of the Year

IBM OS/2 Warp 3.0

Desktop Dynamos

Business Desktop Computer
Dell Dimension XPS P90

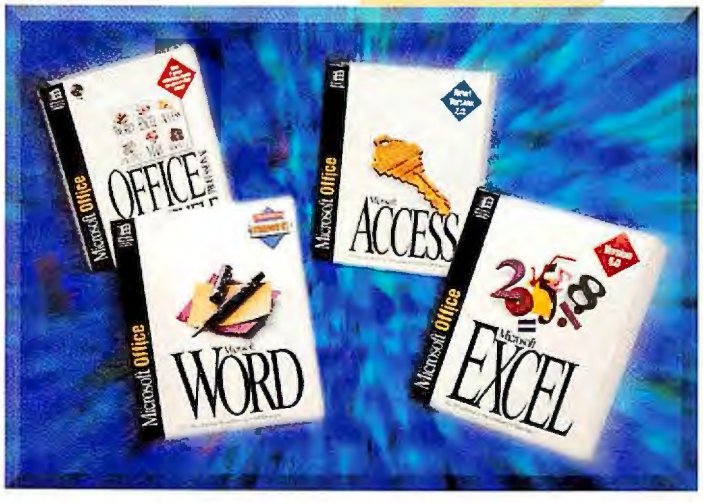
Home Desktop Computer
Micron P90 Home MPC

Operating System/ Environment
IBM OS/2 Warp 3.0

Input/Pointing Device
Microsoft Mouse 2.0

Monitor
ViewSonic 17

Graphics Accelerator Board
Diamond Stealth 64 DRAM



Power Apps

Word Processor
Microsoft Word 6.0 for Windows

Spreadsheet
Microsoft Excel 5.0

Database
Microsoft Access 2.0

Applications Suite
Microsoft Office Professional 4.3

the honors with Compaq). Micron's P90 Home MPC took the home system laurels—no surprise, since it garnered a Best Buy in our February review of home PCs.

Matt Brownell, who supports users at Semiconductor Research Corporation in Research Triangle Park, North Carolina, says he understands why Gateway may have faltered. His company still mostly buys Gateway systems, but he's had up-close-and-personal experience with Micron, too. "We can never get ahold of Gateway's tech support," he says. "Micron has excellent customer service, and I can reach them immediately."

Another regular desktop champion also fell: NEC's MultiSync 5FGe, a prior winner in the monitor category, was unseated by the cut-rate ViewSonic 17. "That's quite an achievement for ViewSonic," says Jesse Berst, executive director of the Redmond, Washington–based Windows Solutions Conference and editorial director of the *Windows Watcher* newsletter. "Price is a feature, too, and if a vendor can deliver a certain level of quality and give users a great price, they appreciate it."

Decline of the Desktop?

On the mobile computing side, newcomers stepped up to the podium as well. Last year's top portables, the IBM ThinkPad 755C notebook and the HP OmniBook 400 subnote, took a backseat to a pair of debutantes from Toshiba: the premium-priced, Pentium-powered T4900C and the tiny Portégé T3600CT. Either computer is powerful enough to replace your desktop system—a trend that could explain why Xircom's Credit Card Ethernet adapter was our panel's fave PC Card (formerly PCMCIA) product, beating out mainstream PC Card products such as the reigning champ Megahertz XJack modem.

A bargain upstart also grabbed the CD-ROM drive spotlight. NEC's double- and triple-speed MultiSpin CD-ROM drives (winners in the previous two years, respectively) lost out

FUTURE STOCK

Whether we like it or not, computing as most of us now know it will change in the next few years, especially with the release of Windows 95 and the increasing importance of the Internet.

Microsoft already owns the operating system and desktop application markets; with Windows 95, the Redmond, Washington, giant also stands a chance of taking the online world by storm, experts say. "I think there are a lot of great enhancements in Windows 95, plus it's going to be launched with the hugest marketing campaign the industry's ever seen," says *Windows Watcher*'s Jesse Berst. One of the greatest of those enhancements is the bundled client software for Microsoft's new online service, The Microsoft Network. "If Microsoft manages to get off the antitrust hook, I would certainly put Microsoft Network near the top of the blockbuster product list," says *Windows 95 Letter*'s Carole Patton.

Networking is another obvious Microsoft target. Windows NT Advanced Server and the BackOffice suite of network applications servers threaten Novell's dominance. "The real competition will start when people see the cost savings and performance gains that a full suite of network services tightly coupled to the operating system offers," says Berst.

On the Internet front, much of the hype that accompanied the World Wide Web's splashy debut has abated. So far, the real activity has come not from cable companies and Hollywood studios but from ordinary people posting to Net news groups and creating homemade Web pages. That could all change, as new technologies promise to turn the Web into a giant virtual Home Shopping Network. The main barrier remains access speed, says Vanderbilt University's associate professor of management Donna L. Hoffman, who codirects Project 2000, a study of marketing on the Web and other kinds of new media. "It just takes too long to browse and order from most Web-based catalogs—the experience of shopping from a full-color hard copy catalog is still much easier."

Hoffman predicts that a critical mass of online buyers and sellers will be achieved only when the average cybershopper has at least a 56-kilobits-per-second connection. "Once that happens, we expect the online storefront model to become successful for more than just niche retailers like CDNow and Internet Shopping Network," she says.

We may never need to venture out of the house again.

"It just takes too long to browse and order from most Web-based catalogs—a full-color hard copy catalog is much easier."

– Donna L. Hoffman, Project 2000

MARK TUCKER

Sound, Fury, and Fun

Sound Card
Creative Labs Sound Blaster 16

CD-ROM Drive
Plextor 4Plex

Multimedia Upgrade Kit
Creative Labs Edutainment CD 16

CD-ROM TITLES:

Business Application
Intuit Quicken 4.0 for Windows

Children's Education
Microsoft Encarta '95

Reference
Microsoft Encarta '95

Game–Adult
Broderbund Myst

Game–Children
Broderbund Just Grandma and Me

Non–CD-ROM Game
(CD-ROM version shown)
id Software Doom II

to Plextor's inexpensive, quadruple-speed 4Plex, another *PC World* Best Buy.

All this change hardly means that every blue-chip vendor is vulnerable to marauding competitors, though. As in every past year in which they have been contenders, the Microsoft Mouse and the Hewlett-Packard LaserJet printer won hands-down in their respective categories. "Microsoft's Mouse and the HP LaserJet win all the time, for good reason," says Carole Patton, chief analyst with the Mendham Technology Group in Mendham, New Jersey, and editor of *Windows 95 Letter*. "They're simply the best." Compared with the sleek Microsoft rodent, Patton says, her old IBM mouse looks like a floor sander. "It's a great design, if your name happens to be King Kong."

And the song remains the same in the sound department, with Creative Labs' Sound Blaster 16 continuing as top sound card. But don't expect a repeat performance next year, says Fredric Paul, editor in chief of the consumer multimedia magazine *Electronic Entertainment*. "Get real—it's old technology," he complains. "Wavetable sound is so much better."

On the Road

Notebook Computer
Toshiba T4900CT

Subnotebook Computer
Toshiba Portégé T3600CT

PC Card (PCMCIA)
Xircom Credit Card Ethernet

Personal Digital Assistant
Sony Magic Link

Soft Sells

In 1995, Windows versions of software predominated in almost every category, proving that it's curtains for new DOS application development. "If you look at the market figures, DOS applications have fallen off a cliff," says Berst. "DOS users aren't buyers. They tend to be people who've got applications that have worked for a while, so they think, Why should I change?"

Not surprisingly, Goliath Microsoft remained as undaunted as ever, with Word for Windows, Excel, and Access holding onto the titles for top word processor, spreadsheet, and database program (Access's reign is now in its third year, and Excel's in its fourth). The success of the Microsoft Office Professional suite (now bundled with several major mail-order vendors' systems)

Cold, Hard Storage

Hard Drive
Western Digital Caviar AC31000

Removable/Portable Drive
Iomega Bernoulli 150 Insider

Tape Backup Drive
Colorado Jumbo 250

Optical Drive
Pinnacle Micro Tahoe 230

ANN STATES

OBLIVION EXPRESS

Even great products can be eclipsed by new technologies or by a competitor that has simply figured out how to do a good thing better. Increasingly, however, manufacturers are delivering products that aren't ready for prime time or, worse, present a solution in search of a problem. We pestered our pundits for their least-favorite PC tools of 1995 and came up with a few clunkers.

Electronic Entertainment's editor in chief Fredric Paul has some problems with Microsoft's, um, revolutionary home-computer interface of the future, Bob—a product that Paul finds just plain condescending. "The idea of a social interface and agents is good—I just don't want it to be a talking parrot. There are a lot of people who need a helping hand with their computers, but I just don't think Bob is it."

Another pointless product was the Alps Glidepoint touchpad. "The Glidepoint is a good idea, but the small size of the surface makes it hard to point the cursor—which is the whole point of a touchpad," says Paul. Semiconductor Research Corporation's Matt Brownell criticizes Microsoft's toylike, house-shaped Home Mouse, which comes complete with chimney. "How could that be comfortable to use?" he asks. He's also frustrated with the eraserhead-like pointing devices built into many laptops. "I wanted to like them until I played with one," Brownell says. "A trackball or an external mouse is much easier to use."

One emerging portable technology hit with a particularly loud thud: infrared wireless communications. In their haste to advertise infrared-equipped portables, vendors are forgetting to provide desktop transceivers—hobbling this function into an equivalent of the proverbial one hand clapping. Semiconductor Research purchased several infrared-equipped laptops that lacked transceivers. "I wanted this to work so bad," Brownell groans. The same situation applies to infrared-equipped systems from Gateway, he says. Third-party solutions exist, but Brownell says the accompanying software isn't yet up to par.

GERRY GROPP

LAN Links

Network Server *(not shown)*
Compaq ProLiant 2000

LAN Operating System (Peer-to-Peer)
Microsoft Windows for Workgroups 3.11

LAN Operating System (Server-Based)
Novell NetWare 3.12

Groupware Application
Lotus Notes

LAN E-Mail Package
Lotus cc:Mail Desktop Release 2.0 for Windows

Making Connections

Fax-Modem
U.S. Robotics Sportster 14.4 Data/Fax Modem

Fax Software
Delrina WinFax Pro 4.0

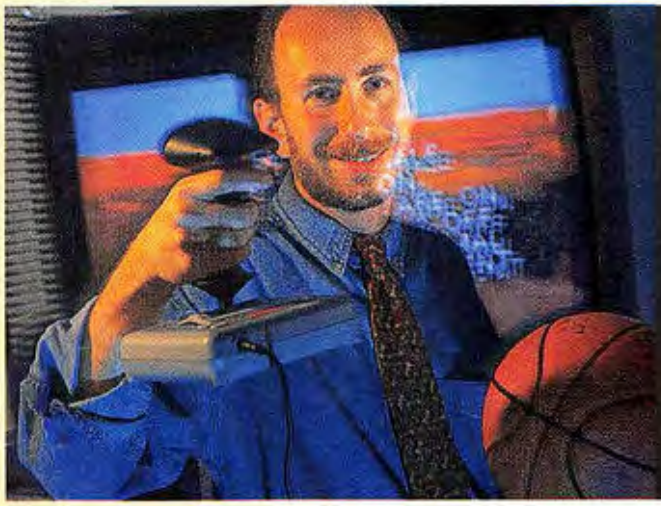
Communications Software
Datastorm ProComm Plus 2.0 for Windows

Internet Interface/Utility
NetScape Navigator 1.0

Online Service
CompuServe

BBS
The WELL

Internet Access Provider
Netcom



"There are a lot of people who need a helping hand with their computers. I just don't think Bob is it."

– Fredric Paul, Electronic Entertainment

Off the Page

Scanner
Hewlett-Packard ScanJet IIcx

OCR Software
Caere OmniPage Professional 5.0

against competing offerings from Lotus and Novell may partially explain Microsoft's desktop dominance. (Veteran software support winner WordPerfect finally lost out to Microsoft, due in part to WordPerfect's decision to discontinue its popular unlimited phone support policy.)

The suite deal has clearly changed how products compete. Randal Lawson, administrative dean of instruction at Santa Monica College in Santa Monica, California, still relies on a collection of old favorites: WordPerfect for Windows, Lotus 1-2-3, and Microsoft Access. But if Lawson were buying today, he thinks that the convenience and savings of a suite would probably outweigh product loyalty. "Now that it's easy to convert data from one product to the other, I'd consider switching to a suite," he admits.

Page Pumpers

Laser/Dye-Sublimation Printer (Color)
Fargo PrimeraPro
Hewlett-Packard Color LaserJet

Laser Printer (Monochrome)
Hewlett-Packard LaserJet 4

Ink Jet Printer (Color)
Hewlett-Packard DeskJet 560C

Ink Jet Printer (Monochrome)
Hewlett-Packard DeskJet 540

Microsoft held plenty of sway in the CD-ROM title arena, too. Its flagship multimedia reference work, Encarta '95, was our panel's favorite in both the reference and the children's education categories. Broderbund's spooky, brainy adventure Myst replaced Virgin Game's 1994 champ 7th Guest as favorite adult CD-ROM game. Another Broderbund title, Just Grandma and Me, from the popular Living Books series, was voted favorite children's game. (But if you think that our experts only go for the nice-nice stuff, better think again. Id Software's Martian blood-and-guts blowout Doom II took a bow as top non–CD-ROM game.)

"Now that it's easy to convert data from one product to the other, I'd consider switching from my collection of old favorites to a suite."

– Randal Lawson, Santa Monica College

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

If Microsoft had gotten its way, its winning streak would have extended to the finance category. But the U.S. Department of Justice recently moved to block Microsoft's proposed merger with Intuit, whose Quicken for Windows again topped the personal finance slate. Expect plenty of O.J.-style court wrangling on this one. And despite customer frustration with shipping delays and bugs that surfaced in the 1994 version, TurboTax for Windows beat all comers in the tax realm. (Intuit acquired it when the company gobbled ChipSoft in 1993.)

On the communications software front, ven-

MICHAEL GRECCO

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8 page per minute print speed.

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Windows™ compatible.

250 sheet legal/universal paper tray standard.

Upgradable to 850 sheet capacity.

45 resident scalable fonts.

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For Fax Back specifications, call 1-800-654-6651, ask for document 1005.

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Your Business Has Never Looked Better T.M. Oki America, Inc., Windows T.M. Microsoft Corp.

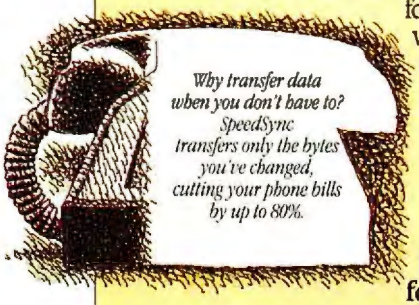
Cable | Wireless | Modem | Network

MOST REMOTE CONTROL PROGRAMS ARE INEXPENSIVE. UNTIL YOU USE THEM.

What's the difference between LapLink® for Windows™ and other remote control programs?

Not much, if you compare price tags.

But when you compare the cost of actually *using* LapLink for Windows with the cost of using anything else, the difference is pretty dramatic.



Dialing for dollars.

Consider, if you will, the 23.6 minutes that, according to a recent IDG Research study, is the average length of a remote notebook connection.

Then get ready to appreciate the time and money you'll save with our ingenious SpeedSync.™

Instead of transferring entire files, this patent-pending technology compares old versions with new and sends only the bytes you've changed, reducing transfer times by up to 80%.

If that doesn't sound like a big deal to you, then you haven't seen your company's phone bill lately. Or dialed your desktop from one of those hotels that doubles the price of outbound calls before slapping them on your room tab.

And if you're wondering why we're talking about file transfer in a remote control ad, you should know that, according to IDG Research, it's the second most frequent thing remote control software gets used for.

And what, you ask, is the first most frequent thing?

E-mail, of course. Which is another reason to specify LapLink for Windows.

Because only LapLink for Windows lets you use remote control to read your e-mail in one window while you transfer files in another. Simultaneously.

If you like that, you'll just love running multiple services in multiple windows to multiple PCs, all at the same time.

All together now.

What's that? Did we say "multiple PCs, all at the same time?"

You bet your support costs we did. In fact, you can connect – via modem, cable or network – to as many as 15 PCs at once.

Which makes LapLink for Windows the most cost-effective way to set up multiple PCs, monitor remote systems, diagnose and resolve problems, distribute new software (like new versions of Windows), and teach everybody how to use the stuff.

By now, your overburdened support technicians may be hyperventilating. So make sure you have the smelling salts handy when you tell 'em that LapLink for Windows *works with Windows 95!*

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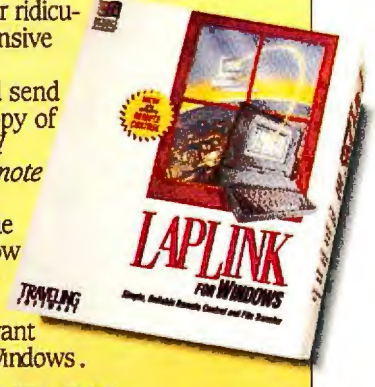
We'll answer questions, tell you about our ridiculously inexpensive competitive upgrade, and send you a free copy of *The Practical Guide To Remote Control.*

Because the more you know about remote control, the more you'll want LapLink for Windows.



We couldn't have said it better ourselves.

"LapLink for Windows fulfills the promises that remote control has been making for the past seven years."
PC Magazine, UK, Oct.'94

"LapLink for Windows 6.0 is seriously good stuff. Recommended."
BYTE Magazine, Jan.'95

"If you use more than one computer, you need LapLink for Windows."
PC/Computing, Nov.'94

"Installation is simple and the connections are easy to set up."
Windows Magazine, Dec.'94

TRAVELING SOFTWARE

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Circle 34 on reader service card

POWERPC VS. PENTIUM: A YEAR LATER

Last year our panel of experts chose the PowerPC 601 RISC processor as the most promising new hardware. Twelve months later we find ourselves wondering, Did it deliver on its promise?

Not yet. Yes, the powerful new processor designed by Motorola, Apple, and IBM still shows great promise, and PowerPC-based Macintoshes have all but replaced Mac systems using older 680X0 processors. But the PowerPC has yet to become a force in the much larger PC market.

Blame IBM. Set to roll out its first batch of OS/2-flavored PowerPC systems last fall, IBM pulled the plug when it became clear that OS/2 for PowerPC was nowhere near ready. Accordingly, the first shipping IBM PowerPC systems—slated for June 1995 delivery—will run Windows NT, not OS/2. (These systems will use newer, more powerful 603e and 604 processors, rather than the 601.) The company anticipates shipping an OS/2 version of PowerPC in the fall.

This operating system bait and switch has contributed to confusion among developers, who may opt to wait until one operating system stands out as the clear first choice. Likewise, the vast majority of users are unlikely to commit to the PowerPC until it offers a compelling suite of native applications running under at least one of the operating systems.

With IBM reluctant to send a PowerPC system to market, most other PowerPC makers have held back as well. "It's hard to build a clone market when there's nobody out there to clone," says Linley Gwennap, editor in chief of *Microprocessor Report* in Sebastopol, California.

IBM's false starts notwithstanding, many analysts expect that once the faster, cheaper PowerPC appears, it will stand a good chance of competing with Intel-based systems. "PowerPC is going to provide a price/performance advantage," Gwennap predicts. "The question is, Can IBM translate that advantage to successful product?"

Otherwise, the competing chips are falling where they may. Clone makers AMD and Cyrix, for instance, hope to claim increasing market share with their K5 and M1 Pentium-class chips. Meanwhile, Intel aims to leapfrog high-performance RISC architecture altogether with a new line of chips. Working with Hewlett-Packard, Intel is designing fin de siècle chips using the Very Long Instruction Word (VLIW) design. (Rumor has it that AMD is working on a VLIW CPU.) VLIW is purported to perform like RISC while maintaining backward compatibility with the Pentium and other CISC designs.

Swiss Army Knives

Utility Collection
Symantec Norton Utilities 8.0

Windows Shell
Symantec Norton Desktop 3.0 for Windows

Backup Software
Symantec Norton Backup 8.0

Shareware
PKWare PKZip 2.04g

Presentation Is Everything

Desktop Publishing
Adobe PageMaker 5.0

Font Software
Adobe Type Manager 3.0

Presentation Graphics
Microsoft PowerPoint 4.0

Draw Software
CorelDraw 5.0

Image Editing/Paint
Adobe Photoshop 3.0

Power Tools

Computer-Aided Design
Autodesk AutoCAD

Programming Language
Microsoft Visual Basic 3.0

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Circle 192 on reader service card

dors that provide low-cost Internet access services are garnering attention. Netcom's flat-rate Internet accounts and easy-to-learn NetCruiser interface made this service our favorite on-ramp. NetScape Communications' World Wide Web browser—NetScape Navigator—stole the thunder from NCSA Mosaic, thanks to its security features and tight links with the company's Web server product. Despite America Online's dizzying growth, CompuServe still reigns as the best commercial online service. "I love AOL's interface," says Santa Monica College's Lawson, "but so far, CompuServe offers a lot more services."

"If you look at the market figures, DOS applications have really fallen off a cliff."
—Jesse Berst, Windows Watcher

A few other repeat winners surprised no one by showing up on the 1995 Best Products list: Autodesk's AutoCAD remains unchallenged as the acme of CAD tools; and Novell NetWare, Lotus Notes, and Lotus cc:Mail still have workgroups sewn up tight.

Warp Speed for OS/2

Perhaps most surprising of all the winners was our panel's choice for product of the year. Hold on to your antistatic wristrest—it's IBM's OS/2 Warp 3.0.

Who'd have thought OS/2 would beat Windows? It comes as no surprise to *Windows Watcher*'s Berst. "OS/2 users are among the most loyal and vocal users of any product," he notes, adding, "besides which, OS/2 is the first true 32-bit operating system for the desktop, a technical achievement worthy of note." But with Windows 95 looming, Berst isn't sure how Warp will fare next year: "I think it will be harder for IBM next time around. It's one thing to win when you're the only 32-bit desktop operating system, and another when you've got competition."

Indeed, today's winners could be tomorrow's forgotten heroes as the PC marketplace continues its strange morph into the future. Though loyal to classic, top-notch products, PC users are clearly willing to dump old favorites if a newcomer promises productivity breakthroughs or major savings. The best products of 1996 will be those that offer quality at a low price but aren't afraid to take a chance on new technology. Need a blueprint? Look to Microsoft.

Scott Spanbauer is a contributing editor for PC World. *PMC Research, a San Francisco–based consumer research firm specializing in high-technology markets, gathered and tabulated all data for this article.*

ROBBIE MCCLARAN

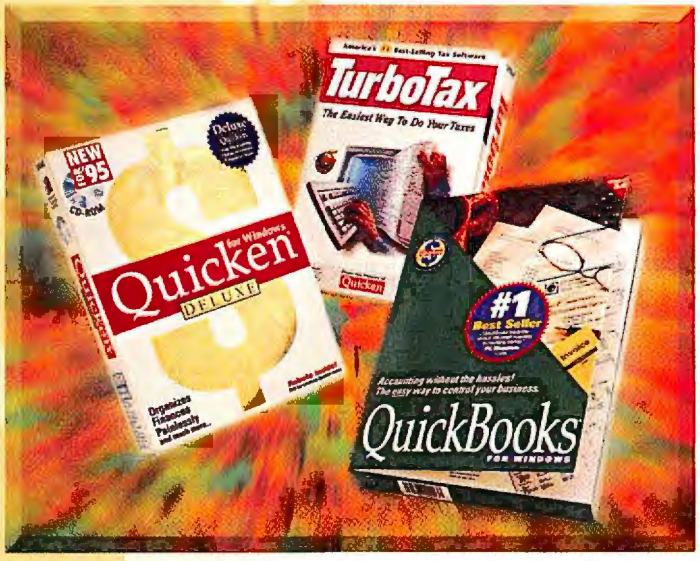
Keep Your Ducks in a Row

Project Manager
Microsoft Project 4.0

Personal Information Manager
Lotus Organizer 2.0

Contact Manager
Symantec Act 2.0 for Windows

Forms Software
Delrina PerForm for Windows



Money, Money, Money

Accounting
Intuit QuickBooks 3.0 for Windows

Personal Finance
Intuit Quicken 4.0 for Windows

Tax Planning/Preparation
Intuit TurboTax for Windows

Who Can You Trust?

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Fast Forward:

FULL-MOTION VIDEO BOARDS

Tired of squinting at herky-jerky video in tiny little windows? The latest Windows accelerators speed up and smooth out full-motion video. And they'll light a fire under your graphics to boot.

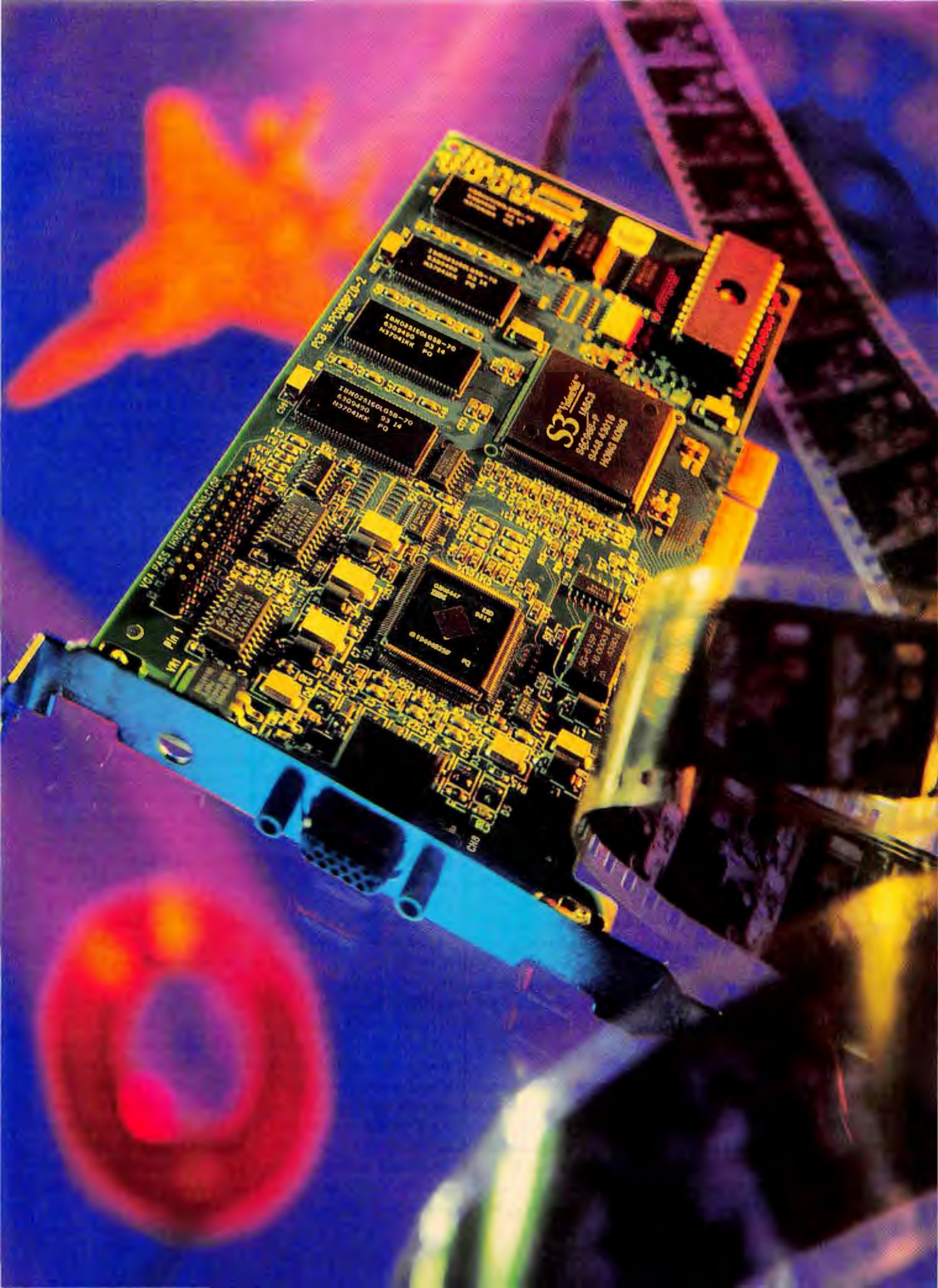
By Eric Knorr

VIDEO WITH FULL MOTION is the next wave in PC applications and titles. If you don't believe us, check out any multimedia title: Study the Zapruder film from the JFK assassination in Compton's 95 Encyclopedia, or watch Babe Ruth hit a towering home run in Microsoft Baseball, and you'll get the idea. Games like Quantum Gate and Wing Commander III weave video into their plots to increase the sense of reality, and businesses can use video for computer-based training and PowerPoint presentations.

One problem: Even the fastest Pentium PC strains under the demands of full-motion digital video, especially when windows are stretched to fill the screen. The result is distracting, jerky video with dropped frames, chopped audio, and blocky pixels. Conventional Windows accelerators do little to help, since they don't address video functions. But a new generation of boards called *video accelerators* enhance both Windows video and graphics, providing an all-in-one solution for power-hungry multimedia PCs—at a price only slightly higher than that of a stand-alone graphics board. In fact, before long it may be hard to find a graphics card that *doesn't* offer video capability.

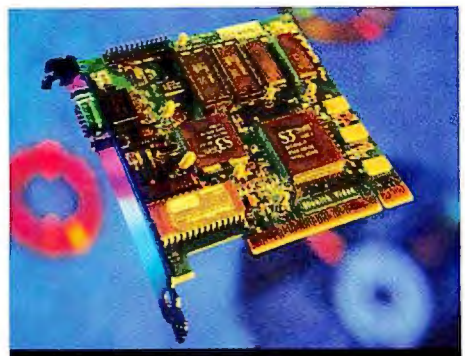
To help you prepare for the video future, we rounded up general-video accelerators with prices ranging from $195 to $500 on the street and ran them through a battery of tests to judge video smoothness and quality. We also benchmarked the boards using the *PC World* Windows Integrated Test Suite (WITS), a collection of six Windows applications designed to test graphics performance. Overall, we were impressed: Compared with conventional graphics accelerators like our baseline

NEAL FARRIS



Diamond Stealth 64 VRAM board, most of the new cards produced noticeably better video quality. Best of all, you don't have to give up graphics performance to get TV-like video quality: All of these boards are competitive with mainstream graphics accelerators, and several of them established new graphics speed records.

But one board stood out from the pack. The Diamond Stealth Video DRAM vaulted over some tough competition to become our overall Best Buy, thanks to its low $233 price and the impressive boost it gives to both video and standard PC graphics.



BEST BUY

To earn a Best Buy, a board must deliver smooth video playback; excellent graphics performance; and a reasonable price. A degree of sophistication—providing simple installation and useful graphics utilities—helps too. The Diamond Stealth Video meets the test. A $233 street price makes it one of the least expensive video-enabled graphics boards in our review, yet its outstanding graphics acceleration and strong video playback are on a par with those of boards costing $100 more.

Shrinking It Down

Nothing taxes a PC like video, simply because so much data is involved. A full-motion, full-screen digital video clip that matches the quality of a good VHS tape can demand more than 25MB of data per second. No CD-ROM drive or hard disk can pump data at that speed, let alone store more than a few minutes' worth. That's why all PC video is compressed using a mathematical algorithm called a *codec*—short for compression/decompression—that spells out how video is shrunk into condensed code and expanded back. Unlike the compression in products such as PKZIP, DoubleSpace, and DriveSpace, almost all video compression schemes lose data in the process. This degrades image quality but lets the codecs achieve compression ratios as high as 40:1 or more.

The most popular compression schemes for CD-ROM titles and PC video productions are Cinepak and Indeo, software-only codecs that run on almost any PC with a 386 or better processor. Titles such as Microsoft Baseball and VidGrid rely on these schemes to compress and play back video files.

For high-quality CD-ROM video, MPEG (Motion Pictures Expert Group) compression provides superior image quality, 30-fps (frames per second) playback, and better compression ratios than those of Cinepak and Indeo. But the MPEG codec is so complex, an additional MPEG video playback card is usually needed to handle all the decompression tasks. For this reason, relatively few CD-ROM titles use MPEG-based video, although more may emerge as affordable MPEG boards hit the market. (See "The MPEG Connection," which includes a review of four MPEG boards.)

Blowing It Up

General-purpose video accelerators themselves do not decompress video—the CPU does all that. So if you're serious about video, a Pentium PC is a good idea. Once the CPU decompresses the data, the accelerator takes over, converting the data from its compact, video-specific format to one friendly to PC graphics standards.

The accelerator can then scale video images to a larger size, all the way to full screen if you like. In this step, the board adds pixels that weren't in the original low-resolution image. But these accelerators don't produce the chunky images you see when you normally stretch a video window; rather, they intelligently place pixels and smooth out lines to maintain good image quality—making even small 160-by-120 videos look acceptable when expanded. As our tests show, some boards are better at this trick than others.

The key to making these accelerators work is a Windows technology called Display Control Interface (DCI). Simply put, DCI lets any Windows application talk directly to graphics hardware, and routes video tasks to the accelerator for processing. To use this capability, the accelerator must have a DCI driver. All but one of the general-purpose boards we reviewed include such a driver (along with a DCI software upgrade for Windows). The VideoLogic PCI Movie, which came in dead last in our tests (excluding the baseline board), lacks DCI capability.

During testing, we received last-minute DCI driver revisions and encountered several installation snafus, which we note in the individual reviews. Microsoft says that DCI will be built into Windows 95, and by the time that juggernaut arrives, installing a video accelerator for Windows should be a lot closer to foolproof.

Video Voodoo

Our tests produced two types of results: average fps scores (see Test Report: Video Accelerators Smooth Playback) and subjective judgments of picture quality (noted in each review). We used eight video clips, each using 24-bit color and 30 frames per second. Four of these were at 320 by 240, and four were less demanding 160-by-120 clips. To reflect common video applications, we compressed two of the clips at each resolution using Cinepak and compressed the other two using Indeo. We played back the 320-by-240 clips first at their normal resolution and then scaled to 640 by 480. The 160-by-120 clips were stretched to 640 by 480 for testing.

In each test, we used Doceo's Video Compression Sampler utility for Windows to determine how many frames, if any, were skipped during playback—the best measure of general video accelerator performance. As the Test Report reveals, these boards improved on the showing of our baseline Diamond Stealth 64 VRAM board—a fast Windows graphics accelerator without video hardware that dropped more than half the frames in the video files. It struggled especially with scaled video, where frame rates fell to one-fifth of normal, yielding playback that was jerky and distracting. Note that every board had a harder time maintaining frame rates in the Indeo tests than with Cinepak, an indication of the comparative efficiency of the two codecs. If you have a fast Pentium PC, you will undoubtedly get smoother playback than what we saw on our Polywell DX4-100 test system.

As we suspected, video scaling stressed the boards, causing the slower ones to drop frames even from the Cinepak clips. Nonetheless, when scaling video from 320 by 240 to 640 by 480, none of them dropped to the jerky frame rates of our baseline graphics-only card, and all delivered better-looking scaled images than our baseline board did.

However, expanding the video windows still made the clips look considerably worse than in their native resolution. That's no surprise, considering that these boards are trying to fill the screen by "guessing" what the image should look like. When we scaled 160 by 120 clips to 640 by 480—the most demanding scaling scenario in our tests—all the boards produced images so jagged and chunky, you'd only want to view them from across the room.

TALE OF TWO CODECS

Stretching a Cinepak clip made for a single-speed CD-ROM drive produces gross pixelation. An MPEG video playing at the same data rate looks smooth and clear.

Graphics Details

The last thing you want is to lose graphics performance as you gain video acceleration, so you need a video accelerator with graphics performance at least as good as that of the board you have. When we ran our 12 contenders through WITS, we were not disappointed: In almost all cases, the boards reviewed here should be a match for comparable graphics-only accelerators currently on the market. In fact, several boards—the Best Buy Diamond Stealth Video, STB Velocity 64V, Hercules Stingray 64/Video, and miroVideo 12PD—appear on our Top 10 Windows accelerators list thanks to their outstanding overall value.

Another spec to watch for is the top *refresh rate*. The higher the refresh rate, the more stable the image, and the longer you can stare at the screen without eyestrain. The card you choose should have at least a 75-Hz refresh rate at 1024-by-768 screen resolution—only the miroVideo 20TD falls short in this group. Higher is even better, though monitors that handle more than 75 Hz at this resolution tend to be pricey. The Diamond Stealth 64 Video VRAM is the champ here, with 120 Hz refresh at 1024 by 768 and 90 Hz at 1280 by 1024.

Remember, the amount of RAM your board can hold determines the number of colors it can display at a given resolution. If your board accepts only 2MB of RAM, you'll never get more than 65,536 colors at 1024 by 768; with 4MB, you can enjoy 16.8 million colors for photographic quality. The extra 2MB of RAM can cost $100 to $200, depending on memory type. Boards that use dynamic RAM (DRAM) are cheaper, but video RAM (VRAM) won't choke under demanding 24-bit color graphics and video.

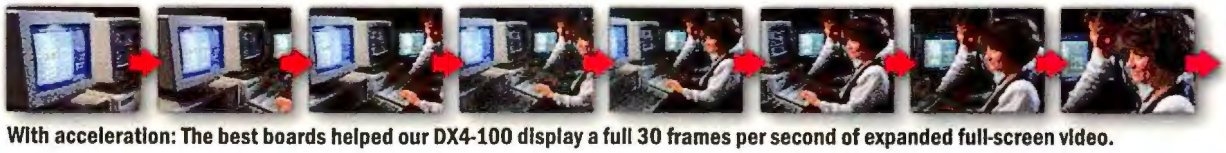
Finally, have a good look at each company's warranty and tech support. These boards are bleeding-edge technology, and some may simply refuse to work in your machine. Access to the manufacturer through CompuServe, America Online, or a private BBS will ensure that you can get a new DCI driver fast, something we had to do several times in the course of this review. All in all, the easier a company is to contact—by modem, toll-free call, or fax-back service—the better off you are.

Despite a few installation glitches, we were generally impressed by these products. All deliver significant improvements in video quality while also managing to boost graphics performance. With video clips standard in virtually every CD-ROM title—and beginning to show up in everyday business apps—a video accelerator can bring your PC one step closer to being a multimedia powerhouse.

Eric Knorr is a contributing editor for PC World *and the editor and principal author of* The PC Bible *(Peachpit Press, 1995; 800/283-9444). Video testing was conducted at the PC World Test Center by Kirk Steers and Dean Andrews. Graphics testing was conducted by Jon Peddie Associates.*

On the Fast Track: New Boards Pull Video Performance Out of the Mud

Without acceleration: Our DX4-100 dropped 4 out of 5 frames, yielding jerky playback when playing video expanded to full screen.



With acceleration: The best boards helped our DX4-100 display a full 30 frames per second of expanded full-screen video.

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[1] [2]The Triton PCI Chip Set, and the ATI MACH PCI Accelerator is only available on selected advertised Models. *All Pentium systems come with 256KB cache; 486DX2/66 systems come with 128KB cache standard. Some software packaging may be cosmetically different than pictures shown. CD Titles do not include Manuals. CD Titles are subject to change and cannot be substituted. On-Site Service may not be available in certain remote areas. All returned items must have a Return Merchandise Authorization (RMA) number and must be in original packaging. The cost for returned freight is not included with any Money-Back Guarantees; shipping charges are non-refundable. Due to volatility of prices, Quantex does not offer a price protection policy. Prices and product descriptions subject to change without notice.Quantex Microsystems cannot be responsible for errors in typography or photography. "Intel486 and IntelDX2 are trademarks and Pentium and the Intel Inside Pentium processor are registered trademarks of Intel Corporation" Some of the names or trademarks shown herein may be the property of other companies. Screen images simulated. Quantex 1995. All Rights Reserved.

Diamond Stealth 64 Video VRAM

PROS: Smooth video performance, good image quality

CONS: Installation glitches, slow graphics

The Diamond Stealth 64 Video VRAM placed near the top in our video performance tests, with full-motion playback (29-to-30-fps rates) in all but the expanded Indeo action clips. Better yet, clips looked remarkably TV-like until they were scaled up.

Even with the board's speedy 120-Hz refresh rate and CorelDraw 4.0 bundle, its $389 street price is hard to justify. Its Windows setup bombed on us, and it finished dead last among general-purpose boards when displaying standard business applications. Our advice: Buy its DRAM cousin, the Best Buy Diamond Stealth Video. *Diamond Multimedia Systems, 800/468-5846* **Reader service no. 678**

Diamond Stealth Video

PROS: Smooth video playback, fast graphics, inexpensive

CONS: InControl Tools crashed during setup

The $233 Diamond Stealth Video delivers a potent combination of price and performance. The board dropped nary a frame on its way to a Best Buy, stumbling slightly on the tough Indeo-compressed 640-by-480 action video. And the Stealth Video's 80.7 WITS score makes it a top graphics performer.

The Stealth Video accepts only 2MB of DRAM, and its 75-Hz refresh rate at 1024 by 768 falls behind tested VRAM boards. Diamond's InControl Tools are helpful for checking frame rates and switching resolutions, but the version we used crashed. The board includes CorelDraw 4.0, which—combined with a low price and terrific all-around performance—makes it a resounding Best Buy. *Diamond Multimedia Systems, 800/468-5846* **Reader service no. 679**

Diamond Viper Pro Video

PROS: Top video performance and image quality

CONS: High price, unexceptional graphics speed

The Diamond Viper Pro Video is the only board we tested that always maintained 29 or 30 fps. Its picture quality topped that of all general-video boards as well, but at $479 (including CorelDraw 3.0) this board isn't cheap. Its Weitek graphics and video chips clashed with our Polywell DX4-100 test system, so we tested it on a similarly configured Blackship DX4-100. It boasts fast 100-Hz refresh rates at 1024 by 768, while its 2MB VRAM can be upgraded to 4MB for high-resolution, true-color display. For sheer video quality, the Viper Pro Video is clearly the board to beat—except for its steep price. *Diamond Multimedia Systems, 800/468-5846* **Reader service no. 680**

Genoa VideoBlitz III AV

PROS: Fast graphics, smooth video, good picture quality

CONS: Slight falloff in Indeo picture quality, bare-bones software

The $369 Genoa VideoBlitz III AV boasts lightning-fast graphics and smooth video playback. Its overall WITS score of 82.7 falls only half a point behind that of the blazing Number Nine 9FX Motion771.

THE MPEG CONNECTION

You want TV-quality video? Then your only choice is MPEG, the compression/decompression scheme (so named after the Motion Pictures Expert Group). MPEG delivers video quality vastly superior to that of Cinepak or Indeo, even on a single-speed CD-ROM drive.

We tested four boards that combine MPEG video and graphics, and found outstanding quality. At 352 by 240—standard MPEG resolution—all boards produced video close to broadcast television quality. The best cards even excelled at scaling video to full screen.

It takes a special board to handle MPEG video, so few titles are available. But this appears to be changing: feature films like *Top Gun* and *Star Trek II* have been compressed to MPEG on two-CD sets. And MPEG games such as Flash Traffic and Silent Steel are gaining acclaim. In fact, MPEG may well help transform the PC into an entertainment center for the home.

We tested the VL-based Genoa GVision DX, Orchid Kelvin MPEG, Sigma RealMagic Rave, and the PCI-based Jazz Multimedia Jakarta.

The Jakarta does it all: integrated graphics, general video enhancement, and hardware-based MPEG decompression.

None matched the polish of the general-video boards we tested. Hardware-based MPEG playback makes skipped frames unlikely, so our tests were based on image quality only. The $449 GVision DX and $399 Jakarta won hands down in this beauty contest, with VHS-like full-screen images. The $429 Kelvin MPEG and $479 RealMagic Rave produced a shimmering effect similar to "snow" on a TV.

Installing the VL boards was hairy. The GVision DX was the only VL board actually shipping at test time, but setup was clumsy, and selecting a monitor required a familiarity with refresh rates. And the other boards had bugs that need to be addressed.

Only the Jakarta displayed real sophistication, with easy installation, polished manuals, and slick packaging. It's also the only board with both MPEG and general-video acceleration (see capsule review). But the Jakarta had problems at 800 by 600 resolution: Moving the cursor jiggled the MPEG window, and windows wouldn't stay on top when selected. If the company fixes these bugs, the Jakarta stands out as an all-purpose video solution.

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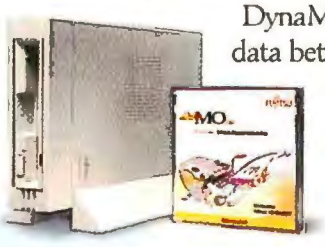

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Circle 153 on reader service card

The VideoBlitz kept pace with the top-rated Diamond Viper Pro Video, though it stumbled on expanded Indeo clips. Our preproduction board installed easily, but the software lacks sophistication despite the helpful uninstaller, and Genoa's support policies are slim. The VideoBlitz accepts up to 4MB of VRAM, although an 84-Hz refresh rate at 1024 by 768 is only so-so. Still, this no-frills board impressed us. *Genoa Systems, 800/934-3662* **Reader service no. 681**

Hercules Stingray 64/Video

PROS: Low price, smooth Cinepak video

CONS: Below average Indeo performance, no color data conversion

The Hercules Stingray 64/Video delivers midrange graphics and video for a low $195 street price. But it produced chunky images when videos were stretched, and 320-by-240 Indeo clips looked jerky. As a graphics accelerator, the StingRay posted an overall WITS score of 75, which, combined with its bargain price, makes it one of four boards in this review to earn a spot on our monthly Top 10 Windows Accelerators chart.

The Stingray installed easily, thanks to a simple DOS program and strong Windows graphics software. But it's limited to 2MB of DRAM, so you can't go beyond 800 by 600 in 24-bit color. Refresh rates max out at 75 Hz at 1024 by 768. Despite these complaints, the StingRay is a strong value for multimedia bargain hunters. *Hercules Computer Technology, 800/532-0600* **Reader service no. 682**

Jazz Multimedia Jakarta

PROS: Excellent software, easy installation, MPEG hardware acceleration

CONS: Below-average Cinepak and Indeo performance

The Jazz Multimedia Jakarta packs both general-video and MPEG playback onto a single board (see "The MPEG Connection"). The

FEATURES COMPARISON Affordable Accelerators Now Boost Graphics and Video

● = Yes ○ = No

n/a = not applicable

Standard features	Diamond Stealth 64 Video VRAM	Diamond Stealth Video	Diamond Viper Pro Video	Genoa VideoBlitz III AV	Hercules Stingray 64/Video [1]	Matrox MGA Millennium
GENERAL VIDEO BOARDS						
Street price	$389	$233	$479	$369	$195	$329
Bus	PCI	PCI	PCI	PCI	PCI	PCI
RAM type	VRAM	DRAM	VRAM	VRAM	DRAM	WRAM
Installed/maximum RAM (MB)	2/4	2/2	2/4	2/4	2/2	2/8
Maximum horizontal scan rate (kHz)	97	80	82	79	80	90
Video capabilities						
Video processor	S3 Vision968	S3 Vision868	Weitek P9130	S3 Vision968	IC Works ZoomDAC	Matrox MGA 64
Integrated	●	●	○	●	●	●
Connectivity	n/a	n/a	n/a	n/a	n/a	n/a
Dedicated MPEG chip	○	○	○	○	○	○
DCI driver	●	●	●	●	●	●
Graphics capabilities						
Graphics coprocessor	S3 Vision968	S3 Vision868	Weitek P9100	S3 Vision968	Ark Logic Ark2000PV	Matrox MGA 64
Width of data path	64-bit	64-bit	32-bit [3]	64-bit	64-bit	64-bit
Maximum refresh at 1024 x 768 resolution (Hz)	120	75	100	84	75	120
Maximum colors at 1024 x 768 resolution (millions)	16	16	16	16	16	16
Switch resolutions and colors without restarting Windows	○	○	○	○	○	●
OS/2 drivers/Windows NT drivers	●/●	●/●	●/●	●/●	●/●	●/●
Service and support						
Warranty (years)	5	5	5	2	2	3
Toll-free technical support	○	○	○	○	●	○
Weekday support (hours)	14	14	14	9	12	10
Fax/BBS	●/●	●/●	●/●	●/●	○/●	●/●

BEST BUY

[1] Video scaling only; no color space conversion supported.

[2] Includes TV tuner, video inputs, and capture capability.

[3] Interleaved design yields 64-bit–like performance at lower graphics modes.

Jakarta's graphics are good, too: The 2MB DRAM board chalked up a respectable 77.5 score in our WITS benchmark. But expanded videos looked choppy and the $399 street price is steep compared to other boards. Still, the Jakarta costs less than any MPEG-only board we reviewed, while delivering top MPEG quality. With the Jakarta, you'll be prepared for the widest range of video. *Jazz Multimedia, 408/727-8900* **Reader service no. 683**

Matrox MGA Millennium

PROS: Good video performance, 3-D acceleration, excellent 24-bit graphics

CONS: None

The $329 Matrox MGA Millennium is designed for the future, speeding not just graphics and video but 3-D images. The 2MB board fell close behind the Viper Pro Video in our frame rate tests, but its 78.2 WITS score is a step slower than the graphics leaders'. The board's 24-bit performance is very good, and it accepts a whopping 8MB of unique WRAM (Window RAM)—a new design well suited to demanding video and 3-D graphics—which lets it display 24-bit color at 1600 by 1200. The board's 120-Hz refresh rate at 1024 by 768 tied for highest in the review, and installation and graphics utilities are impressive. While 3-D acceleration isn't terribly useful now, wait a year or so. In the meantime, the MGA Millennium includes a CD-ROM with 3-D software—an intriguing deal. *Matrox Graphics, 800/361-1408* **Reader service no. 684**

miroVideo 12PD

PROS: Low price, very good video performance

CONS: Below-average Indeo quality

A $229 street price makes the miroVideo 12PD an attractive buy. The board can't match the Viper Pro Video in picture quality in Indeo

	miroVideo 12PD	miroVideo 20TD [2]	Number Nine 9FX Motion771	STB Velocity 64V	VideoLogic PCI Movie	Jazz Multimedia Jakarta	Genoa GVision DX	Orchid Kelvin MPEG	Sigma RealMagic Rave
						GEN'L/MPEG	MPEG BOARDS		
	$229	$499	$329	$299	$399	$399	$449	$429	$479
	PCI	PCI	PCI	PCI	PCI	PCI	VL	VL	VL
	DRAM	DRAM	VRAM	VRAM	VRAM	DRAM	DRAM	DRAM	DRAM
	2/2	2/2	2/4	2/4	2/2	2/2	2/2	2/2	2/2
	80	80	90	100	80	80	60	78	63
	Alliance Promotion	Tseng Viper	S3 Vision968	S3 Vision968	VideoLogic PowerPlay 32	Tseng Viper/ Zoran ZR 36100	C-Cube CL-450	C-Cube CL-450	Sigma Designs EM 7000
	●	○	●	●	○	○	○	○	○
	n/a	n/a	n/a	n/a	VMC	n/a	n/a	n/a	VAFC
	○	○	○	○	○	●	●	●	●
	●	●	●	●	○	●	○	○	○
	Alliance 1000	Tseng Labs ET4000/W32p	S3 Vision968	S3 Vision968	Weitek P9100	Tseng Labs ET4000/W32p	Cirrus Logic GD-5434	Cirrus Logic GD-5434	Trident TGUI9440AGI
	32-bit [3]	32-bit [3]	64-bit	64-bit	32-bit [3]	32-bit [3]	64-bit	64-bit	32-bit [3]
	75	70	120	100	90	75	75	75	75
	16	16	16	16	16	16	16	16	8
	○	○	○	●	○	●	○	○	○
	●/●	○/○	●/●	●/●	○/○	○/○	●/●	○/○	○/●
	2	2	5	lifetime	1	5	2	4	5
	●	●	○	●	○	○	○	○	●
	9	9	10	10	10.5	8	9	10	8
	●/●	●/●	●/●	○/●	●/●	○/○	●/●	●/●	●/●

For more information about all products in this table, circle reader service no. 904.

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Processor	486DX2/66	Pentium 75MHz	Pentium 75MHz
Processor Upgradable	Yes	Yes	Yes
Std./Max. Memory	8MB/136MB	8MB/192MB	16MB/192MB
Hard Drive	420MB	420MB	720MB
Cache Internal	8KB	16KB	16KB
Cache External	256KB (optional)	256KB	256KB
Local Bus Graphics	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	2MB/4MB
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 Preinstalled	MS-DOS® 6, MS-Windows® 3.1	MS-DOS 6, MS-Windows 3.1	MS-DOS 6, MS-Windows 3.1
Energy Star Compliant	Yes	Yes	Yes
Warranty†	3-Year	3-Year	3-Year
Price*	$1,949	$2,319	$3,119

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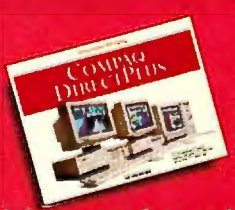

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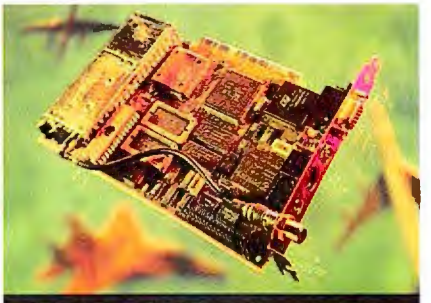
video, but with the exception of one Indeo test (where the 12PD sputtered to 17 fps), it dropped nary a frame. Cinepak quality matched the Viper's in all but the scaling stress test, where we expanded a 160-by-120 window to 640 by 480. The miroVideo 12PD's 77.4 WITS score is respectable—comparing well to boards on our Top 10 Windows Accelerator list—but it doesn't challenge the Best Buy Diamond Stealth Video.

Like the bargain-priced Hercules Stingray 64/Video, the miroVideo 12PD is limited to 2MB of DRAM and has a maximum 75-Hz refresh rate at 1024 by 768. But if you're looking for an alternative to the Diamond Stealth Video, the miroVideo 12PD is a good buy. *Miro Computer Products, 800/249-6476* **Reader service no. 685**



MIROVIDEO 20TD

Tune in and turn on: This board combines graphics, video, TV, and video capture.

miroVideo 20TD

PROS: Built-in TV tuner can also accept cable TV, input ports and software for video capture

CONS: Below-average video playback quality and performance, most expensive board reviewed

The miroVideo 20TD is a true jack-of-all-trades: Along with general-video acceleration, you get a TV tuner and video capture capability. You can view broadcast TV in a window or capture from the tuner, a VCR, or a camera. Add Ulead Systems' Video Studio capture and editing software, and the $499 price is remarkably low.

As a playback board, the miroVideo 20TD is unexceptional. Its cheaper sibling, the miroVideo 12PD, did better with most clips, providing smoother playback and better-looking images—especially when windows were stretched up to 640 by 480 resolution. But the 20TD's 77.7 WITS score is respectable. If you long to sit in the director's chair, this package is a steal. But if all you need is playback and graphics acceleration, look elsewhere. *Miro Computer Products, 800/249-6476* **Reader service no. 686**

Number Nine 9FX Motion771

PROS: Fastest graphics performance, good software

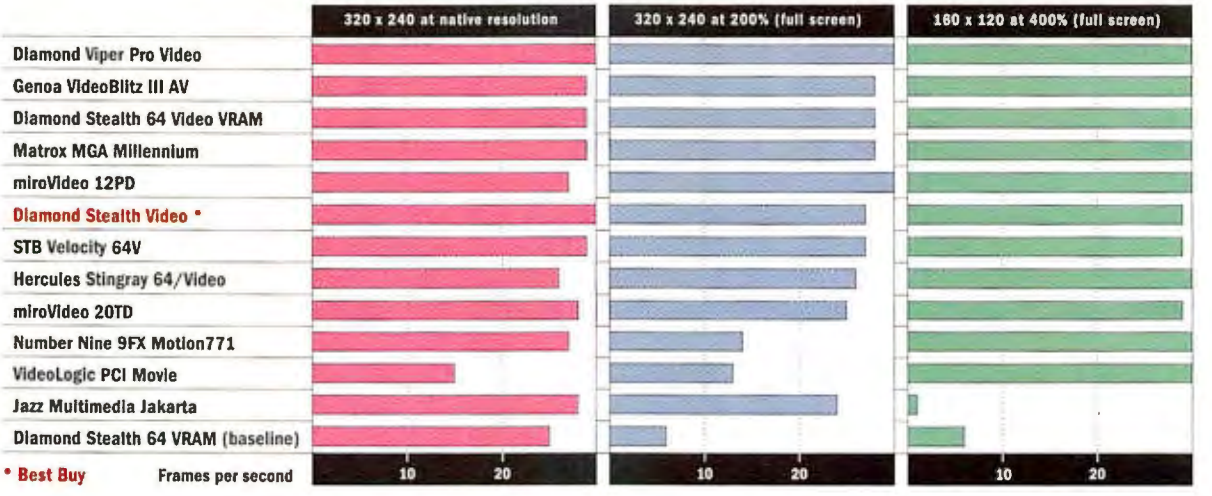
CONS: Poor video performance

The Number Nine 9FX Motion771 is a great graphics board: Its 83.2 WITS score is the fastest we've ever seen. And when we ran video clips at native resolutions, the 9FX Motion771 rarely dropped frames. But doubling the size of any 320-by-240 clip cut frame rates almost in half.

The 9FX Motion771 we received was a preproduction unit, so using an updated DCI driver may eliminate jerky playback of

TEST REPORT Video Accelerators Smooth Playback

Video-enabled boards take over processor-intensive tasks, giving the CPU more time to decompress video. In our tests, nearly every board delivered significantly smoother video playback than our baseline nonvideo graphics board.



Longer bars are better; order is best to worst.

Methodology

Boards were installed on a DX4-100 PC with 16MB of RAM, 256K of secondary cache, and a 540MB IDE hard drive. Two video clips—a low-motion clip and an action sequence—were compressed using Indeo and Cinepak codecs and played under each codec at two resolutions: 160 by 120 and 320 by 240. We played back the resulting eight clips under Windows 3.1 and counted frame rates. The 320 by 240 clips were played at native resolution (first column), then expanded by 200% and played at 640 by 480 resolution (second column). The 160 by 120 clips were expanded by 400% and played at 640 by 480 resolution (third column). Chart shows average number of frames displayed per second.

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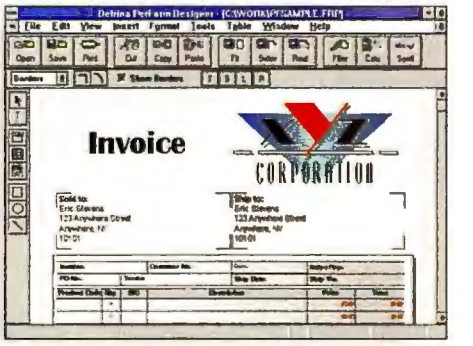

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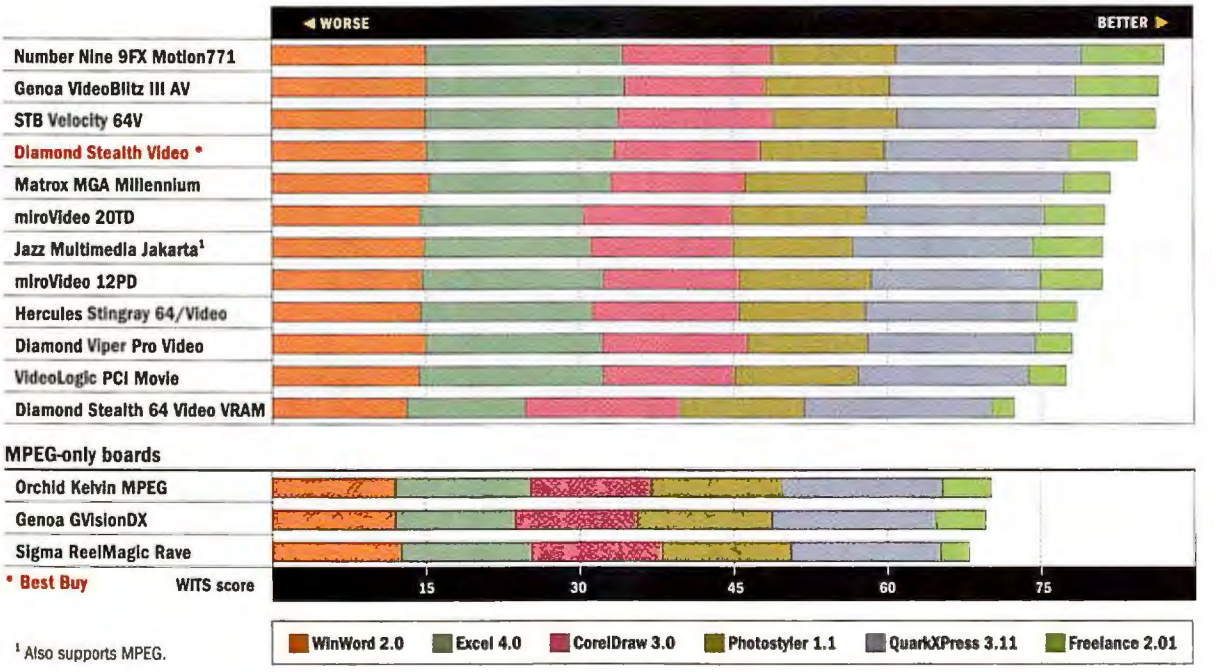
TEST REPORT

Video Accelerators Race to New Graphics Speed Records

In addition to speeding video playback, these boards impressed us with swift Windows graphics. Three boards—the Genoa VideoBlitz III AV, the Number Nine 9FX Motion 771, and the STB Velocity 64V—set new performance records in our Windows Integrated Test Suite, while eight others scored better than 75 in our overall WITS scale.



[1] Also supports MPEG.

Methodology

We ran all boards through our Windows Integrated Test Suite benchmark—the application-based test used in our monthly Top 10 Windows Accelerators column. WITS measures acceleration by performing graphics-intensive tasks in six popular Windows applications. Tests were run at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall WITS score is the aggregate of the application scores; higher scores indicate better performance.

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

scaled video; other boards using the same S3 Vision968 chip provided better video performance in our tests. A street price of $329 is not too much to pay for the kind of graphics performance the Motion771 offers, especially when you consider its excellent software utilities and high refresh rates. But video aficionados should look elsewhere. *Number Nine Visual Technology, 800/438-6463* **Reader service no. 898**

STB Velocity 64V

PROS: Very fast graphics performance, excellent video

CONS: Somewhat jerky playback with scaled video

The $299 STB Velocity 64V stands out with an 82.4 WITS score—among the fastest we've seen. But the board stumbled with video, struggling to maintain smooth playback with 320-by-240 Indeo videos at 640 by 480.

Upgradable to 4MB of VRAM for true-color graphics, the Velocity 64V offers fast 100-Hz refresh rate at 1024 by 768. Slick utilities ease installation and use, and you get a lifetime warranty and strong support policies. The Velocity 64V's lack of video prowess kept it from a Best Buy, but blazing graphics and a low price earn it the number six spot on our Top 10 list of Windows accelerators. *STB Systems, 800/234-4334* **Reader service no. 687**

VideoLogic PCI Movie

PROS: None

CONS: Worst video performance, no color data conversion

The only board reviewed without a DCI driver, the venerable PCI Movie choked on every 320-by-240 clip, dropping two-thirds of the frames in Indeo clips of that resolution. The PCI Movie even trailed the non-video capable Diamond Stealth 64 VRAM baseline board in some tests. A 74.1 WITS score is second-worst in the review.

Like the Hercules Stingray, the PCI Movie scales video clips but doesn't convert video data to RGB format. Future support for DCI may improve the PCI Movie's handling of video, but this is small comfort when you consider the high $399 street price and 2MB VRAM limitation. *VideoLogic, 800/245-8587* **Reader service no. 688**

Here's Something You Don't See Every Day

At the breakneck speed at which technology progresses, it's amazing how difficult it can be to find the features you want in a new monitor at a price that doesn't hit you like a total wipeout. Advanced features that provide a pleasing, more productive viewing experience should be affordable, but it's something you don't see every day. Added value at a moderate cost is exactly what's provided by the new DeluxScan line of monitors from Hyundai Display Products . . . every day.

Justifying the cost to upgrade a monitor (or ten monitors), whether for size or function, is about as daunting a task as waterskiing without skis. That's why Hyundai has chosen to take the sting out of upgrading by pricing the DeluxScan line *below* comparable monitors, while including a carefully selected package of the latest features. To meet the needs of a variety of customers, DeluxScan monitors are available in 15-, 17-, and 21-inch models. More sophisticated features can be found in the 15- and 17-inch Pro models. DeluxScan monitors are fully compatible with VGA, SVGA, XGA, and Apple Macintosh graphics standards.

More Than Monitors

Choosing and purchasing a new color monitor involves more than the screen that sits on your desktop. The company behind the monitor is almost as important as the product itself, and I'm proud to be a part of what's behind the new line of DeluxScan high-resolution monitors that we've developed at Hyundai. Hyundai Electronics America (HEA) is a wholly owned subsidiary of Hyundai Electronics Industries (HEI), a leading member of the $70 billion Hyundai Business Group. Together we are dedicated to customer satisfaction through the continuous pursuit of excellence. We've been pursuing excellence for over ten years, and the result is an impressive average annual growth rate of 30%. In 1994, HEI invested over $1.6 billion in electronics research and development. We've made a strategic decision to focus on the core technologies that will lead to digital video products for the upcoming "information superhighway." We are currently in the advanced stages of research on HDTV and plasma display technologies, and our new fabrication facility for TFT LCD manufacturing is nearly complete. Our new Digital Video Systems Division is developing consumer video-on-demand set top boxes, PC plug-in cards with set top box-like functionality, digital DVB Direct Broadcast Satellite receivers, and mini-video servers. The acquisition of TV/COM International and the formation of our Digital Media Division will help to put us at the forefront of compression audio video technology.

HEA is projecting a landmark $2 billion in revenue for 1995. By mid-1996, we will open the doors at our new corporate campus in San Jose, California. We're excited about this move because it symbolizes our commitment to the electronics industry and evolving digital video technology. Hyundai aims to be a preeminent supplier of video products today and in the future by offering a competitive combination of features, quality, and price. Our goal is to continue to meet the full spectrum of our customers' needs, develop solid, responsive customer support programs, and build strong channel relationships. So keep in mind, when you choose one of the new DeluxScan color monitors, we're behind you all the way.

Jerry Butlin
Vice President, Sales and Marketing
Monitor Division

What were once options are now standards for this line of quality monitors, all backed by the dependable Hyundai name. Among other benefits, DeluxScan monitors incorporate the following features:

- **Digital Controls with Programmable Presets**
- **Flat Screen CRT Technology**
- **Higher Refresh Rates**
- **Higher Resolution**
- **Plug-and-Play Capability**
- **Total Green Design**

DeluxScan models utilize **microprocessor-based digital controls** to allow convenient adjustment to all screen parameters, including contrast, brightness, size, position, and pincushion. This feature eliminates the need to adjust images with each resolution change and enables users to program monitors to their own specifications.

To greatly reduce the aggravating distortion that appears on the edges of most standard CRTs, DeluxScan models use Hyundai's **Flat Screen Technology** (FST). Sharper edge-to-edge image quality and reduced glare mean graphics that are visibly more crisp and clear than those seen on standard monitors.

The **higher refresh rate** standards of 72Hz and above are supported by this new line of Hyundai monitors. Higher refresh rates produce steadier, flicker-free images that result in easier viewing and reduced eye-strain, even after long hours at the computer. **Higher resolution** standards of 1600 x 1280 and 1280 x 1024 are achieved with most DeluxScan monitors. Together these features consistently provide users with cleaner and crisper images, and help to create a pleasant, more productive work environment.

Hyundai will also be offering **plug-and-play** features on select new models. Certain models in the DeluxScan family support the Display Data Channel (DDC) communications standard developed by VESA to respond to the

The DeluxScan 17 Pro is feature-rich—the premier monitor from Hyundai

Windows 95 operating system. DDC offers an interface for automatic configuration of the video controller and monitor. DDC also simplifies installation and automatically matches the monitor to your computer.

Ergonomically and environmentally conscious, Hyundai applies a **Total Green approach** to the design of the DeluxScan line. The Total Green approach includes EPA Energy Star certification awarded to peripherals that automatically reduce their power consumption to less than 30 watts after a period of inactivity. With this power saving mode, the annual electric bill for a 17-inch monitor used eight hours a day drops from approximately $88 to $32. DeluxScan monitors also comply with SWEDAC (MPR-II) guidelines developed to reduce potentially harmful electromagnetic emissions. In addition, all the materials used in DeluxScan cartons, manuals, and labels are completely recyclable. In essence, the Total Green approach saves energy, money, and resources, and reduces potential human risk factors.

	CRT SIZE	DOT PITCH	MAXIMUM RESOLUTION	GREEN
DeluxScan 15	15"	0.28 mm	1024 x 768	Yes
DeluxScan 15 Pro	15"	0.28 mm	1280 x 1024	Yes
DeluxScan 17	17"	0.28 mm	1280 x 1024	Yes
DeluxScan 17 Pro	17"	0.26 mm	1600 x 1280	Yes
DeluxScan 21	21"	0.28 mm	1600 x 1280	Yes

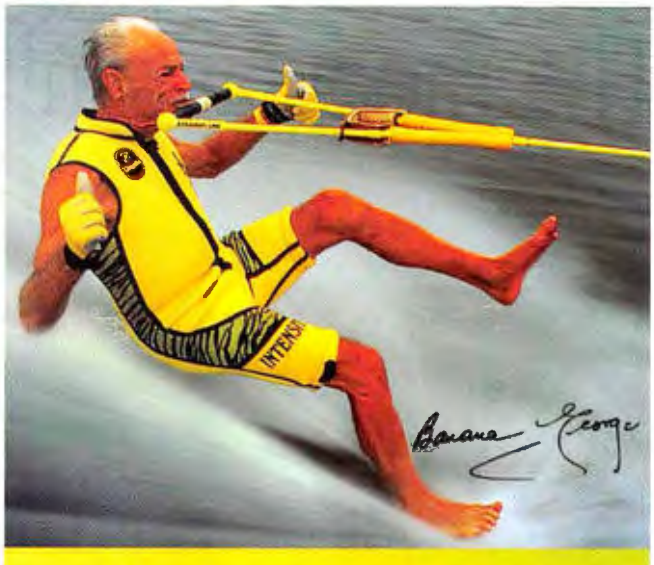
While most users are thrilled with the idea of working on a larger monitor, an upgrade may raise space concerns. Hyundai has kept these concerns in mind during the design process, so much so that the 17-inch model should fit in the typical desk space required for a standard 15-inch monitor. In addition, even though upgrading from a 15- to a 17-inch monitor is just a two-inch diagonal increase, it translates to a 30% jump in total viewing area.

Beyond these notable features in the DeluxScan line of monitors, the higher end 17- and 21-inch models go a step further to provide professional performance for more demanding users. Features in the high-end 17- and 21-inch models include **Invar Shadow Mask** and **Dynamic Focus** technologies to improve spot roundness and eliminate edge-to-edge distortion. Combined with color matching and temperature controls, these features deliver clear, color-accurate pictures without moiré, distortion or loss of focus.

With **multiple video inputs**, the user can access two computer sources simultaneously, and switch between them via convenient front panel controls. The versatility allowed by multiple video inputs is especially significant for those in cross-platform corporate environments.

The final feat behind the successful introduction of the DeluxScan line of monitors is old hat to us: Hyundai's legendary **commitment to quality and customer service.** All monitors in our newest line are ISO-certified and backed by our extensive two-year warranty, exclusive nationwide 48-hour Express Service, and our $70 billion corporation.

So if you still think there isn't a line of monitors that provides all the features and quality you want at a price that won't wipe you out, maybe it's time to look into Hyundai. DeluxScan: All the features. Hyundai value. Something you definitely don't see every day.



Win a free trip to Florida, and meet Banana George Blair.

To find out more about how Hyundai's new DeluxScan line of monitors provides the quality and features you want at a price that won't wipe you out, mail or fax the completed reply card or call us at the 800 number listed below.

When you reply to this offer, you will be entered in a sweepstakes in which two lucky winners and a guest of their choice will meet the legendary Banana George Blair on their free trip to Florida. Enter now! It's a chance you don't get every day.

Call today:
1-800-568-0060

Entries must be postmarked by August 31, 1995 to be eligible. Employees of HEA and their families, its subsidiaries, and authorized distributors are not eligible.

Yes! I'd like more information about Hyundai's DeluxScan line of monitors.

Mail or fax this completed form to:

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DRAWING *for* DUMMIES

BY JAMES A. MARTIN

Whether you need a quick flowchart, org chart, or floor plan, the latest business graphics packages claim to make it as simple as a click of the mouse. Which ones deliver?

JOHN BLECK

Great news—you've just been put in charge of a new division of your company. But before you uncork the champagne, anxiety hits: You'll need to come up with an organization chart, a floor plan for offices, and flowcharts for quick overviews of four new projects. How to manage it all before next week's companywide meeting?

The answer is easier than you might think. Multipurpose business graphics programs like Visio and ABC FlowCharter help you track projects and organize resources in visual terms. These programs—like draw packages with MBAs—offer libraries of predrawn shapes that you simply drop into a document and connect with lines. Even if you don't know a T square from a T-bone, you can very easily

create an organization chart to show who is working on your product-marketing campaign, a flowchart detailing the way you'll implement it, or a bar graph to chart your monthly sales figures.

So how well do these programs deliver on the promises of ease of use and versatility? To find out, I looked at the four leading packages—ABC FlowCharter 4.0, Corel's CorelFlow 2.0, Adobe's IntelliDraw 2.01, and Visio 3.0. I created three kinds of everyday business graphics—an organization chart, a flowchart, and a floor plan—in each of the four programs.

Each package has its own distinctive strengths. For example, the $69 CorelFlow stands out for its large number of shapes and clip art, whereas the $299 ABC FlowCharter lets you create the most elaborate flowcharts. But when we added everything up, the $129 Visio nudged past the $95 IntelliDraw to earn a Best Buy, thanks to its intuitive interface and excellent set of drawing tools.

Ease of Use Reigns Supreme

While all four programs let you drag and drop objects to create your drawing, some make this process easier than the others do. The best programs, such as Visio, make producing a drawing a straightforward process by clearly arranging all available drawing tools on screen and labeling all buttons and shapes so you know how to use them. Visio also gets high marks for its handy pop-up help windows. IntelliDraw's 99 levels of undo are great for helping you retrace your steps and figure out where your drawing went awry.

The biggest time-savers are templates containing predrawn, preconnected shapes. Why waste energy creating an organization chart from scratch when you can simply customize an existing template? All four of the programs offer basic templates—flowcharts, bar charts, and organization charts—but the best also give you more-specialized templates, such as cause-and-effect (also called fishbone) diagrams. Visio offers the best selection of business-oriented templates.

For those times when you can't use a template, you'll need to learn how to use your program's drawing tools. Each program ships with a library of predrawn shapes, from simple rectangles and diamonds to fancier objects, such as filing cabinets and fax machines. You can just drop them into drawings and edit them on the fly. The better a program's shapes library, the less actual drawing you have to do. While CorelFlow has the largest number of shapes, Visio offers the most useful selection for business.

But there's more to creating a chart than dragging and dropping shapes from a library; you also need to connect the shapes with lines or arrows. All the programs offer a line tool for this purpose. And all but CorelFlow automatically connect a line to an object's edge once you position the cursor over the object.

Look for a program that offers more than just rudimentary line tools; the more options you have, the less drawing you'll have to do. ABC FlowCharter, for example, lets you select from a variety of line types—including straight, right-angle, and curved lines—to create your drawings.

Beyond Drag and Drop

Here are some other important features you should consider:

- **Ability to create slide presentations.** If you're creating organization charts or flowcharts on screen, chances are you'll use them for presentations. Being able to create a slide presentation within your draw program saves you the time and effort of moving those charts into a dedicated presentation graphics program.
- **Spelling checker.** Nothing looks worse than a chart full of typos. All but Visio have built-in spelling checkers.
- **Automatic line rerouting.** What if you take someone off your product-marketing campaign or decide to phase out one of your processes? At times like these, you'll want to rearrange or delete shapes in your chart. All the programs we reviewed except Visio can accommodate these changes by automatically realigning the chart—minimizing the amount of redrawing you'll need to do yourself.
- **Dimension lines.** When you create a floor plan on screen, you'll want to show the scale you're working at (for example, 1 inch equals 1 foot). Dimension lines help you do this by automatically measuring the distance between a line's end points and displaying the measurement. (Only IntelliDraw and Visio offer this feature.)
- **Data fields.** ABC FlowCharter and Visio both allow you to link a spreadsheet table's data directly to objects in your diagram. This enables you to quickly generate charts and graphs based on the data—to link sales data to a bar chart, for instance.
- **Freehand drawing tools.** If you ever want to create a new shape or customize an existing one, freehand drawing tools are a real plus. All but CorelFlow offer these tools.
- **Import/export formats.** If you want to add clip art or photos to your creations—say, a photo of each employee on your organization chart—your package must support the format that the images are in. CorelFlow and Visio offer the best support for file import/export formats such as PCX and TIFF.
- **Alignment tools.** All of the programs except IntelliDraw use a page layout grid for documents, which helps you place and distribute objects evenly. When you drag a shape into position, the snap-to-grid feature automatically positions the object on the grid. All but FlowCharter automatically center your drawing as well.
- **OLE 2.0 support.** All but IntelliDraw support the Windows Object

BEST BUY

It was an extremely tight race between IntelliDraw and Visio, but the $129 Visio ultimately gets the nod for its straightforward layout, intuitive interface, strong collection of shapes and templates, and excellent tech support. However, if you can afford another $95, IntelliDraw would make an excellent companion program, if for no other reason than its superlative clip art collection (which you can easily import into Visio).

USABILITY REPORT CARD

VISIO MASTERS THE USABILITY CHALLENGE

	Organization chart	Flowchart	Floor plan	Overall	Comments
ABC FlowCharter 4.0	A	B+	D	B	Hard to use, but SnapGraphics module draws charts easily
CorelFlow 2.0	C	C	C-	C-	Clunky line tool, unattractive shapes, and no dimension lines for floor plans.
IntelliDraw 2.01	A	B-	A	B+	Interface takes getting used to, but clip art collection is tops.
Visio 3.0	A	B	A	A-	Wide variety of shapes, templates, and tools makes it easy to use.

BEST BUY

Linking and Embedding (OLE) 2.0 specification. IntelliDraw supports only OLE 1.0. Both versions enable you to take an object created in one application and embed it in another, but OLE 2.0 streamlines the process by importing tools and menus from the object's native program so you can edit items from within other programs. If you want to embed a Visio flowchart in an Excel spreadsheet, for example, you can double-click on the chart within Excel and edit it in a Visio window; the changes you make will be reflected in both the Excel spreadsheet and the original Visio file. Conversely, you can embed an Excel spreadsheet in any of these business draw packages.

If you need to create only flowcharts or organization charts, you may be better off opting for a dedicated package. See "Just Say Flow" and "Org Charts à la Carte" for more information about these types of programs.

Hidden Costs

Remember when you could call tech support any time and ask as many questions as you wanted, free of charge? Not so anymore. Like many other software programs sold today, each of the packages we review offers a limited number of free calls, followed by high fees charged on a per-call basis. Visio is the least egregious: You get 90 days of free support, then you must select one of three payment options for future calls.

With the door on free support shutting so soon after you purchase your software, it's all the more important to get a package that won't leave you full of questions. Our Best Buy, Visio, does the best job of getting you up and running quickly, but the other programs have valuable features as well. Read on for more about what each package has to offer. While none is flawless, we think you'll find one that's right for you.

James A. Martin is a freelance writer in San Francisco and formerly the graphics editor at Macworld *magazine. Arden M. Hoffman is an assistant editor at* PC World.

For more information on all products in this article, circle reader service number 908.

ABC FlowCharter 4.0

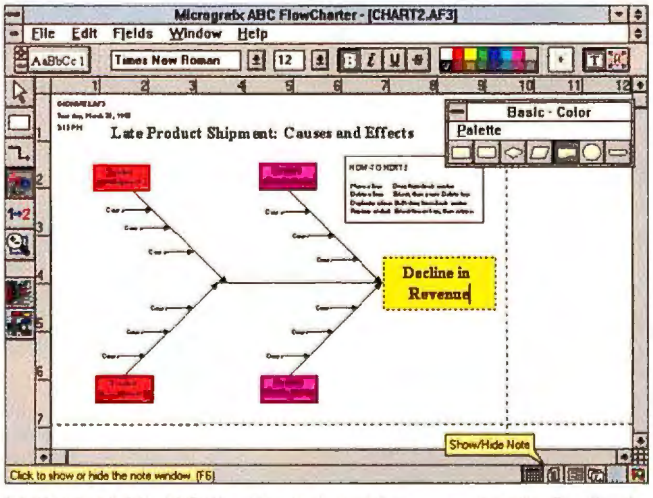
PROS: Handy SnapGraphics module, strong line tools, supports data fields and multipage charts
CONS: Expensive, unattractive shapes, can't automatically center charts on page, one level of undo, no dimension lines

ABC FlowCharter aims to be the most complete business graphics program available. Unfortunately, it's a bit overambitious. For those who need to create charts only occasionally, the $299 ABC FlowCharter is both too difficult and too expensive. You get only one level of undo, and, unlike Visio, the program doesn't lay out all the chart tools you need in front of you. For example, you have to go into the File menu to find the drawing templates. Worse, you can't easily center charts on the page.

The program's ace in the hole, however, is SnapGraphics, an integrated drawing module with a variety of templates that make creating an organization chart or flowchart about as easy as microwaving a TV dinner. (SnapGraphics by itself is $50.)

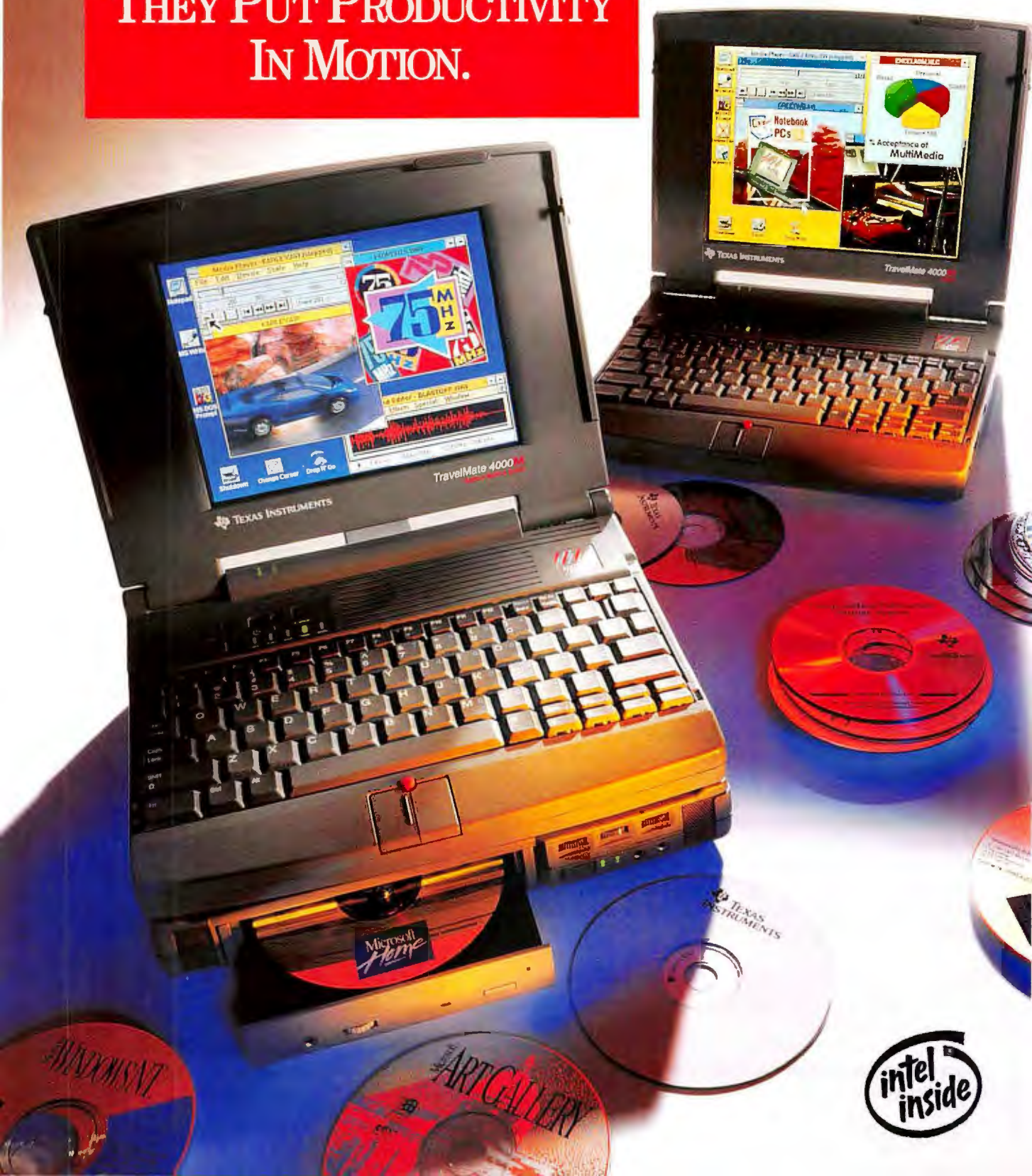
FlowCharter, however, has no flowchart or organization chart templates, so we had to create our drawings from scratch—an intimidating prospect, considering FlowCharter's bare-bones interface. SnapGraphics, on the other hand, has on-screen placeholders that make it easy to arrange charts. Just drag a shape from a palette over to one of the predrawn placeholders, and voilà! Then connect, resize, or move the shapes however you want. My only quibble with SnapGraphics is that it doesn't import text into flowcharts, so creating a chart took longer than I liked.

And as for floor planning, both modules fall flat: FlowCharter has no dimension lines for measuring space, and it lets you open only one shape palette at a time, even though its office-furniture and floor-planning shapes are in two separate palettes. What's more,



FIT TO BE TYPED. ABC FlowCharter's text boxes—such as the Decline in Revenue box in this diagram—automatically expand as you type.

THEY NOT ONLY SOUND GREAT, THEY PUT PRODUCTIVITY IN MOTION.



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most of these shapes look clunky and unappealing. SnapGraphics offers no floor-planning shapes or tools at all.

If you're willing to struggle with FlowCharter's interface, you'll find some features (not available in the SnapGraphics module) that let you create more-complex business drawings. The DataAnalyzer module lets you link data fields to chart objects, which comes in handy for charting sales figures or displaying data within organization charts—for example, you can list employees' salaries and start dates below their names and titles. Also, the program's five line-rerouting options—direct, right angle, curved, organization chart, and cause-and-effect (fishbone)—make it easier to create a wide range of drawings. Best of all, FlowCharter lets you produce charts that flow easily across multiple, tiled pages.

Considering FlowCharter's complexity, Micrografx's support plan of just 30 days of free calls to a toll line is hardly adequate.

If you're new to business graphics, SnapGraphics may be all you need. It lets you whip up clean graphics without much effort. While it's not as full featured as FlowCharter, it's much easier to use and it's dirt cheap. *Micrografx; 800/603-0074, 214/234-1769*
Reader service no. 674

JUST SAY FLOW: DEDICATED FLOWCHARTING

True, you can create respectable flowcharts with business graphics programs such as our Best Buy, Visio, but no program is perfect—a scant shape library here, an awkward connector tool there. Your best bet may be a dedicated flowcharting application. Here's a brief look at some leading flowcharting programs. (For 32-bit Windows 95 flowcharting, see May's *Quick Take* on Arcland's $299 FlowModel; 610/993-9908.)

Clear Software's allClear III for Windows

If you can type, you can create a flowchart. That's the premise behind the $180 allClear III, a program geared for beginners who want simple, yet full-featured flowcharting.

What's unique about allClear is that it generates charts from text-based outlines using coding, called *scripts*. For starters, once you select the type of graphic you want to create—say, a process diagram, organization chart, or decision tree—two windows appear on screen: a diagram window, containing a template of the chart or diagram you've chosen; and a script window, into which you enter text in outline form. The program links the text in the script window directly to shapes in the diagram window. For example, type the words *Begin Process* on the first line of the script, and allClear fills the first shape in the diagram with those words.

Punctuation in a script determines the flowchart's direction; a colon, for example, generates a multiple-choice branch in the chart. You can also spruce up charts with more than 180 editable shapes, clip art, and a variety of line styles. Shapes will also resize automatically to fit your text. And if you forget a task—such as importing Lotus Notes—an instruction window can take you though the process step-by-step. *Clear Software; 800/338-1759, 617/965-6755* Reader service no. 869

Kaetron's TopDown Flowcharter for Windows

For $189 TopDown Flowcharter for Windows lets enables you to plan complex projects requiring multilayered flowcharts, with one chart nested inside another.

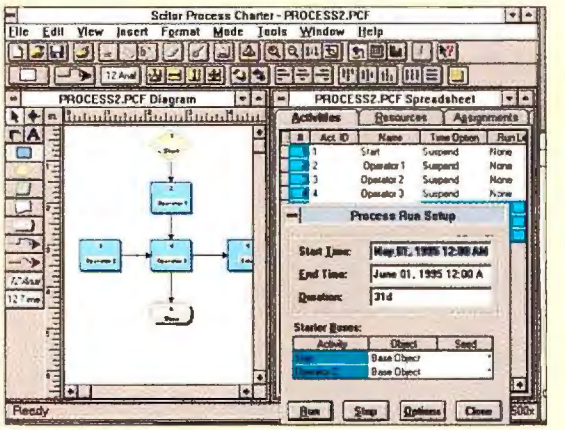
Simply double-click on a chart object, and you can create a subchart linked to that object. You can also change the hierarchy of subcharts or cross-link them to each other.

Other useful features include TopDown's Drop Anchor—which lets you place a marker in a document for quick retrieval later—and the ability to attach lengthy notes to any object without affecting the flowchart itself. *Kaetron Software Corp.; 800/938-8900, 713/298-1500* Reader service no. 870

Scitor's Process Charter 1.0 for Windows

With its profusion of toolbars, palettes, icons, shapes, and more, Process Charter for Windows makes it easy for beginners to whip up a simple flowchart in a hurry.

But flowcharting is just a fraction of what Process Charter can do. This $480 program is also a high-end data analysis tool that lets you perform time-based what-if scenarios and process simulations. Say you want to create a process chart of incoming tech support calls. You can enter employee info and number of calls per hour into the program's spreadsheet, then assign that data to any object (or step) in the process and specify a period of time. Click the Process Run button, and the program simulates the call flow, showing bottlenecks in red. Best of all, several processes can run simultaneously.



PROCESS CHARTER LETS YOU experiment freely with what-if scenarios to spot potential bottlenecks.

Process Charter isn't perfect–it doesn't support OLE, undo is limited, and it's pricey. But for sophisticated resource analysis, this tool goes far beyond simple flowcharting. *Scitor Corp.; 800/549-9876, 415/462-4200* Reader service no. 871

—James A. Martin

CorelFlow 2.0

PROS: Low price; lots of clip art, digitized photos, and fonts; roll-up window-shade palettes; large color palette

CONS: No on-screen ruler, awkward line tool, no freehand drawing tool, no tiled pages, only one level of undo

No one could ever accuse Corel of being stingy with its CorelFlow 2.0 package. For $69 you get 1000 clip art images, 2000 symbols (including arrows, shapes, and electical engineering symbols), and 1000 digitized photos on a broad range of subjects. Too bad actually using these shapes to create business drawings is such a chore.

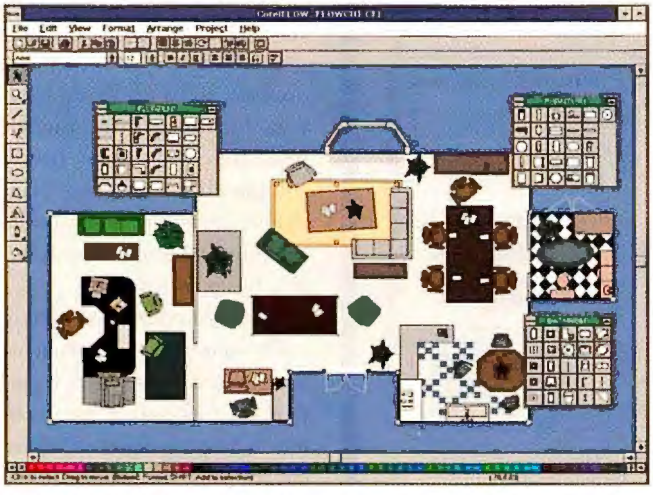
When making my organization charts and flowcharts, I was immediately put off by the way CorelFlow's line tool wouldn't automatically snap to the bottom or side of the objects I wanted to connect. As a result, I found myself drawing messy lines that bled into an object or that weren't perfectly straight. I couldn't connect one line to another or join a line to a text box, either. To generate an angled line, I had to draw the line, double-click to create an end point, draw the rest of the line, double-click again, and so on. Nothing looks worse than an off-center chart. The lack of an on-screen ruler or auto-align feature made it nearly impossible to center my charts with precision on the page.

What's more, CorelFlow is the only program that offers no freehand drawing tool, making it harder to modify predrawn shapes. As with ABC FlowCharter, CorelFlow's lack of dimension lines and inability to blend shapes made floor planning a challenge.

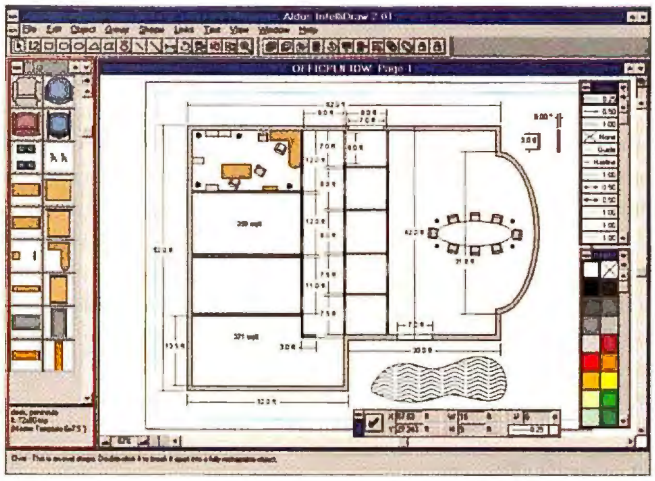
For all its faults, CorelFlow has a few redeeming qualities. I liked how the window-shade palettes rolled up to minimize on-screen clutter; and the extensive color palettes helped me make distinctive-looking drawings.

Corel gives you one free call on its toll-free support line; after that, you pay $25 per call or $2 per minute.

CorelFlow is worth buying only if you want to use its huge selection of clip art, photos, and symbols to spruce up drawings made in another drawing package. For creating professional-looking business graphics, spend a little more and get Visio. *Corel Corp.; 800/772-6735, 613/728-8200* **Reader service no. 675**



GETTING DOWN TO BUSINESS. CorelFlow's floating tool palettes roll up like window shades, giving you room to work.



LAYING OUT A FLOOR PLAN is a snap with IntelliDraw, thanks to its horizontal and vertical dimension lines and snazzy clip art collection.

IntelliDraw 2.01

PROS: Top-notch image library, auto-align feature, good drawing and connecting tools, rich typographic features, 99 levels of undo, ability to lock objects in place

CONS: Nonintuitive interface, OLE 1.0 support only, no time-line templates, no context-sensitive on-screen help

IntelliDraw's attractive, highly malleable image library alone is worth the program's $95 street price. This Adobe package offers a wide range of useful clip art, as well as many striking and brightly colored images. Best of all, some of the artwork can be broken into smaller, editable components. But a nonintuitive interface keeps IntelliDraw out of the Best Buy ranks.

Creating an organization chart in IntelliDraw is easy thanks to its built-in templates. Although the program lacks a grid, IntelliDraw's auto-align feature—vertical and horizontal crosshairs that pop up automatically over your chart as you drag a shape in place—is a huge help in positioning shapes precisely. I had a harder time creating a flowchart—the template was small and awkwardly arranged.

IntelliDraw makes it easy to import numerical data from text files directly into a chart. If you have a text file that contains annual sales figures for a particular product line, for instance, you can import that data directly into a bar chart; the bars will automatically adjust in size to represent the imported sales figures.

The program handles floor planning exceptionally well, thanks to its horizontal and vertical dimension lines, which measure the space between the line's start and end points after you tell the program what scale to assume. The package also enables you to calculate an area's square footage.

IntelliDraw's text features are the best of the programs reviewed here, complete with leading, kerning, and paragraph formatting controls. You can flow text automatically from one object to another, wrap text around shapes, edit text on a path, and twist and twirl text using special-effects tools. And if you don't like your experiments, don't sweat it—you've got 99 levels of undo.

The program has some drawbacks, albeit not serious. It takes a while to get used to the way IntelliDraw arranges and integrates documents, palettes, and toolbars on screen. When opening the

flowcharting shape palette, for example, I had to resize it so it wouldn't overlap with my workspace window. In contrast, Visio neatly aligns your workspace and window shapes automatically.

IntelliDraw supports only OLE 1.0—a drawback for anyone wanting 2.0's ease. And Adobe's tech support is a labyrinth of voice-mail menus before you get to talk to a real person. After your first free call to a toll number, count on paying $3 per minute for help.

IntelliDraw's slightly awkward interface and unimpressive flowcharting capabilities keep it from being a Best Buy. But overall it's a flexible, versatile, and affordable program that's particularly recommended for anyone who wants to generate charts and graphs with both style and precision. *Adobe Systems Inc.; 800/833-6687, 415/961-4400* **Reader service no. 676**

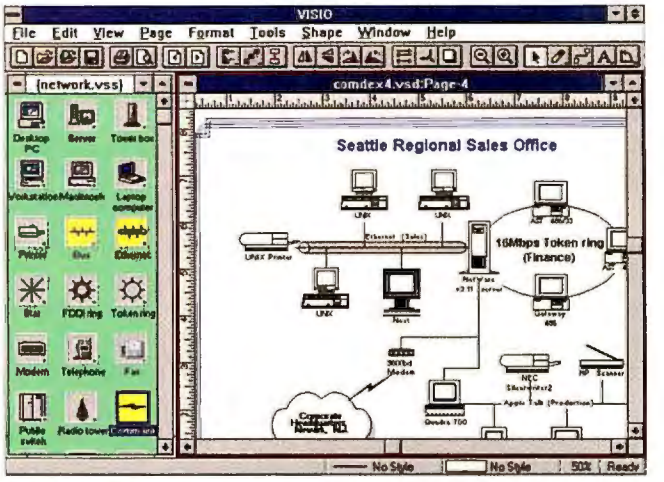
Visio 3.0

PROS: Intuitive layout, large selection of high-quality shapes and templates, easy-to-use connector tool, good on-screen help, 90 days of free tech support

CONS: No text importing, weak text controls, no built-in spelling checker, some shapes lose characteristics when placed in a template

Visio's clean and simple layout makes it one of the easiest business graphics programs to use and helps earn it a Best Buy. In fact, I created a basic organization chart in just 15 minutes—without ever cracking open the manual.

First, I opened an organization chart template, which the $129 Visio calls a stencil. A blank page appeared on the right side of the screen, and to the left was a window containing a SmartShape



VISIO'S CLEAN LAYOUT makes it easy to create diagrams. Just drag a shape from the left window and drop it into the drawing on the right.

library used for organization charting. I chose the shapes I wanted—dragging each from the left and dropping them into the stencil window on the right—then connected the shapes easily with Visio's connector tool. SmartShapes are editable, too; I stretched a rectangle without distorting the entire shape.

Although Visio doesn't have an auto-align feature like the one in IntelliDraw, I found it easy to align my chart on the page by using the Align and Distribute commands. Whenever I was unsure of what I was doing, Visio's status bar helped to clue me in.

Visio's luster dimmed just a bit as I proceeded with my next tests, however. Instead of directly importing text into a flowchart, you must copy and paste text into each object. If you decide to resize the object later, you have to reformat the text inside the objects. And curiously, several of Visio's SmartShapes lost some of their characteristics when I dropped them onto a stencil. For instance, when I selected a yellow, three-drawer file cabinet from the SmartShape library and placed it onto a floor plan, the file drawer suddenly lost its coloring and looked considerably less polished.

Visio's support for nearly every aspect of OLE 2.0 client-server technology makes it particularly well suited for medium to large companies, or for anyone with the programming know-how to write Visual Basic scripts to take full advantage of

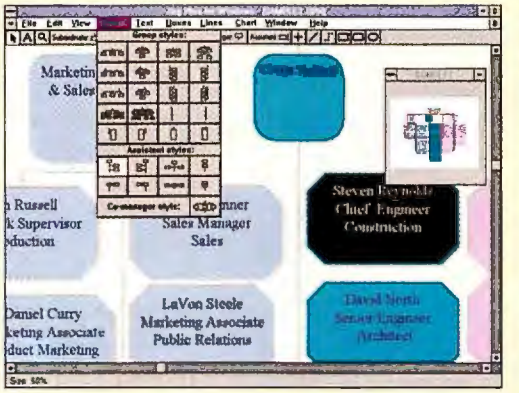
ORGANIZATION CHARTS À LA CARTE

If organization charts are all you need, consider Clear Software's $59 OrgCharts and Banner Blue's $140 Org Plus. Both are easy to use and can import clip art, text, and spreadsheets into your charts.

OrgCharts takes a text-based approach to creating organization charts. Simply fill in one of six preset outlines, and the program translates that information into a chart. You can change shapes, colors, and fonts; and add borders, shadows, and text. *Clear Software; 800/338-1759, 617/965-6755* Reader service no. 872

Banner Blue's Org Plus takes a different approach to ease of use. Instead of starting with text, you begin with a chart consisting of two boxes connected by a single line—there are 12 styles to choose from. Add to your chart by selecting the Coworker, Assistant, Manager, or Subordinate buttons from a palette, then choose a spot in your diagram where you want them positioned. You can type in text as you go or build the chart first and add text later. *Banner Blue Software; 510/794-6850* Reader service no. 873

—Arden M. Hoffman



Preset Group Styles in Banner Blue's Org Plus made it easy to build this corporate ladder quickly.

OLE 2.0. Corporate users will also appreciate the ability to exchange data easily with Lotus Notes.

In addition to Visio's large collection of bundled shapes, Visio Corporation also sells a variety of highly focused add-on shapes libraries, including ones for electrical engineering, insurance, and biotechnology applications. Each of these add-on libraries sells for about $50 on the street. The company also sells a $29 instruction book, called *Developing Visio Shapes*, to help you develop shapes libraries customized for your department or company.

Visio's tech support is top-notch. You get 90 days of free calls on a toll line, then you choose from one of three reasonable payment options. Each time I called, a support staffer answered the phone promptly and provided courteous, knowledgeable answers.

Visio's excellent graphics tools, terrific shapes, and first-rate help pull it into first place with ease. Visio may lack the graphics sizzle of IntelliDraw, but it does the best job of letting you crank out a wide variety of sharp-looking drawings. *Visio Corp.; 800/446-3335, 206/521-4500* **Reader service no. 677**

FEATURES COMPARISON Visio Tops the Charts in Business Graphics

● = Yes ○ = No

Standard features	ABC FlowCharter 4.0	CorelFlow 2.0	IntelliDraw 2.01	Visio 3.0
Street price [1]	$299	$69	$95 [2]	$129
Hard disk space required (MB) [3]	21	5	15	15
System memory required (MB)	4	4	5	4
Create slide shows	●	○	●	○
Spelling checker	●	●	●	○ [4]
Step-by-step help	●	●	○	●
Levels of undo	1	1	99	10 [5]
Draw templates				
Bar charts	●	●	●	●
Flowcharts	○	●	●	●
Diagrams	●	●	●	●
Technical schematics	○	●	●	●
Forms	●	●	●	●
Maps	●	●	●	●
Organization charts	○	●	●	●
Floor planning	○	●	●	●
Time lines	●	●	○	●
Graphics tools				
Predrawn shapes	781	2000 [6]	750 [6]	700 [6]
Automatic line rerouting	●	●	●	○
Dimension lines	○	○	●	●
Snap objects to grid	●	●	○	●
Automatically center drawing	○	●	●	●
Data fields	●	○	○	●
Freehand	●	○	●	●
Bézier curve	●	○	●	○
Formats supported				
EPS, PCX, PICT, TIFF	○	●	● [7]	●
OLE 2.0	●	●	○ [8]	●
Service and support				
Toll-free phone call	○	●	○	○
Charge for technical support	●	●	●	●
Weekday support (hours)	10	16	9	11
Money-back guarantee (days)	30	10	30	60

BEST BUY

[1] Based on vendor estimates unless otherwise noted.
[2] Based on mail-order prices.
[3] Full installation.
[4] Via $29 add-on.
[5] Can be increased with more memory.
[6] Approximate.
[7] Import only for PCX.
[8] OLE 1.0.

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$2345 Or Lease For $92/Month*

SoundPro P-54 Dual Scan

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SoundPro P-54 Active Matrix

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- 8MB RAM - Upgradable to 16 or 40MB's
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- Removable Hard Drive Up to 1 Gigabyte Capacity
- Includes AC Adapter, NiMH Battery, Carrying Case, MS DOS 6.22 & Windows for Workgroups 3.11
- Options: Docking Station, Internal 14.4/14.4 Fax-Modem, Car Adapter, External Battery Charger, Extra Batteries
- **Sound System Upgrade: $125.00** Includes: External Speakers & Microsoft Sound System Software
- **Upgrade to P-90 for $225.00 or P-100 for $375.00**

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SoundPro CD Dual Scan

DX4™-100 Dual Scan Color, Dual Batteries, 8MB RAM/340MB HD

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SoundPro CD Active Matrix

DX4™-100 Active Matrix Color, Dual Batteries, 8MB RAM/340MB HD

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- Base 4MB RAM upgradable to 32MB
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SoundPro Active Matrix

DX4™-75 4MB RAM/340MB HD

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- 4MB RAM, 1.44MB Floppy
- Local Bus Video & Local Bus HD I/O
- Over 3 Hours of Battery Life
- Removable Hard Drive Up to 1 Gigabyte Capacity
- Includes AC Adapter, NiMH Battery, Carrying Case, MS DOS 6.22 & Windows for Workgroups 3.11
- Options: Docking Station, Internal 14.4/14.4 Fax-Modem
- **Sound System Upgrade: $125.00** Includes: External Speakers & Microsoft Sound System Software
- **Upgrade to DX4™-100 for $100.00**

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- Internal 5.25" Double-Speed CD. Supports CD-ROM and CD Audio
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- 10.4" or 11.3" LCD Available in Dual Scan Color or Active Matrix Color Displays

- 16-bit Stereo Sound - SoundBlaster™ & SoundBlaster Pro™ Compatible
- Advanced PCI Local Bus Interface
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New notebooks packed with built-in CD-ROM drives, sound, and

MULTIMEDIA TO GO

speakers promise all-in-one, on-the-road convenience and portability.

Are they worth the price? By James A. Martin

Your boss says to get out there and dazzle prospective clients with a new multimedia presentation: video clips, sophisticated graphics, audio narration, the works. No problem, you say—and immediately phone your chiropractor, because in the past, traveling with an ambitious multimedia show usually meant schlepping a spine-twisting, clavicle-cracking assortment of equipment: a laptop and its peripherals, an external high-capacity hard drive to hold that moving presentation, a pair of external speakers, and maybe even an LCD projection panel.

But put that chiropractor on hold for a moment. Within the last six months, several computer manufacturers have released the first wave of integrated multimedia notebooks with built-in CD-ROM drive, Sound Blaster–compatible 16-bit

ILLUSTRATION: GORDON STUDER, PHOTO: JOHN GREENLEIGH

audio, internal stereo speakers, audio input and output jacks, a speedy processor, two PC Card (formerly called PCMCIA) Type II slots (or one Type III slot), and a snazzy color display. Now your company can show its Cecil B. DeMille extravaganza using lightweight compact discs, and you can embark on your road show in unencumbered bliss.

At least, that's the premise behind multimedia notebooks. The reality, as I discovered from hands-on experience with five models, is not always so rosy. First, there's the sticker shock: Several no-frills multimedia notebooks are priced at around $4000, while the most expensive models can set you back almost as much as a new car.

With most models weighing between 8.8 and 11.2 pounds (once you include the AC adapter, battery, and so on), you're not necessarily done with those chiropractor appointments. Meanwhile, a CD-ROM drive sucks up battery juice with gusto—you're lucky if you get two hours of play from one charge. And choosing a multimedia notebook essentially means deciding which compromise is the least inconvenient. Despite their drawbacks, the best multimedia notebooks offer all-in-one-box convenience and portability you just wouldn't otherwise have.

Here's an evaluation of the first multimedia notebooks to hit the market: MPC's CD-Book 875, Aspen Computer's Universa CD, Toshiba's T2150CDT, Panasonic's V41, and IBM's ThinkPad 755CD. To test their multimedia playback capabilities, I viewed the Video for Windows clips from Byron Preiss Multimedia's Seinfeld Screensaver & Planner CD-ROM, as well as QuickTime movies from the CNN Time Capsule 1994 CD-ROM (Vicarious Software). I checked to see how fluidly—or fitfully—the videos played on each notebook's LCD screen and, for comparison, on an external monitor (NEC's MultiScan 3FGx); and I compared the notebook speakers' sound quality with that produced by external speakers. I also checked out a variety of notebook features—pointing device, traveling weight, physical dimensions, warranty, and so on. (For a quick comparison of features, see the table "Sizing Up Multimedia Notebooks.")

MPC CD-Book 875 While CD-ROM drive access is convenient, the exposed laser eye is vulnerable to dust and dirt.

DON'T LEAVE THE OFFICE WITHOUT...

- ✓ Power strip with 3-to-6-foot cord
- ✓ Pointing device
- ✓ Run-time viewer (lets you run the presentation without the application that created it)
- ✓ Wireless or cordless mouse
- ✓ External speakers
- ✓ Hard copy of presentation
- ✓ Backup disk copy of presentation

MPC CD-Book 875

MPC's CD-Book 875 offers a 9½-inch dual-scan color screen; 1MB of video memory; 32-bit VESA local-bus video; a compact, slate-gray casing; an aquamarine VersaPoint joystick pointer; a keyboard that pops up to reveal a CD-ROM drive underneath; and an external floppy drive. On the surface, this is an attractive machine, if for no other reason than its (relatively) low price. The $2458 MPC CD-Book I tested was equipped with 8MB of RAM, a 340MB hard drive, and a DX4-75 processor.

But this system will ultimately disappoint anyone needing a multimedia presentation machine. The colors on the MPC display frequently looked washed out, and there was more ghosting (pale streaks of light) going on than in all the *Amityville Horror* movies combined. Fast video motion was annoyingly jittery. For instance, the CNN Time Capsule video of Nancy Kerrigan's side-to-side twists on the ice wobbles as if it were filmed during an earthquake. In comparison, video playback on the external NEC monitor eliminated the video's jitters.

Giving a presentation can be unnerving enough. Who needs to worry about something as simple as locating a cursor? It's common for cursors to disappear on dual-scan screens, and the CD-Book 875 display is no exception. Add to that the notebook's uncomfortably stiff pointer, and you're likely to face an awkward moment before your audience, mumbling, "I know that cursor's around here *somewhere*." (MPC is replacing its pointer with a touch-sensitive trackpad in its next models.)

Sound capabilities are of course a major feature of the multimedia notebooks. Alas, the stereo speakers that fit inside cannot provide the output needed in a presentation. While you can probably get by with the MPC's internal speakers in intimate surroundings, I wouldn't rely on them to fill a large conference room. External speakers are clearly called for—but that means you've got to cart them along as well as the external floppy drive.

Playing a CD on this notebook is a fairly straightforward affair: Unlatch and lift up the keyboard, drop a disc onto the CD-ROM drive's platter, and snap the keyboard back into place. But beware—with the keyboard propped open, the drive's sensitive optics are vulnerable to fingerprints, dirt, dust, and the occasional clumsy flight attendant with an open Coke can.

The CD-Book was often painfully slow at simple tasks, such as launching Windows or accessing files. While the dual-scan screen significantly lowers the cost of the machine, it also limits its practicality in group presentations. (A crisper active-matrix screen adds $1049 to the price of a system). Because of these drawbacks, and despite its weight and price, I can't recommend the CD-Book 875. *MPC Technologies, 800/672-9979, 714/724-9000* **Reader service no. 736**

COMPUTER SCREENS: SEINFELD SCREEN SAVER & PLANNER (BYRON PREISS MULTIMEDIA) AND CNN TIME CAPSULE 1994 (VICARIOUS SOFTWARE)

MULTIMEDIA MAKEOVER:
TURN YOUR NOTEBOOK INTO A SHOW MACHINE

Call me a cheapskate. Call me a technology dinosaur. Call me a Luddite, for heaven's sake, but I'm perfectly content with my current notebook—even though it could be considered multimedia challenged.

Apparently I am not alone. Thousands of other computer users feel the same way, and hardware vendors have answered our whining with sound cards, CD-ROM players, and a legion of other multimedia combo devices we can just plug in for instant upgrades. Which equipment *you* need to transform your notebook into a multimedia show machine depends on what it can do now.

If you have a notebook with no audio capabilities, you'll need a PC Card (formerly PCMCIA) sound card, speakers, a CD-ROM drive, and possibly a SCSI card to connect the drive. If your notebook is equipped with stereo sound, you'll still have to invest in a CD-ROM drive, a SCSI card, and—for improved sound—a pair of external speakers. You can buy each device individually, but I wouldn't advise it. Individual components have compatibility problems with each other. (I felt like Judge Wapner as I tried to settle the territorial spats between the sound cards I attempted to add and the SCSI card I was trying to configure. When the sound would work, the CD-ROM was unresponsive, and vice versa.)

Sound Without the Fury

Instead, get a combination package that pairs a sound card and CD-ROM drive in a single unit. These lightweight combo devices plug in and install quickly and without a hassle.

The pioneering $499 **Z-Player** from Zenith Data Systems—a bantam, 2-pound CD-ROM drive that has stereo speakers integrated with a 16-bit sound card—connects to a notebook with a supplied Type II PC Card. Powered by six AA batteries, a rechargeable NiCd cell, or an AC adapter, the Z-Player was up and running in just minutes after an easy installation program automatically configured the system. The double-speed CD-ROM drive handled video playback adequately, but the stereo speakers were prone to distortion at medium to high volumes. However, the unit comes equipped with output jacks for external speakers. Like almost all other notebooks with PC Card sound cards, the Z-Player is *not* Sound Blaster compatible—which means it can't handle sound on DOS-based programs.

Zenith Z-Player

New Media's $799 **CD Sound Studio** weighs 4½ pounds in its attractive, notebook-size casing that fits comfortably under your computer. As with the Z-Player, a simple connection via a PC Card Type II slot gets your notebook singing. The sound quality is particularly good—no doubt because the CD Sound Studio was jointly designed by New Media and speaker maker Altec Lansing (which sells a similar model under its own label). The small speakers placed on the front and side of the unit spew out surprisingly rich treble and bass considering their size.

Axonix's $559 **ProMedia Player** has all the bells and whistles: 16-bit audio, 4-watt amplified stereo sound, built-in stereo speakers, a double-speed CD-ROM drive, and output jacks for speakers and a microphone. The ProMedia Player is modular: Each part is also sold separately for $329 each. Already have or don't need sound on your laptop? Then just plug in the CD-ROM reader module. Sound quality was good enough, if a bit shrill at high volume. The CD-ROM drive offered acceptable playback of data, video, and audio.

Axonix ProMedia Player

EXP Computers CD940

Two Cards in One

If you impetuously purchased a portable CD-ROM drive and then realized you didn't have the sound to go with it, you can get a PCMCIA sound card that has a SCSI adapter built in—thus solving the eternal SCSI–sound card conflicts and saving a PC Card slot to boot.

New Media's **Multimedia Combo** offers 16-bit stereo sound with a high-performance SCSI adapter in a single Plug and Play card. The $499 PC Card device includes Microsoft Windows Sound System and CorelSCSI software for no-brainer installation of sound and just about any CD-ROM drive.

ROM to Travel

If you already have 16-bit sound integrated into your notebook, then CD-ROM is all you need to make it multimedia worthy. Your choice of

continued on next page

CHRISTINE ALICINO

MULTIMEDIA MAKEOVER: TURN YOUR NOTEBOOK INTO A SHOW MACHINE

continued from previous page
drives seems to expand on a monthly basis, too.

EXP Computers' $449 **CD940** is unique in its design: It has no power supply. Instead, the double-speed drive gets the little juice it needs from your notebook via a foot-long cable attached to a PC Card Type I. A 15-second installation procedure gets the 2.8-pound CD940 spinning quickly. It automatically switches off when not in use; that's no big deal, since it doesn't drain battery power.

NEC Technologies' $415 **MultiSpin 3Xp Plus** is the only

MultiSpin 3X Plus

triple-speed portable CD-ROM drive on the market. It transfers data at 500 kilobytes per second (K/sec) with an average access time of 240ms. (Most double speed drives average 300ms access times.) The MultiSpin weighs 4.6 pounds and is powered by an AC adapter or optional battery pack. It does not include the SCSI adapter card you need to connect it to a notebook, making it the most expensive CD-ROM solution we reviewed. While it installed to an NEC Versa notebook in less than a minute, it was troublesome to set up on non-NEC portables. If speed is of the essence, the MultiSpin 3Xp Plus may be worth the hassle.

Media Vision's $349 **Reno** Portable CD-ROM Player (MV0400SE) is the cheapest one available—*if* you already have a SCSI adapter for your notebook. But it's a "penny wise, pound foolish" solution. A flimsy plastic case brings the drive itself in at just 1.2 pounds (1.8 pounds with batteries). Unfortunately, you must always keep the battery pack attached—even when using the AC adapter—which makes the Reno inconvenient to haul around and assemble. The connection at the rear of the unit is wobbly at best. While this drive might be appropriate at the beach, it certainly would not exude a professional image in the executive conference room. And if you don't have a SCSI card to connect the Reno to your portable PC, add another $299 to the price.

Sony's **PRD-150** costs $499.95 but includes the necessary PC Card connection to hook up the double-speed drive to your notebook. Weighing less than a pound, it is powered

Microsolutions Backpack

Panasonic KXL-D720

by two AA batteries or an AC adapter. Like the Media Vision Reno, it comes with headphones and front-panel audio CD controls. The clamshell casing is also, alas, like Reno's, and made of unreinforced plastic. So what you save on space and weight, you lose in shock resistance, although its 300 K/sec data transfer rate is fast enough for most multimedia playback.

Panasonic boasts that its **KXL-D720** is the lightest CD-ROM drive available, and at half a pound it might be—if you didn't figure in the AC adapter or six AA batteries it needs to run. The $399 double-speed drive is bundled with a PC Card Type II SCSI connector. It sports a clamshell design, but its plastic feels a tad sturdier than that of its competition. Installation was effortless: In less than 5 minutes, my notebook became a multimedia pro.

Parallel Ports in a Storm

Face it—parallel ports are for printers. And since they require no configuring to use, they're convenient—but also slow: A printer does not need the quick, back-and-forth communication a CD-ROM drive demands from a computer's CPU. Still, wouldn't it be nice just to plug in a CD-ROM drive like a printer and get going immediately?

Micro Solutions' **Backpack 4X CD-ROM** provides a 250ms access time, amazingly fast for a parallel port connection. The $529, 3½-pound, AC-powered drive is solidly constructed and works with both standard and the newer, faster enhanced parallel ports. Installation with the included software takes less than a minute. A printer cable attaches to the throughput connector on the back of the drive.

While this cross section of add-ons is by no means comprehensive, it should give an idea of the ever-increasing choices available—and end the days of your portable being multimedia challenged.

Axonix Corp. 800/866-9797
Reader service no. 753

EXP Computers, Inc. 800/397- 6922
Reader service no. 754

Media Vision 800/845-5870
Reader service no. 755

Micro Solutions 800/890-7227
Reader service no. 756

NEC Technologies 800/632-4636
Reader service no. 757

New Media Corp. 800/453-0550
Reader service no. 758

Panasonic Communications & Systems Co. 800/742-8086
Reader service no. 759

Sony Electronics, Inc. 800/352-7669
Reader service no. 760

Zenith Data Systems 800/533-0331
Reader service no. 897

—Michael S. Lasky

CHRISTINE ALICINO

Aspen Universa CD
The CD-ROM drawer does not open far enough for easy disc insertion.

Aspen Universa CD

Let's face it: If you want to project a professional image, you simply can't afford to breeze into a client's office and beam proudly as your presentation plays—on a dual-scan screen. You might as well walk in with toilet paper stuck to your shoe.

Aspen Computer has taken some of the sting out of buying a notebook with an active-matrix display by equipping its Universa CD notebooks with screens that are slightly smaller (and less expensive) than the Toshiba, IBM, or Panasonic displays. The model I evaluated, for instance—with a DX2-66 processor, 9½-inch active-matrix color display, 8MB of RAM, and a 520MB hard drive—has a manageable list price of $3675.

Universa's active-matrix screen offered respectably crisp colors and hues. The unit's comparatively sluggish DX2-66 processor, however, caused video frames to freeze now and then, and at times fast movements in the video were jerky on playback. Even more troublesome than the subpar video was the Universa's poor sound quality.

The internal speakers produced a tinny sound that became easily distorted when the volume was increased. Given the Universa's 10.6-pound traveling weight—the second-heaviest notebook I evaluated—I doubt you'll want to lug a pair of external speakers as well.

The Universa's industrial design is well intended but unsuccessful in execution. The computer ships with a floppy drive built for either internal or external use; you can replace the internal CD-ROM drive with the floppy, or connect the floppy to an external port. And while physically swapping the two drives was no problem, the computer didn't recognize the floppy drive when it was installed. I had to fiddle with the config.sys file a bit before the floppy was accepted in its internal berth.

Another drawback is that the CD loading tray doesn't pull out far enough; to place a disc on the tray, you have to insert it at an awkward angle. In addition, if you don't remember to lock the tray in place with a switch, the computer won't recognize the CD-ROM drive.

Speaking of switches, the on/off switch, located on the top left side, practically takes two hands: one to secure the computer while the other moves the switch. This means you don't have to worry about the computer accidentally switching on in transit and wasting your battery. By the same token, though, you can kiss your fingernails goodbye.

Although the Universa's design quirks are not a huge problem, they certainly won't make your life on the road any easier. And when you factor in the notebook's inferior sound, spotty video playback, and hefty weight, it all adds up to a multimedia portable that, although decently priced for an active-matrix model, requires too many compromises.

(At press time, Aspen introduced an upgraded Universa CD notebook with a zippier DX4-100 processor and 10.4-inch screen for $300 more. A four-speed CD-ROM module also is available for $450 more.) *Aspen Computer, Inc., 800/472-3273, 716/626-0315* **Reader service no. 737**

JOHN GREENLEIGH

Toshiba Satellite Pro T2150CDT

Believe it or not, there *was* such a thing as a multimedia portable before the current wave of sleek notebooks. Toshiba's T6600C/CD, for example, had a 10.4-inch active-matrix screen, a graphics accelerator, a built-in CD-ROM drive, 16-bit stereo, internal speakers, a decent amount of memory, and a large hard drive. There were a few slight problems, however: It weighed 19 pounds, looked like a portable sewing machine, had no battery operation, and cost more than $7000.

I am so thankful that the same functionality now comes in more svelte proportions that it feels like sour grapes to find fault with Toshiba's latest entry in the field—but, alas, I do. First, though, let's consider the Satellite Pro's gold stars. The notebook has a comfortable traveling weight of 8.8 pounds. The internal CD-ROM drive

NOW HEAR THIS

While more notebooks are being equipped with built-in sound, the tinny tones issuing forth from their diminutive speakers do not enhance a multimedia presentation, let alone private listening. Clearly, you need external speakers with more resonance, and I found the right pair to travel with—the JBL Media 2. When upright, the 5-watts-per-channel speakers are L-shaped. A hinge allows them to lie flat in a carrying case. And they put out sound with enough oomph to carry across any boardroom. No doubt that's because they house separate 3-inch woofers and 1½-inch tweeters, plus a built-in subwoofer to carry the bass sounds usually lost by lesser speakers. The units ($159.95 a pair) also have an automatic sound-sensitive on/off switch with a power indicator light. *JBL Multimedia Division, 800/366-4525* Reader service no. 740 —M. S. L.

JBL Media 2

CHRISTINE ALICINO

Toshiba Satellite Pro T2150CDT It comes with a floppy drive, but it's external only.

is positioned conveniently, in the upper right corner, and the disc tray pulls out far enough so you can easily load a disc. At 5.33 hours (*without* the CD-ROM drive in use), the Toshiba's battery lasted the longest of the multimedia notebooks we tested. Best of all, the stereo sound issuing from the Toshiba's twin internal speakers was top-notch, capable of reaching high volumes without distortion.

Ultimately, however, the Satellite Pro was a disappointment. The DX4-75–powered computer played back Video for Windows files without much of a problem, save for occasional jerkiness. But QuickTime for Windows files suffered from some extreme synchronization problems. In a news clip from the CNN Time Capsule disc, for instance, Tonya Harding's words were always about 2 to 3 seconds behind her mouth movements; this, while perhaps poetic justice, does not help sell a multimedia presentation. Other CNN files produced similar results.

Meanwhile, the Toshiba's 10.4-inch active-matrix display suffered from poor contrast and color saturation. In fact, several people in the PC World Test Center were convinced it was a dual-scan screen. Given all that, the price of the model I evaluated—$3799—seems too high. After a few hours with the Satellite Pro, in fact, I felt twinges of nostalgia for that chunky Toshiba multimedia portable of yesterday. At press time Toshiba announced new 700C Series 90-MHz Pentium notebooks with 11.3-inch color displays, 16-bit audio, and optional quad-speed CD-ROM drives. *Toshiba America Information Systems, 800/334-3445, 714/583-3000* **Reader service no. 738**

PROJECTING THE RIGHT IMAGE: LCD PROJECTION PANELS

You can have an absolutely dazzling, knock-'em-dead, multimedia blitz of a presentation. But if those images aren't projected on a big screen with the sharpness and clarity they require, you might as well be standing there with handwritten paper flash cards.

Projecting high-quality images requires an LCD projection panel—typically a notebook-size, two-sided screen connected to your portable computer's external monitor port and placed on an overhead projector. None of these panels are cheap—from $2500 to $7000, depending on screen quality and their multimedia capabilities.

With that type of investment, it's all the more important to select a panel that produces a crisp duplicate image of what appears on your computer screen. The four key criteria for selecting an LCD projection panel are:

- **Portability.** Keeping down the panel's weight is as important as making sure it's easy to carry—particularly in combination with your other equipment.
- **Durability.** With repeated setup and disassembly, the panel needs to withstand constant handling.
- **Usability.** Not only does a panel need to project well, but it must be able to make your presentation an easy process. Extra technical hassles are the last thing you need when you're trying to make a good impression.
- **Features.** It should be able to output at least 256 colors—and ideally up to 16.8 million; screen resolution should equal what a monitor could handle—at least 640 by 480 and preferably up to 1024 by 768; it should be an active-matrix model, which offers crisper imaging than dual-scan; and it should be laden with multimedia capabilities (built-in stereo speakers, external ports for additional speakers, and inputs for VHS and broadcast reception).

Of course, all panels are dependent on the intensity of the light source in the overhead projector they are paired with.

PanelBook 550

My focus is on multimedia capability. Accordingly, I looked at midpriced panels from three leading vendors: In Focus Systems, nView, and Polaroid. I assessed how well these fairly sophisticated devices measure up to the four criteria. All models offered active-matrix, high-resolution display; multimedia sound and video output; and remote control operation. For the first three criteria, I ranked the models as Acceptable, Good, or Excellent.

PanelBook 550

In Focus Systems
800/294-6400
Reader service no. 749

By far the bulkiest of the three panels I used, the 5½-pound, $5799 PanelBook 550 cleverly stores its controls in a sliding drawer that even has a recessed compartment for its convenient remote control unit. The hardest part of setting up the PanelBook was figuring out how to open the drawer—and once I did, it was difficult to open it without leaving fingerprints on the screen. Installation took 5 minutes and consisted of plugging in the power cord and the connector cable to the computer's external monitor port. On-screen imaging from the 9.4-inch ac-

Panasonic V41 and IBM ThinkPad 755CD

With their crisp, vibrant, and large color LCD screens, high-speed DX4-100 processors, and various multimedia extras, the Panasonic V41 and IBM ThinkPad 755CD are the only notebooks of the current crop worth considering for professional multimedia needs. Of course, with their prices—$4599 for the V41, $6799 for the ThinkPad—no one but professionals with serious multimedia needs could justify buying them anyhow.

The Panasonic's 10.4-inch, active-matrix screen renders up to 65,536 gorgeous colors and yields superb contrast. Indeed, when placed beside the ThinkPad's high-quality, 10.4-inch, active-matrix screen (also capable of 65,536 colors), the Panasonic display was noticeably—though not dramatically—superior.

Video playback, for the most part, was smooth on both systems, with none of the fast-motion jitters or cursor disappearing acts I noticed on some other notebooks. But like the Toshiba, the V41 had sync problems matching audio with video in some QuickTime for Windows clips. The Panasonic played Video for Windows files from the Seinfeld platter without problems.

The ThinkPad, with a built-in video accelerator that optimizes .avi files, had a slight edge over the V41 when playing Video for Windows files at full screen. The difference in performance was

tive-matrix screen was crisp and sharp, and motion video projection was accurate with no ghosting or frame delay. Video ports for U.S. and international VCRs were well labeled, and the remote control selections—including a user-customizable button—gave me freedom of movement. The PanelBook 550 fits into an included thin cloth bag—a nice idea, but at $5800, it really needs its own protective carrying case. That'll cost you extra.

PORTABILITY: Acceptable
DURABILITY: Good
USABILITY: Good

nView Z115

nView Z115

nView Corp.
800/736-8439
Reader service no. 750

The sleek, $5495, 4.3-pound Z115 comes housed in its own soft-shell carrying case. The panel's slim profile is matched only by the skimpiness of its multilingual documentation. Despite the manual's brevity, I was still able to get the 8.4-inch active-matrix screen up and running quickly. Although the control panel is inconveniently placed on the front of the unit—and thus in direct line of an overhead projector's light beam—once it was set up I no longer had to fiddle with the buttons. The panel produced crisp imaging from VGA as well as NTSC and other video sources. The connector ports were well marked and all necessary cables included. While the Z115 does offer audio from a built-in speaker, I got much better sound using my own external speakers. The remote control was, unfortunately, annoying to install and use, so I didn't. Motion video projection—from sample Video for Windows files—appeared as crisp and sharp as they were on my notebook screen.

PORTABILITY: Excellent
DURABILITY: Excellent
USABILITY: Good

Polaview 3000

Polaroid Corp.
800/816-2611 ext. 970
Reader service no. 751

The $5995, 4.7-pound Polaview 3000 is packed with bells and whistles. The 8.4-inch active-matrix screen didn't miss a beat projecting still or moving images. Capable of handling about 16.8 million colors from a computer or any video source—and with all requisite ports clearly marked for quick setup—the panel is housed in a sturdy, high-impact plastic shell case. I didn't need the instruction book to figure out how to set up or use the remote control, which handles the on-screen mouse for truly free movement during presentations. A built-in stereo amplifier that connects to any audio source (including a microphone and external speakers) is a convenient plus. A "mask" feature let me hide my presentation screens until I was ready to reveal them. With the remote's easy-to-learn special effects, I was able to freeze, enlarge, or do an inverse view of the screen—on the fly.

Polaview 3000

The Polaview made me feel confident and in charge of my presentation. One downside: You need the remote control to power up the unit. If the remote's batteries run down, you can't use the system at all.

PORTABILITY: Excellent
DURABILITY: Excellent
USABILITY: Good

—M. S. L.

JOHN GREENLEIGH

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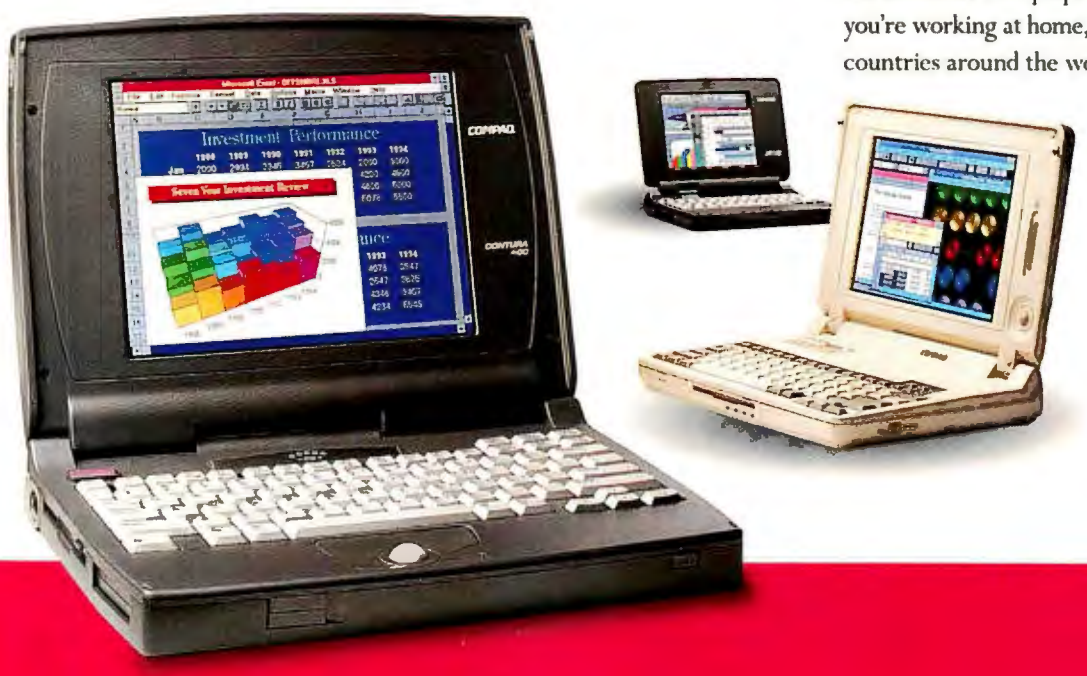

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CARRYING THE LOAD: AN OPEN-AND-SHUT CASE

Notebook computers are designed to travel, right? Then why do so few notebook manufacturers include a protective carrying case with machines that can cost more than $7000?

While the omission might seem like cheapskate marketing, it is also a blessing in disguise. Third-party luggage and accessory companies have leapt in to fill the void with a vast array of carrying cases—from traditional soft-sided leather and nylon attaché-style luggage to more pragmatic notebook backpacks and even packs with a neoprene wetsuit-like fabric that fits your notebook like, well, a wetsuit.

No matter what fabric or design you favor, some important considerations should figure in your buying decision:

- How much weight will the bag add to your carrying load? Three to six extra pounds might not seem much, but it certainly does if you have to schlep it to the last gate at the airport.
- Does the bag offer enough padding to protect your notebook in case you drop it? One of the single largest causes of notebook malfunctions is impact damage.
- Are there enough compartments to store accessories—power cord, multimedia speakers, files and office supplies for the road?
- Are the dimensions right or adjustable to fit your notebook?

With those criteria in mind, I cased out the cases that would let me pack my road warrior equipment safely, snugly, conveniently, and above all else, *lightly*.

Zeos is one of those rare computer vendors that actually includes a carrying case with many of its pricier notebooks. For the lower end models, bags are strictly à la carte. One of my favorites is Zeos's $59 case made of ballistic nylon (the almost indestructible material used in parachutes); while it is specifically designed to fit Zeos units, I was able to jam my larger ThinkPad in the well-padded compartment. The 3-pound nylon bag is not only the lightest of the briefcase-style cases, it also sports a sturdy, soft foam handle that makes carrying a breeze. For $118 you can buy a soft-sided 3.8-pound leather version that looks très executive but lacks its nylon sibling's firm handle. If your notebook is more than 8 inches long or 12 inches wide, the Zeos bags will be too small.
Zeos, 800/554-5220, **reader service no. 741**

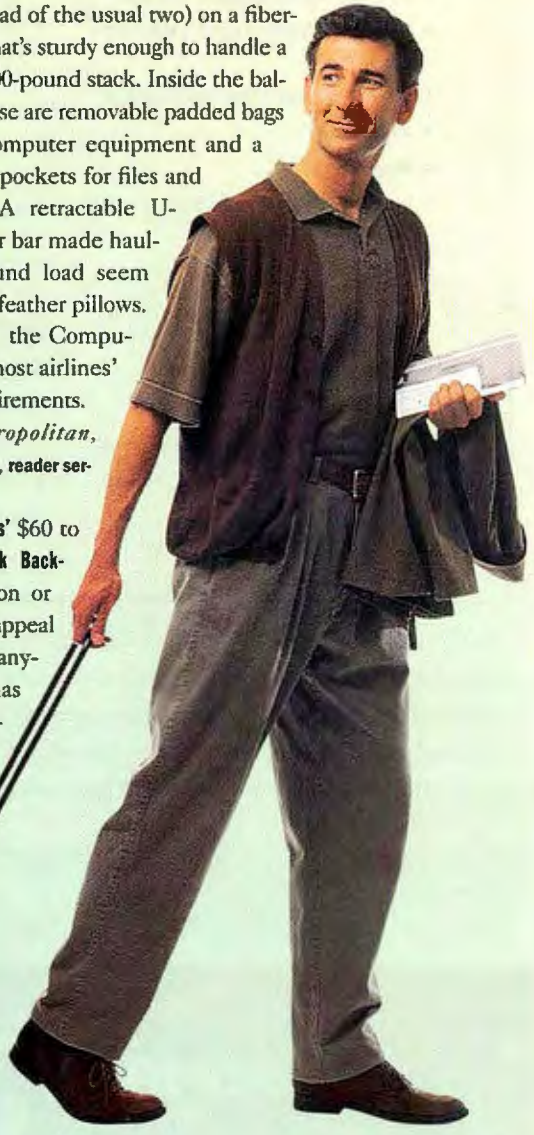
While the $42 **Lands' End Original Attaché** was not designed with computers in mind, it's a nice match for virtually *any* size notebook. For another $25, you can get a canvas computer case that slips around your portable like a padded glove and fits easily in the main compartment of the attaché (which comes in eight colors), along with all your accessories. The combined weight for the attaché and the computer case is 3.8 pounds, and when I'm not carrying a computer, I have lots of space for other things that I often tote around.
Lands' End, 800/356-4444, **reader service no. 742**

If your traveling road show includes a heavy or bulky entourage of equipment, try **Mascot Metropolitan's** $195 high-tech **Tutto CompuCruiser**. The 20-by-13-inch bag has four built-in wheels (instead of the usual two) on a fiberglass frame that's sturdy enough to handle a top-loaded 100-pound stack. Inside the ballistic nylon case are removable padded bags to protect computer equipment and a bevy of side pockets for files and accessories. A retractable U-shaped puller bar made hauling a 50-pound load seem like carrying feather pillows. To top it off, the CompuCruiser fits most airlines' carry-on requirements.
Mascot Metropolitan, 800/949-1288, **reader service no. 743**

Silicon Sports' $60 to $200 **Notebook Backpacks** (in nylon or leather) will appeal to just about anybody who has previously endured the aches and

Lands' End Original Attaché

Tutto CompuCruiser



CHRISTINE ALICINO

pains of lugging conventional shoulder-strap cases. The well-padded, hands-free bag has accordion dividers for paperwork and books and assorted pockets for accessories and other equipment. I like the feather-light 1.8-pound backpack because it camouflages the presence of an expensive computer.
Silicon Sports, 800/243-2972, **reader service no. 744**

Among the glut of conventionally styled notebook PC attachés, a couple stand out. The designers of **Targus** cases must actually *use* the bags they create—they offer comfort and practicality. The $119 **Universal Notebook Case** has all the expected (and needed) pockets for cords, AC adapters, floppy disks, accessories, papers, and other doodads. The squat 4-pound case fits not only a notebook but a personal printer or similar-sized device in separate padded, counterbalanced compartments.
Targus, 800/390-4622, **reader service no. 745**

ASU's $70 nylon **JT Madison Softside Portfolio Case** weighs 3.4 pounds and looks like an unobtrusive attaché. It's designed for frequent fliers by a company that specializes in luggage for airline flight crews. And while **Kensington's** $89 nylon **Notebook Traveler** weighs in at a relatively hefty 4.2 pounds (the leather one is a whopping 5.4 pounds), its sturdy foam-covered handle and roomy interior offer both carrying comfort and padded security for computers, accessories, and lots of files.
ASU, 800/756-1444, **reader service no. 746**
Kensington, 800/535-4242, **reader service no. 747**

So I'm walking through the PC World Test Center, carrying my notebook in **Coach's Organizer Brief**—the elite leathersmith's first attaché designed for mobile warriors—when a technician at a Pentium PC yells, "Hey, that's a smart-looking attaché you got there, can I try it out?" Imagine, someone wanting to *try out* a briefcase? But this is a Coach, a name synonymous with luxury, meticulous craftsmanship, and smart design. "Wow, that leather is just like buttah, isn't it?" Yes. "I bet it costs a lot." Yup, and at $488, the No. 532 *is* more an investment than a simple purchase. But given Coach's track record, it will last a lifetime. Although it looks particularly sturdy, it weighs just 4.6 pounds. Sleek zippered, ballistic-nylon–lined sections for papers and accessories and an adjustable padded compartment for any notebook help balance the load, making it easier to carry.
Coach Leather, 800/223-8647, **reader service no. 748 —M. S. L.**

Coach Organizer Brief

Silicon Sports BackPack

IBM ThinkPad 755CD A hard-to-open latch prevents easy access to the CD-ROM drive under the keyboard.

marginal but still perceptible. The Seinfeld clips looked almost real-time on the ThinkPad, as if I were watching a broadcast on a somewhat snowy TV screen.

If full-screen playback is important to you, take note: Panasonic is also shipping the CF-VEV411, a $649 MPEG plug-in module that lets you play files in any software-video format at full screen, without loss of resolution. (At press time, Panasonic also announced two new Pentium-based multimedia notebooks with suggested list prices from $6799 to $7399. These notebooks are additions to the Panasonic mobile multimedia line and are identical to the V41 except for their faster processors, the company said.)

As with the MPC notebook, you access the Panasonic's CD-ROM drive by lifting the keyboard and dropping a disc onto the drive's exposed optics (just hope a disc is *all* you drop onto the drive). The floppy drive shares the same slot as the main battery, so you can't have both CD-ROM and floppy drive access while running on batteries. Not that it would matter: PC World Test Center battery tests showed the Panasonic running out of juice after 2 hours and 18 minutes—and that's *without* using the CD-ROM drive.

The ThinkPad CD-ROM drive uses a more traditional CD loading tray. The drive's optics are visible on the tray, so once again, butterfingers beware. Like most major ThinkPad components, the drive is removed by lifting up the keyboard and pulling the drive from its slot. You'll have to remove the CD-ROM drive, in fact, if you want to use a floppy, as the two drives share a slot. I found the keyboard difficult to unlatch, and after a few openings and closings, one of the latch springs went *sproing*, making it virtually impossible to snap the keyboard entirely shut on the left side.

Overall, the ThinkPad has more multimedia bells and whistles than the other notebooks I looked at. Its internal speakers are excellent, although I did notice some distortion at higher volumes. There's also built-in video capture for importing still images and motion video into your presentation. The IBM Mwave digital signal processor offers a 32-voice MIDI synthesizer; a 14.4-kbps fax-modem; and computer telephony capabilities, including a full-duplex speakerphone, an answering machine, and voice messaging.

The ThinkPad has other advantages over the V41: It's lighter and smaller, and IBM's textured, rubber-tip TrackPoint III input device is easier to use than Panasonic's trackball. More important, the ThinkPad is backed by a 30-day money-back guarantee, on-site service, and 24-hour telephone support; the V41 is not.

The Panasonic V41 is a solid machine. But if you're willing to spend $4599 for it, consider spending more to invest in the feature-rich ThinkPad 755CD instead. IBM now offers a faster $7499 75-MHz Pentium version, the 757CX. *Panasonic Personal Computer Company, 800/742-8086* **Reader service no. 739** *IBM PC Company, 800/426-2968*

JOHN GREENLEIGH

FEATURES COMPARISON Sizing Up Multimedia Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	MPC CD-Book 875	Aspen Universa CD	Toshiba Satellite Pro T2150CDT	Panasonic V41	IBM ThinkPad 755CD
List price	$2458	$3675	$3799	$4599	$6799
CPU	DX4-75	DX2-66	DX4-75	DX4-100	DX4-100
Traveling weight (pounds) [1]	8.8	10.6	8.8	11.2	9
Width x depth x height (inches)	11 x 8.5 x 2.4	11.6 x 9 x 2.4	11.7 x 8.8 x 2.1	11.7 x 9.3 x 2.3	11.7 x 8.3 x 2.2
Installed/maximum RAM (MB)	8/32	8/64	8/32	8/32	8/40
Installed/maximum hard disk (MB)	340/524	520/810	500/500	450/680	540/810
CD-ROM drive	Philips	Philips	Toshiba	Matsushita	Teac
Floppy drive [2]	external	internal or external	external	internal, removable	internal, removable
PC Card slot (PCMCIA) Type II/III	2/1	2/1	2/1	2/1	2/1
Battery life (hours) [3]	1.75	2.33	5.33	2.3	3.2
Pointing device	VersaPoint II joystick pointer	TrackPoint	AccuPoint track point	trackball	TrackPoint III rubber tip
Display					
Type	color dual-scan	color active	color active	color active	color active
Screen diagonal (inches)	9.5	9.5	10.4	10.4	10.4
Maximum colors or gray shades	256	65,536	256	65,536	65,536
Maximum resolution on external monitor	1024 x 768 x 256	1024 x 768 x 256	1024 x 768 x 256	1024 x 768 x 256	1024 x 768 x 256
Audio					
Speakers	JSR	E-Tech	Toshiba	Matsushita	Matsushita
Watts per channel	2	4	4	2	.5
Hardware volume controls	function keys	dial	dial	dial	dial
Built-in microphone	●	●	●	○	●
Miscellaneous features	AT bus port for single-speed CD-ROM drive; 6 bundled CD titles	5 bundled CD titles; bundled utilities include Quick Restart	bundled utilities include MagicDisc and Finesse	external microphone	internal 14.4 data fax-modem; telephony with full-duplex speakerphone, voice messaging, 7 bundled CD titles
Service and support					
Warranty (years)	1	1 parts, 2 labor	3	3	3
Money-back guarantee (days)	30	10	determined by dealer	○	30
On-site service available	○	○	●	○	●
Turnaround time for service (hours)	72	72	48	24–72	48

[1] Includes battery, CD-ROM drive, AC adapter, and floppy drive.

[2] Floppy drives are 3½ inch with 1.44MB capacity; ThinkPads offer an optional 2.88MB-capacity floppy drive.

[3] For test methodology, see this month's system review.

The Dream Machine

If the top-notch ThinkPad *still* isn't perfect, then what would it take to make a flawless multimedia notebook system? I'd start with the MPC CD-Book 875's price tag ($2458); throw in the Panasonic V41's display and zippy CPU performance; and stir in the ThinkPad's easily exchangeable components, fluid video playback, telephony features, full-size keyboard and TrackPoint, and sleek black casing. I'd add some petite, internal Bose speakers—something powerful enough to knock every tchotchke off the shelf. I'd include speech-recognition hardware and software ("Computer, play Myst for me!"), and batteries that last at least 4 hours—with the CD-ROM drive in use, natch. And I'd want to use an internal CD-ROM, floppy, and hard drive *without swapping components*. Finally, I'd want this dream notebook to weigh 5 or 6 pounds, tops.

This dream is still a couple of years away. Until then, corporate travelers with a multimedia mandate have a choice: Spend $6799 on an IBM ThinkPad 755CD—or keep paying those chiropractor bills.

James A. Martin frequently covers CD-ROM hardware and software for PC World *and* Macworld. *Michael S. Lasky is a senior associate editor for* PC World.

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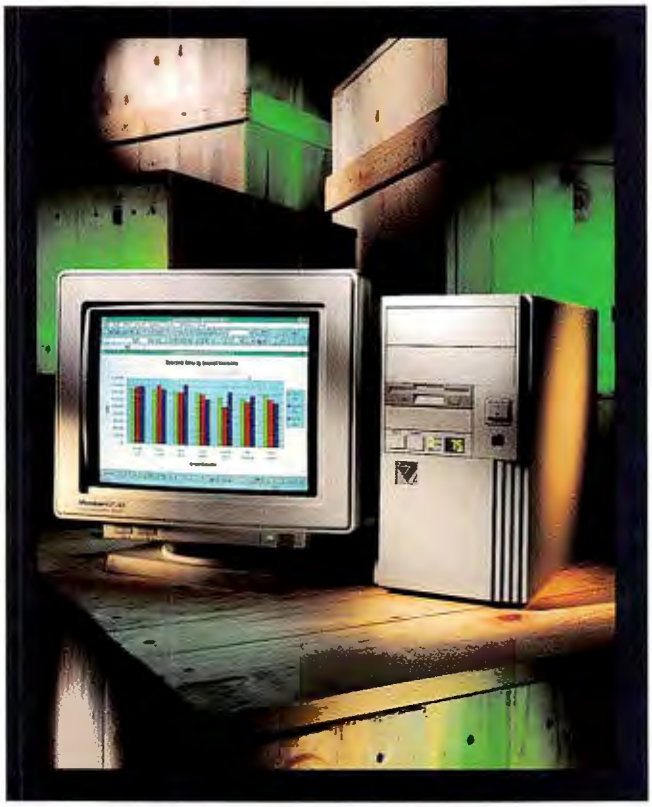
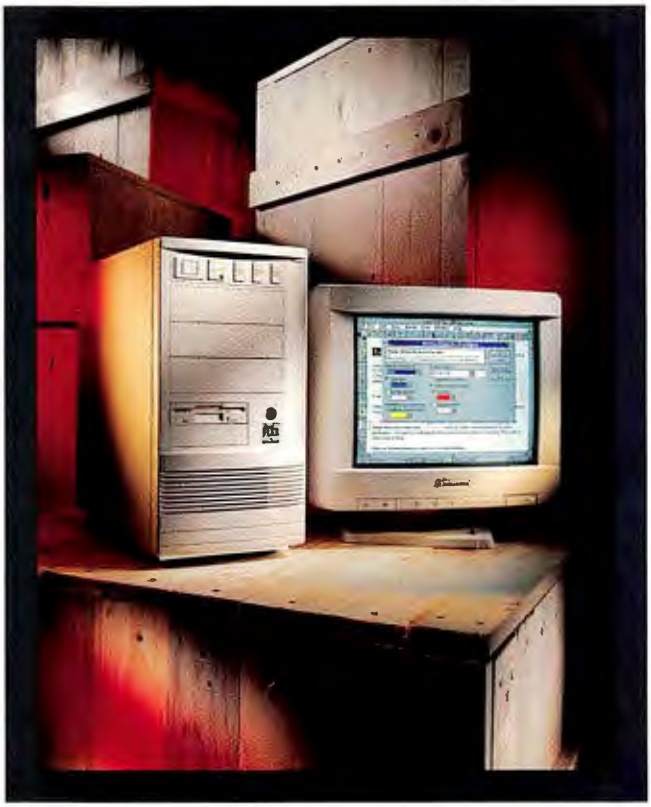
TOP 20 PCs

POWER FOR PENNY



TOP FOUR BUDGET SYSTEMS: 1. VEKTRON PCI P75



2. MICRO EXPRESS MICROFLEX-VL/80

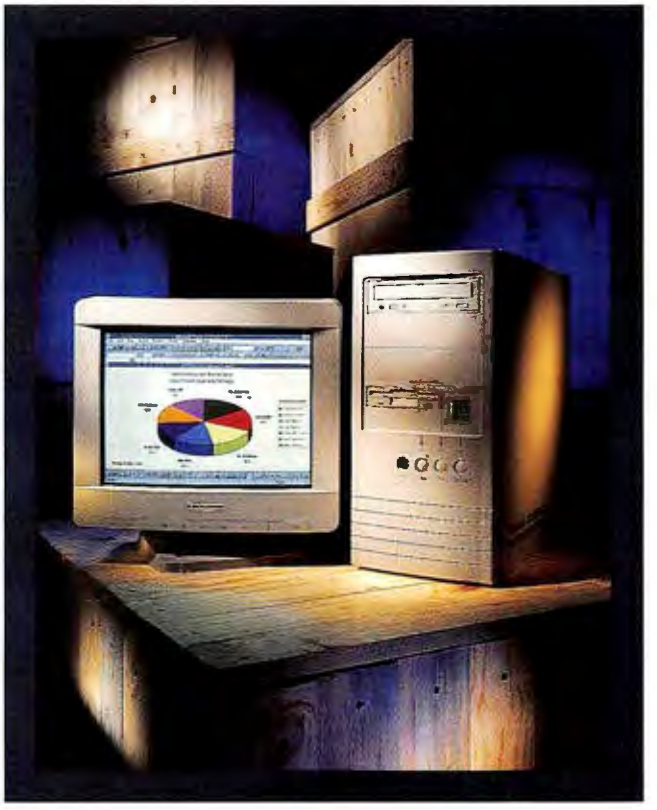
Only last year, getting a Pentium system was a distant dream for most of us. Pentium-60 PCs had just rolled onto the scene with great fanfare and steep $5000 prices. Sure, they were screamers, but who could afford them?

Times have changed. You can now get Pentium-level power for well under $2000. In fact, nearly every computer on our Budget Desktops Top 20 chart offers Pentium-60–level performance or better. A few of these bargain beauties even rival Pentium-90 desktops. And we're not talking about stripped-down boxes. Many of these PCs come with 15-inch monitors and 16MB of RAM, and most of them have 540MB or larger hard disks. You can even indulge in multimedia pleasures—half of these systems sport double- or quad-speed CD-ROM drives, sound cards, and speakers.

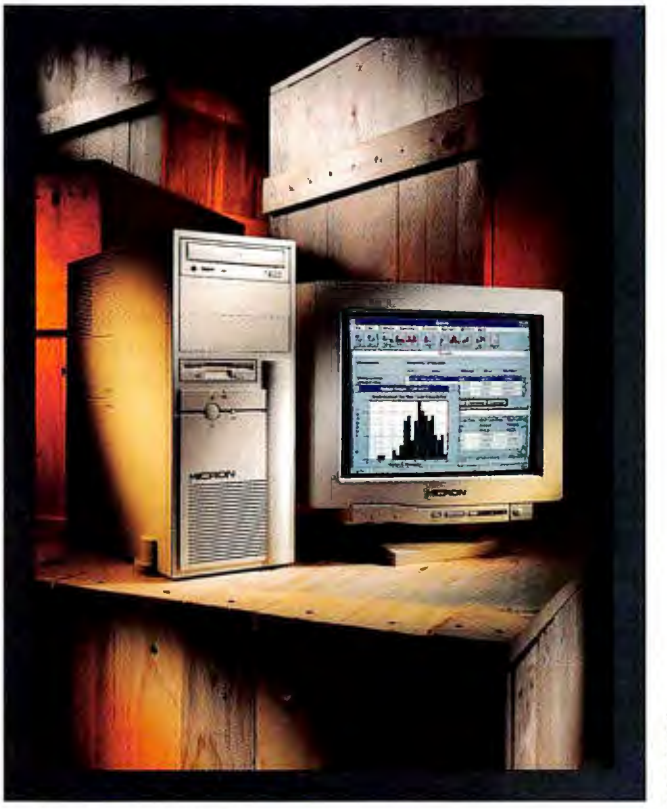
Note that we say *Pentium-level* power. Over half the PCs on the Budget Desktops chart are not based on Pentiums at all, but on a variety of 486 chips—mostly the 100-MHz DX4. However, DX4-100 systems using both Intel and AMD versions of that chip perform every bit as well as a typical Pentium-60 PC in common business applications and often cost noticeably less. It's no surprise many vendors have dropped Pentium-60 computers from their product lines in the last few months. In fact, the Pentium-75 PC may be the next star of the budget category. Four Pentium-75 desktops—including the top-rated

PINCHERS

Never has so much computing power cost so little. Over half of this month's Top 20 budget systems deliver Pentium-level performance for under $2000. By Bryan Hastings



3. MICRO EXPRESS MICROFLEX-PCI/104



4. MICRON 4100 MAGNUM

MARC SIMON

Vektron and the number five Best Buy Dimension XPS P75 from Dell—grace the Budget Top 20 this month.

Newcomer Vektron sent us the most stunning example of the kind of PC you can get on the cheap these days. Its PCI P75 minitower is very fast even for a Pentium-75 system. While it falls noticeably behind the Pentium-90s on our Power Desktops Top 20 chart, the PCI P75 delivers an awesome amount of performance for such a low-cost system. In fact, it keeps pace with a third of the Pentium-90 computers we have in our desktop PC database. The PCI P75 also has commendable features, including an 852MB hard disk and a 15-inch monitor. Would you believe a price of $1695? Even with minimal support policies, including a short one-year warranty and a brief 8 hours of tech support per weekday, this PC is still a sweet deal and easily earns the number one slot on our Budget Desktops chart this month. Even if you added a CD-ROM drive, you'd still pay less than $2000 for this system.

Close on the heels of the Vektron are two minitowers

THE PC WORLD TOP 20

POWER DESKTOPS PG. 210

BUDGET DESKTOPS PG. 218

NOTEBOOK PCs PG. 226

from Micro Express. Our number two system is the MicroFlex-VL/80. This Am486DX2-80 is light on components, but at $1383 it's your top choice if you want Pentium-60–level power at a rock-bottom price. True, the VL/80 doesn't keep up with the actual Pentium-60 PCs in our Budget Desktops Top 20 chart, but it's as fast as the typical Pentium-60 in our database. Plus, it's eminently upgradable. Coming in third is Micro Express's MicroFlex-PCI/104, based on AMD's AmDX4-100 CPU. It offers nearly the same performance as the VL/80, and it comes with 16MB of RAM and a double-speed CD-ROM drive—a superb deal for $1599.

If you want power, power, and more power, the Pentium-120s are where it's at. New last month, these top-speed systems took the Power Desktops Top 20 by storm. All but one of the Pentium-120 desktops we've reviewed so far, including this month's Everex Step SP/120, are in the Power Desktops Top 20, and three of them are Best Buys. Dell's Dimension XPS P120c and Micron's P120 Millennia, both reviewed last month, stay at number one and two. Both are awesome performers, especially the Micron, which is one of the fastest PCs on the planet. The Dell edges it out, however, even though it's considerably more expensive than the Micron ($4689 versus $3799). Why? The XPS P120c has superior features and a superb reliability record. In third place is Dell's Dimension XPS P90. Even though the top power systems offer more muscle and features than ever before, these hotshots are more affordable than you might think: The typical Top 20 power system costs well under $4000. Most of the Pentium-90 systems on the Power Desktops chart sell in the low $3000s.

The action is quieter on the notebook front, but we're seeing some motion there, too. Three new totables entered the Notebook PCs Top 20, including the top power Best Buy, Gateway 2000's Liberty DX4-100, a feisty little system with a very friendly $2979 price. The Liberty DX4-100 is the fastest unit available if you don't want to spend big bucks on a Pentium notebook—plus you get an amazing 6.8 hours of battery life, a removable 352MB hard disk, and a 10.4-inch dual-scan screen. Gateway managed to squeeze all this—along with an external floppy drive—into a slim 6.6-pound package measuring just a little over an inch thick. The Liberty is such a good deal, in fact, that it managed to keep Toshiba's classy T4900CT notebook out of the number one power spot. If you're looking for a first-class power note, however, and money is no object, we suggest you start your search with the T4900CT—it excels in every regard. One of the few notes to sport a Pentium-75 CPU, the T4900CT is every bit as fast as the top-rated Liberty, and it's decked out with a huge 810MB hard drive and beautiful 10.4-inch active-matrix screen that displays over 65,000 colors at once. Plus, Toshiba offers some of the best support you can find among purveyors of notebooks. You pay a premium for all this quality, though: Toshiba just slashed the price of the T4900CT by $940, but the unit still sells for a cool $6499.

The WinBook XP SX-33 Monochrome heads up the budget list for the third month running. If you can live with a monochrome screen and a small 260MB hard disk, this system is your best choice, thanks to a great $1739 price and the longest battery life (8.8 hours) we've ever seen. Another WinBook, the WinBook XP DX2-50 Monochrome, slides into the number two spot in the budget section of the Notebook PCs Top 20. Even though this $1799 unit is based on the DX2-50 processor, it's a near perfect twin of its SX-33–based sibling in terms of performance and features, and it has an excellent 6.8-hour battery life. Both of these WinBook models are extremely portable, weighing only 6.8 pounds, and both come with 14.4-kbps fax-modems.

The upshot? If you've put off buying a system during the last year, it's time to take another look at your budget. Whether you're searching for a desktop or a notebook, you can now get more power and features than ever in an affordable computer.

Bryan Hastings is a senior associate editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* PC World *staff members Michael Desmond, John Goddard, Anita Hamilton, Arden Hoffman, Rick Overton, and Melissa Riofrio and freelancer Geoffrey Coffey contributed to this article. Testing by Dave Casini, Ulrike Diehlmann, and Kirk Steers; research and support by Mike Salayko.*

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For more information about all products in this article, circle reader service no. 913.

HOW THE TOP 20s HELP YOU FIND THE RIGHT PC

Our monthly roundup of desktops and notebooks helps even the terminally technophobic quickly choose the best system for their needs. We examine all the aspects of a PC—performance, feature set, upgradability, reliability, and service and support—and compare the system not only to the other computers reviewed this month, but to all the systems we've reviewed in the past ten months that are still on the market. Every month we call vendors to get the latest prices for all the desktops and notebooks previously reviewed, and we note any configuration changes, such as larger hard disks or faster CD-ROM drives. Our database ranks have swelled to more than 300 computers—meaning we come up with the best of all the systems out there. *PC World*'s Top 20 charts are the only source you need to make a fully informed buying decision.

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"This straightforward 300 x 300 dots-per-inch model was our testers' top choice."

"Testers gave the OL400e high marks for its print quality for text (A-), its quiet operation (A) and performance (A-). And they really liked its...price."

— *Home PC 1/95*

"...speedy printing and good print quality in a compact package."

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— *Computer Shopper 3/94*

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— *PC Week 12/20/93*

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"...compact, sleek, and requires about as much desk area as an open magazine."

"...a lot of printer for the money."

"...low cost laser performance in a compact package..."

The OKIDATA a Division of Oki America, Inc.

OL400e

Personal Printer.

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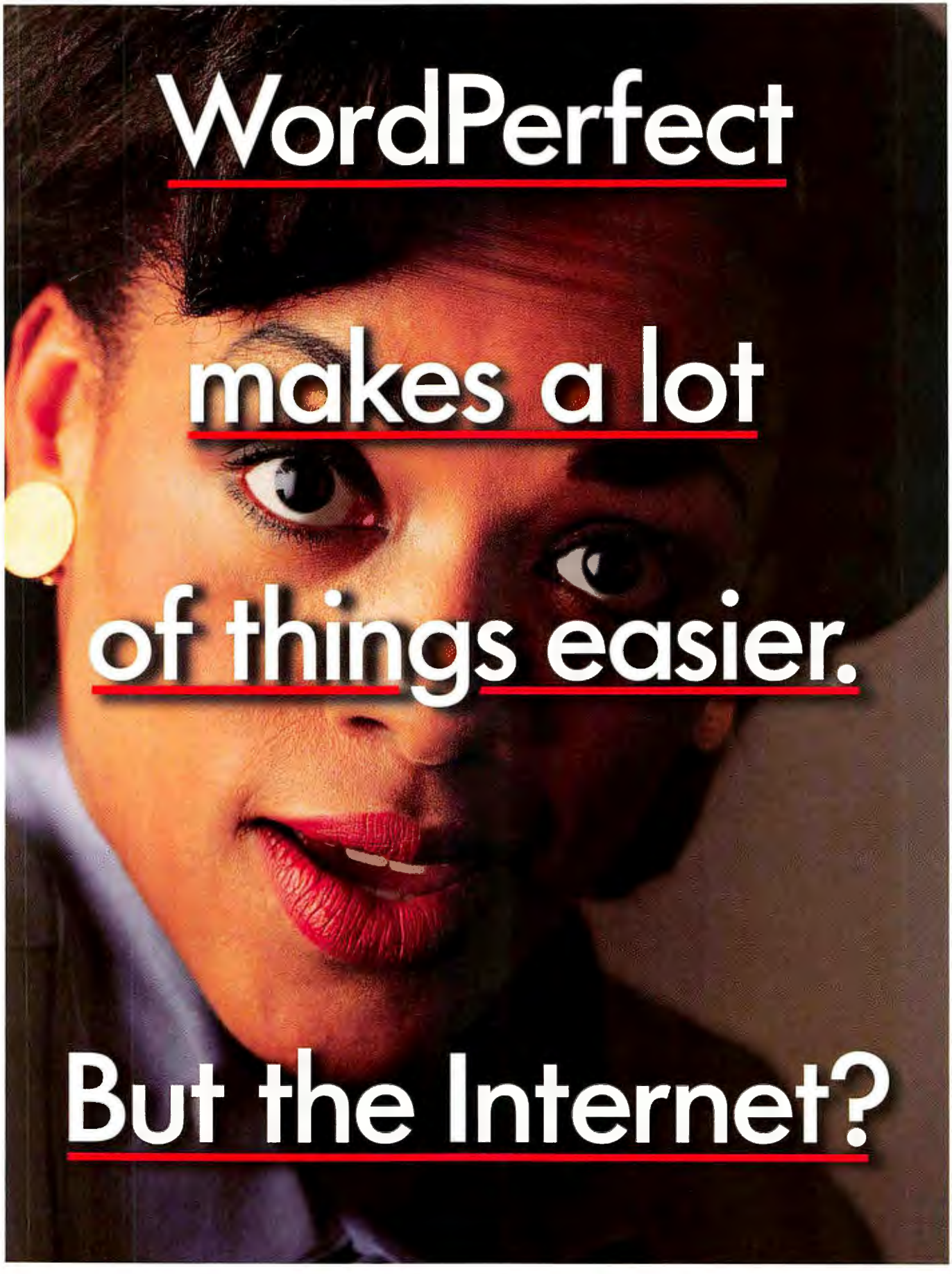

*WordPerfect Internet Publisher is not available in stores. Once you've purchased WordPerfect 6.1, you can download it free from your favorite on-line service, from our Internet server at http://www.novell.com or from the WordPerfect electronic bulletin board at 1-801-225-4414. Or call us at 1-800-861-2554 and we'll send you disks for a nominal fee. Internet Publisher only works with WordPerfect 6.1 for Windows and does not include an Internet connection.

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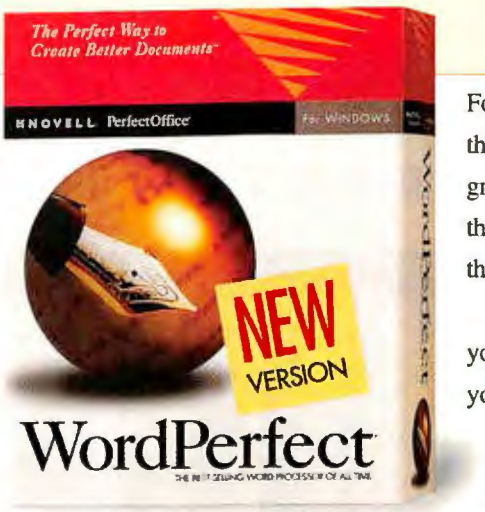

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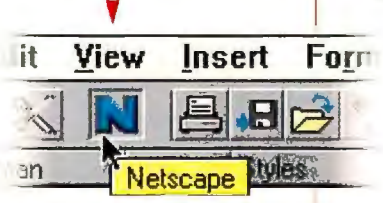

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THE TOP 20

PC WORLD POWER DESKTOPS

Dell Dimension XPS P120c
Superfast PC has it all.

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P120c	1	2	June 95	81	102	71/73	$4689	Pentium-120	16	1624
2 Micron P120 Millennia	2	2	June 95	80	111	65/69	$3799	Pentium-120	16	1278
3 Dell Dimension XPS P90	4	5	Mar 95	78	83	71/73	$3128	Pentium-90	16	1083
4 AT&T Globalyst 630	—	1	current	78	93	75/67	$4007	Pentium-100	16	1084
5 HP Vectra VL3 5/120	3	2	June 95	78	90	78/73	$3700	Pentium-120	16	853
6 Dell OptiPlex XMT 590	6	7	Jan 95	76	82	71/75	$3223	Pentium-90	16	1083
7 Gateway 2000 P5-120	5	2	June 95	76	113	58/61	$4299	Pentium-120	16	1624
8 Dell OptiPlex XMT 5100	9	3	May 95	76	83	71/75	$4049	Pentium-100	16	1083
9 NEC Ready 9510	—	1	current	76	80	64/71	$3006	Pentium-90	16	1278
10 Digital Celebris XL590	11	3	May 95	75	86	75/73	$5300	Pentium-90	16	1083
11 Micron P90 PowerStation	7	6	Feb 95	75	86	65/69	$3198	Pentium-90	16	1080
12 Gateway 2000 P5-100XL	8	2	June 95	75	111	58/61	$3799	Pentium-100	16	1083
13 Dell Dimension XPS P100	10	5	Mar 95	75	77	71/73	$3912	Pentium-100	32	1083
14 Austin PowerPlus 100	—	1	current	74	101	[2]	$3899	Pentium-100	16	1083
15 Vektron Ultimate Power Station P100	—	1	current	73	100	[2]	$4040	Pentium-100	16	2147
16 Everex Step SP/120	—	1	current	73	92	[2]	$3395	Pentium-120	16	1278
17 NEC PowerMate VP75	12	2	June 95	72	69	64/71	$2924	Pentium-75	16	1278
18 Quantex QP5/90W-3	13	5	Mar 95	72	79	58/67	$2997	Pentium-90	16	1083
19 USA Flex PT90 MidTower	14	3	May 95	72	84	[2]	$3750	Pentium-90	16	1083
20 Austin Power System 90	21	8	Oct 94	72	83	[2]	$3402	Pentium-90	16	1057

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

2 Micron P120 Millennia
White-hot speed.

5 Dell Dimension XPS P90
Perennial Best Buy PC.

4 AT&T Globalyst 630
Nice features, well supported.

6 HP Vectra VL3 5/120
Highly reliable system.

	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	17"/.26	800/613-3355	3241	615	It's pricey, but this powerhouse rises to the top with great hardware, reliability, and service.
	4X	ISA, PCI	15"/.28	800/223-6571	3242	616	Fastest Best Buy system comes with an attractive price and generous features.
	4X	ISA, PCI	15"/.28	800/613-3355	3202	617	Longtime Best Buy boasts strong speed, great support, and lots of features for a good price.
	4X	ISA, PCI	17"/.27	800/447-1124	3252	618	Swift, with big monitor and strong service and support.
	2X	ISA, PCI	15"/.28	800/752-0900	3243	619	Despite slow Pentium-120 performance, HP's well-designed desktop still garners a Best Buy.
	4X	ISA, PCI	15"/.28	800/613-3355	3173	620	Excellent reliability and service help take corporate version of Dimension Pentium-90 to no. 6.
	4X	ISA, PCI	17"/.26	800/846-2000	3244	621	Fastest PC ever tested. Spacious tower system has jumbo hard disk and large monitor.
	4X	ISA, PCI	15"/.28	800/613-3355	3222	622	Good expandability and support policies recommend this corporate-minded desktop.
	4X	ISA, PCI	15"/.28	800/632-4636	3253	623	Multimedia and telephony make this desktop excellent for home and business offices.
	2X	ISA, PCI	17"/.26	800/722-9332	3223	624	Very good performance and large monitor from a highly reliable vendor—but it's pricey.
	2X	ISA, PCI	15"/.28	800/223-6571	3184	625	Fast multimedia system with a 1GB hard drive at a fair price.
	4X	ISA, PCI	17"/.25	800/846-2000	3245	626	One of the fastest PCs you can buy, and it's loaded with features.
	4X	ISA, PCI	15"/.28	800/613-3355	3203	627	The 100-MHz version of third-ranked Best Buy runs slower than expected, and it's a bit pricey.
	4X	ISA, PCI	17"/.26	800/752-1577	3254	628	Fast compact system comes with excellent peripherals.
	4X	ISA, PCI	17"/.26	800/725-0026	3255	629	A tad expensive, but speedy and decked out, including a giant 2GB hard disk.
	—	ISA, PCI	17"/.28	800/821-0806	3256	630	Inexpensive but slow for a Pentium-120. Has 17-inch monitor but no multimedia components.
	4X	ISA, PCI	15"/.28	800/632-4636	3246	631	Slowest system on this chart, but also the least expensive, and from a reliable vendor.
	2X	ISA, PCI	17"/.26	800/896-4898	3200	632	Low-cost system with a big monitor; slow performance in this company.
	4X	ISA, PCI	17"/.26	800/872-3539	3224	633	Home and multimedia powerhouse with quad-speed CD-ROM drive and big monitor.
	4X	ISA, PCI	17"/.28	800/752-1577	3142	634	Snappy Pentium-90 climbs back onto the Top 20 after price cut.

advance (The Top 20 Flash Report, $9.95; available June 21). 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 Power Desktops

PENTIUM-100 PCs BURST ONTO THE TOP 20 scene four months ago, and P-120s just last month. Now these systems occupy over half the Power Top 20 chart, and nearly all our power Best Buys are based on one of these two chips. Pentium-90 PCs have had their heyday on the power chart; it shouldn't be too long before cost-conscious buyers start adding Pentium-90 computers to their shopping lists. In fact, half a dozen Pentium-90 systems we've tested sell for less than our budget category's price ceiling of $2250.

The top power desktops these days are packing stunning peripherals. Massive 1GB hard drives and 16MB of RAM are the norm, and chances are good that the PC comes with a 17-inch monitor. Half of these powerhouses also come with high-quality multimedia capabilities, including quadruple-speed CD-ROM drives, 16-bit Sound Blaster–compatible sound cards, and speakers.

1 Dell Dimension XPS P120c

REVIEWED: June 1995

PROS: Excellent performance, 1624MB hard drive, 4MB 128-bit VRAM PCI graphics card

CONS: No free SIMM sockets, one-year warranty, seven-day repair turnaround, high price

Although pricey at $4689, this Pentium-120 minitower comes loaded with features, including 16MB of RAM, a 17-inch monitor, a huge 1624MB hard disk, a quadruple-speed NEC CD-ROM drive, a sound card, and speakers. Also, it's one of the speedier Pentium-120 PCs available—one of the fastest PCs you can buy. Readers praise Dell's record for service and reliability.

2 Micron P120 Millennia

REVIEWED: June 1995

PROS: One of the fastest systems tested, 1278MB hard drive, quadruple-speed CD-ROM drive

CONS: One-year warranty

Only the Gateway 2000 P5-120 outperforms the Pentium-120 Micron Millennia. For under $3800, the Millennia packs a large hard drive, 16MB of Extended Data Out (EDO) RAM, a 2MB 64-bit Diamond Stealth PCI graphics card, and a complete multimedia setup, including a fast quadruple-speed CD-ROM drive. Also, according to our ongoing fax-back survey, Micron gets high praise from our readers for its service record.

3 Dell Dimension XPS P90

REVIEWED: March 1995

PROS: Fast Pentium-90 performance, 1083MB hard drive, 4MB 128-bit VRAM PCI graphics card

CONS: One-year warranty, seven-day turnaround on repairs

Yet another price cut—to $3128—keeps the Dimension XPS P90 minitower on our Best Buy list. The system includes a 15-inch monitor, 16MB of RAM, and a quadruple-speed CD-ROM drive. Respondents to our Reliability and Service Monitor rave about Dell's reliability and support.

4 AT&T Globalyst 630

NEW THIS MONTH

PROS: Very fast, great reliability record, 17-inch monitor

CONS: Documentation leaves the novice behind

AT&T's Globalyst 630 enters our Top 20 with a bang, rising high to a spot on our Best Buy list for power desktops. The $4007 price is high, but it buys you a superfast, richly featured Pentium-100 PC from a company with one of the best reputations for reliability.

AT&T

Inside the midsize tower case you'll find a husky 1084MB hard drive and a fast quadruple-speed CD-ROM drive. A sound card and speakers make this a complete multimedia PC. A 2MB VRAM graphics subsystem provides a high 100-Hz refresh rate at 800 by 600 and also offers 1280 by 1024 resolution—a good match for the system's 17-inch monitor. The Globalyst also comes with a pair of unique communications applications. One is Message Flash, a program that lets you send brief messages to alphanumeric pagers from your PC. The other is Vistium Share Software, a real-time teleconferencing product. The supplied 14.4-kbps fax-modem does the legwork for both.

The AT&T Globalyst 630 offers plenty of room to grow, with three free drive bays and six free slots, including three for PCI. And the company backs the unit with a three-year warranty and around-the-clock toll-free tech support. Readers responding to our Reliability and Service Monitor rate the company extremely highly for system reliability and give it high marks for service as well. The only drawback to this machine is the manuals, which are sparse on illustrations and simple explanations. Even so, the AT&T Globalyst 630 is an outstanding package and well deserves its Best Buy status.

5 HP Vectra VL3 5/120

REVIEWED: June 1995

PROS: Excellent design, top-ranking service and support, good price

CONS: Graphics card memory maxes out at 2MB, performs like a quick Pentium-100

At an attractive $3700 price, Hewlett-Packard's fast Pentium-120 PC comes with 16MB of RAM, an 853MB hard disk, and a double-speed CD-ROM drive. The Vectra VL3 5/120's smart design and stellar service and reliability ratings help make it a Best Buy.

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- Acer, #801
- Apple, #805
- AST, #807
- AT&T (NCR), #808
- Compaq, #811
- Compaq Laptops, #843
- CompuDyne, #813
- Comtrade, #814
- Dell, #817
- Digital (DEC), #816
- DTK, #818
- Gateway 2000, #821
- Hewlett-Packard, #822
- IBM, #824
- IBM Laptops, #844
- Insight, #825
- Leading Edge, #826
- Micron, #828
- NEC, #829
- Packard Bell, #830
- Pionex, #831
- Quantex, #845
- Tandy, #834
- Toshiba Laptops, #846
- VTech, #838
- Zeos, #842

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- Multimedia, Step by Step, *2 pgs, $3.95 #402*
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6 Dell OptiPlex XMT 590

REVIEWED: January 1995

PROS: Terrific Pentium-90 performance, nice-size 1083MB hard drive, three-year warranty

CONS: Seven-day wait on service center repairs is much longer than competitors' turnarounds

7 Gateway 2000 P5-120

REVIEWED: June 1995

PROS: The fastest desktop PC we've ever tested, 1624MB hard drive, 17-inch monitor, quadruple-speed CD-ROM changer, sound card with wave-table recording and playback

CONS: High price, no specified repair turnaround policy, sparse documentation

8 Dell OptiPlex XMT 5100

REVIEWED: May 1995

PROS: Top-notch Pentium-100 performance, three-year warranty, ample 1083MB hard drive

CONS: Unusually long seven-day turnaround on service center repairs

9 NEC Ready 9510

NEW THIS MONTH

PROS: Good Pentium-90 performance, multimedia and telephony features, top-notch service record according to our readers

CONS: Cluttered interior, 1MB graphics memory limits available resolutions

Looking for a well-stocked, affordable power PC? The Pentium-90 NEC Ready 9510 is an excellent option. This $3006 minitower comes well versed in the fundamentals, including 16MB of RAM and a large 1278MB hard drive, and it cruised through our benchmarks slightly ahead of a typical Pentium-90 PC. But the Ready 9510 really gets down to business with a telephony card that combines voice mail, 16-bit sound, 14.4-kbps fax and data communications, and voice mail. This system also includes a fast quadruple-speed CD-ROM drive, speakers, and a microphone. To top it off, NEC bundles Microsoft Encarta '95 and Intuit's Quicken.

NEC

True, the NEC Ready 9510 misses a beat here and there. Its beautiful 15-inch NEC XV15 monitor is ill served by the limited 1MB integrated graphics subsystem—we recommend you get 2MB of graphics RAM. Also, expandability is just okay, with four free slots and three free drive bays. Still, there's much to recommend this reasonably priced power system, including NEC's top-notch service and support. While toll-free technical support is available 11.5 hours per day weekdays only, you get a long three-year warranty, excellent documentation, and one year of free on-site service. Best of all, the company has done very well in our reader fax-back survey, with above-average marks in system reliability and some of the highest service marks in the business.

In short, if you need to set up shop, you can't go wrong with the NEC Ready 9510. Its strong performance, solid price, and intriguing set of features make it a great home or office tool.

10 Digital Celebris XL590

REVIEWED: May 1995

PROS: Fast, capable of accepting a second Pentium-90 CPU, 1083MB hard drive

CONS: Price recently reduced to $5300, but it's still quite high for a Pentium-90 system

11 Micron P90 PowerStation

REVIEWED: February 1995

PROS: Excellent Pentium-90 performance, 512K secondary cache, 1080MB hard disk

CONS: One-year warranty is not that competitive today as a standard offering

12 Gateway 2000 P5-100XL

REVIEWED: June 1995

PROS: Scorching performance, 1083MB hard drive, 17-inch monitor, quadruple-speed CD-ROM drive, 64-bit PCI graphics card, 14.4-kbps fax-modem with voice mail

CONS: No free SIMM sockets, no established repair turnaround policy, manuals lack detail

13 Dell Dimension XPS P100

REVIEWED: March 1995

PROS: Reasonable price for Pentium-100 with generous 32MB of RAM, 1083MB hard drive, 4MB 64-bit VRAM PCI graphics card

CONS: Still a bit pricey, not that fast for a Pentium-100, one-year warranty

14 Austin PowerPlus 100

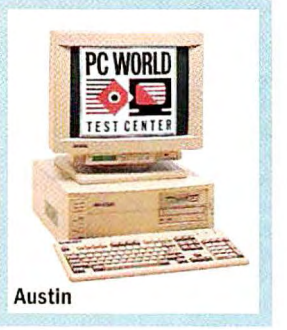
NEW THIS MONTH

PROS: Superfast, 17-inch monitor, 1083MB hard drive, great graphics, very good support

CONS: Scant documentation

Looking for a power system with real muscle? The Austin PowerPlus 100 comes with a reasonable $3899 price, and it's an uncompromising powerhouse for those who want a desktop with the best of everything. By performance standards the PowerPlus is tops, besting nearly every Pentium-100 we've seen and placing respectably among the handful of P-120s we've tested so far.

Austin complements the desktop's Pentium-100 processor with 16MB of RAM and a spacious 1083MB hard drive. The graphics are guided by a 4MB 32-bit Stealth 64 VRAM graphics card. Sitting atop the compact desktop case, the 17-inch programmable monitor from Smile International offers a generous viewable area of 15.8 inches and is capable of 76-Hz refresh rates at 1024 by 768 resolution (for a review, see "Big Screens," April 1995). For fast Net surfing or snappy remote-control communications, Austin packs the U.S. Robotics 28.8 Sportster fax-modem, which cruises along at 28.8 kbps. Multimedia offerings include a Toshiba quad-speed CD-ROM drive, a 16-bit sound card, and a pair of external Jazz speakers. The PowerPlus 100 also comes with one of the better software bundles we've seen, includ-



Austin

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ing Microsoft Office as well as some reference works and games, such as Compton's Encyclopedia and Chess Master Turbo 4000.

Expandability is okay, considering this compact is already pretty loaded. The PowerPlus 100 comes with three free expansion slots and three free drive bays. An impressive warranty includes three years of coverage, 24-hour tech support available seven days a week, and a year of free on-site service.

The verdict? This is not a PC for the budget-minded buyer. But for those who need a complete power desktop, the Austin PowerPlus 100 is one of the most attractive systems you can find.

15 Vektron Ultimate Power Station P100

NEW THIS MONTH

PROS: Superspeedy performer, huge 2GB hard drive, fast quadruple-speed CD-ROM drive

CONS: A bit pricey, one-year warranty, cable clutter, so-so support policies

The $4040 Vektron Ultimate Power Station P100 should dazzle even the most jaded PC buyer. Not only does it outshine the average Pentium-100 system, but it's also as fast as most Pentium-120 PCs we've seen. This unit's 16MB of RAM certainly contributes to its amazing speed, and the whopping 2147MB Seagate SCSI hard drive should handle your storage needs for some time to come. The PC also has a built-in SCSI port.

Vektron

The Vektron's vast hard disk capacity and great graphics performance make it an alluring system for graphic artists. The 2MB ATI Graphics Pro Turbo accelerator is one of the fastest boards we've ever tested, and it lets you view flicker-free images at resolutions up to 1280 by 1024 on the unit's 17-inch monitor. A fast quadruple-speed SCSI CD-ROM drive enhances the loading of CD-ROM–based clip art and applications. The system lacks some multimedia features, however—you need to spend another $150 or so if you want a sound card and speakers.

The expansion options on the Ultimate Power Station are quite good. This tower has five free drive bays and five free slots, including two PCI slots. However, Vektron's support policies could use some punching up. The company offers a short one-year warranty and brief 8-hour-a-day, weekday-only tech support. But you do get a 30-day money-back guarantee, and on-site service for one year is available for $50.

If you crave a feature-packed system, the Vektron Ultimate Power Station P100 should be on your short list. Its huge hard disk, fast CD-ROM drive, large monitor, and speedy accelerator card will please many a power user.

16 Everex Step SP/120

NEW THIS MONTH

PROS: Excellent performance, 17-inch monitor, three-year warranty

CONS: No multimedia

Everex successfully throws its hat into the Pentium-120 ring with the Step SP/120, a strong value in a power desktop. As you might expect, this PC is very fast, although it's no faster than some of the Pentium-100 systems we've seen. Yet its $3395 price is on a par with that of a typical Pentium-90 unit. You get 16MB of RAM, 256K of secondary cache, a big 1278MB hard drive, and an attractive, spacious 17-inch monitor. The 64-bit ATI Graphics Pro Turbo card, equipped with 2MB of VRAM, displays images at resolutions up to 1280 by 1024 on the big screen—terrific for graphic artists and others who need to see fine detail on screen. Both the monitor and the graphics card support a reasonably fast refresh rate of 72 Hz.

Everex

Where the Everex falls short is in multimedia components—there aren't any. But the Step SP/120 gives you lots of room to grow. This minitower comes with six free drive bays and five free slots, including two for PCI; you can increase the secondary cache to 1MB; and there's plenty of room to add RAM. No need to worry about getting adequate support for this powerhouse, either. Everex backs its computer with a lengthy three-year warranty, free on-site service for the first year, and a three-day turnaround on factory repairs, as well as the usual fax and BBS support. Lack of weekend tech support is the only surprise—we're used to seeing this from the better-known vendors.

The Everex Step SP/120 has plenty to tempt savvy buyers. The system is fast, it has quality components, and it doesn't cost a fortune. You'll have to pay extra for the multimedia upgrade, and the lack of weekend support can be limiting, but this is an excellent package for the money.

17 NEC PowerMate VP75

REVIEWED: June 1995

PROS: Good Pentium-75 performance, 1278MB hard drive, quadruple-speed CD-ROM drive, three-year warranty, one-day repair turnaround

CONS: Poor access to SIMM sockets, pricey for a Pentium-75

18 Quantex QP5/90W-3

REVIEWED: March 1995

PROS: 1083MB hard drive, 17-inch monitor, CD-ROM drive, 14.4-kbps fax-modem

CONS: One-year warranty is a short standard offering these days, slight cable clutter inside

19 USA Flex PT90 MidTower

REVIEWED: May 1995

PROS: Impressive multimedia setup with quadruple-speed CD-ROM drive and wave-table MIDI sound card, large 17-inch monitor, very fast 4MB VRAM graphics controller

CONS: At $3750, a bit pricey for a Pentium-90; some cable clutter inside case

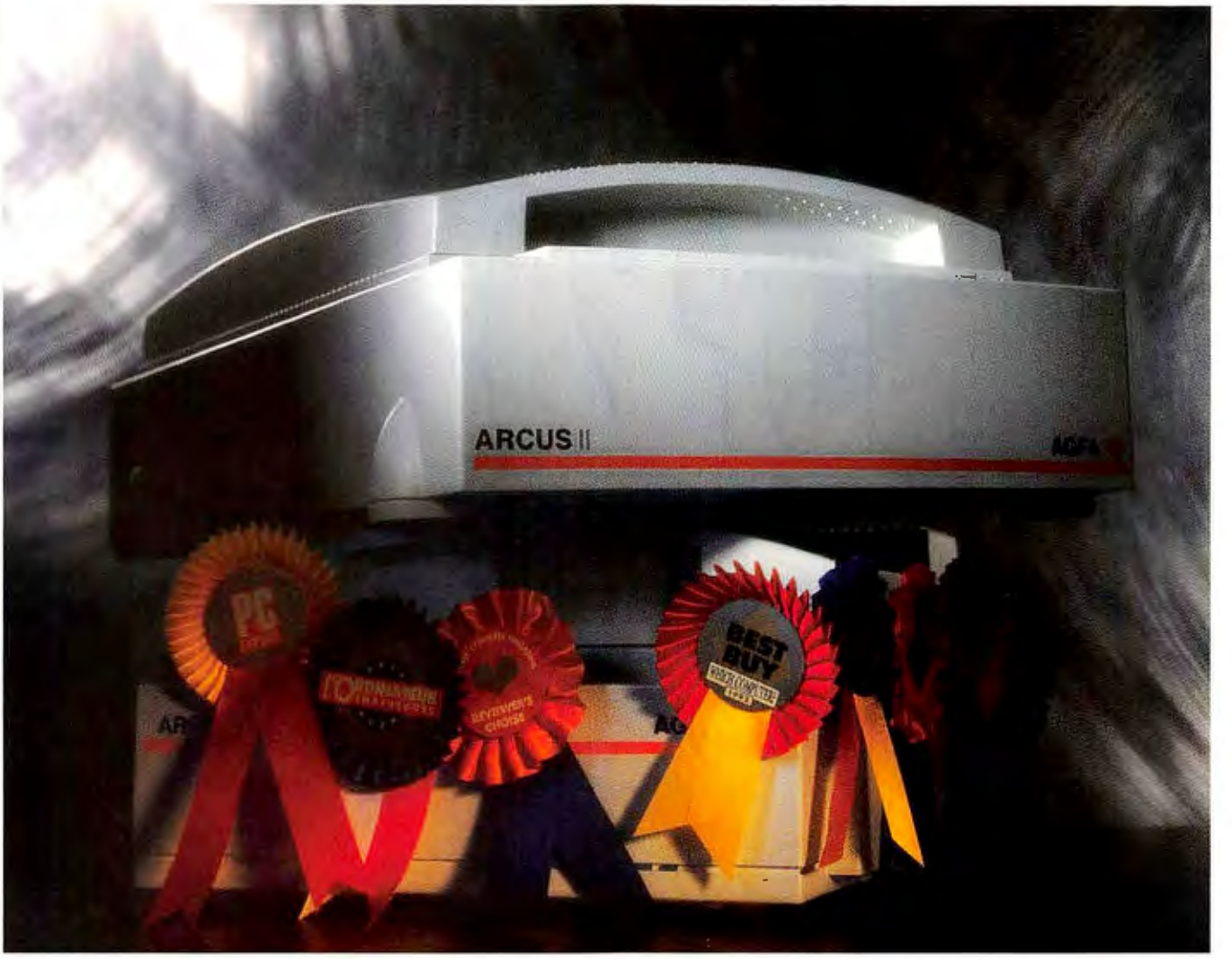
20 Austin Power System 90

REVIEWED: October 1994

PROS: Price cut to $3402 and quadruple-speed CD-ROM drive help it crack the Top 20 again

CONS: None

Anderson & Lembke, Inc.



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THE PC WORLD TOP 20

BUDGET DESKTOPS

1 **Vektron PCI P75**
Great performer.

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 BEST BUY **Vektron PCI P75**	–	1	current	76	74	[2]	$1695	Pentium-75	8	852
2 BEST BUY **Micro Express MicroFlex-VL/80**	2	5	Mar 95	75	57	[2]	$1383	Am486DX2-80	8	425
3 BEST BUY **Micro Express MicroFlex-PCI/104**	–	1	current	74	55	[2]	$1599	AmDX4-100	16	540
4 BEST BUY **Micron 4100 Magnum**	1	10	Aug 94	74	62	65/69	$1799	DX4-100	8	425
5 BEST BUY **Dell Dimension XPS P75**	4	3	Mar 95	74	62	71/73	$2163	Pentium-75	8	545
6 Netis N575	–	1	current	74	72	[2]	$2115	Pentium-75	8	1278
7 PerComp 4100VIP	–	1	current	73	60	[2]	$1849	AmDX4-100	8	850
8 Gateway 2000 P5-60	6	3	Oct 94	73	62	58/61	$1999	Pentium-60	8	731
9 Polywell Poly 486-80VB	3	6	Feb 95	73	63	[2]	$1695	Am486DX2-80	8	540
10 Netis N566	9	2	Mar 95	72	72	[2]	$1935	Pentium-66	8	732
11 Diamond DT DX4-100 VIP	5	5	Mar 95	72	60	[2]	$1699	DX4-100	8	546
12 DFI Diamond 66	19	4	Feb 95	72	50	[2]	$1800	486DX2-66	8	540
13 Polywell Poly DX4-100ED	–	1	current	71	71	[2]	$1950	DX4-100	16	540
14 Polywell Poly DX4-100VP4	11	3	May 95	71	63	[2]	$1955	AmDX4-100	16	545
15 Austin Premier PCI DX4-100	–	1	current	71	63	[2]	$1999	DX4-100	8	732
16 Polywell Poly 560MPC	10	5	Jan 95	71	65	[2]	$1995	Pentium-60	8	546
17 CompuTrend Premio P75	–	1	current	71	65	[2]	$2063	Pentium-75	16	1083
18 Polywell Poly 566V1	24	4	Oct 94	71	72	[2]	$1947	Pentium-66	8	425
19 Diamond DX4-100	12	3	May 95	71	56	[2]	$1995	AmDX4-100	16	540
20 DFI Diamond P60	33	1	Feb 95	71	64	[2]	$2129	Pentium-60	8	540

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

2 Micro Express MicroFlex-VL/80
Cheapest Pentium-level performer.

3 Micro Express MicroFlex-PCI/104
Good all-around PC.

4 Micron 4100 Magnum
Longtime Best Buy still going strong.

5 Dell Dimension XPS P75
Fast, backed by great support.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments (Recommended as home system)
—	ISA, PCI	15"/.28	800/725-0026	3257	635	Great price for a Pentium-75 desktop, and the fastest on this chart.
—	ISA, VL	15"/.28	800/989-9900	3208	636	Near Pentium-60–level performance at a fabulous price.
2X	ISA, PCI	15"/.28	800/989-9900	3258	637	Decent performance, lots of RAM, and a mighty attractive price.
2X	ISA, VL	14"/.28	800/223-6571	3125	638	Fast performance from perennial contender.
4X	ISA, PCI	15"/.28	800/613-3355	3229	639	Lively budget system from reliable Dell, and it has multimedia.
4X	ISA, PCI	15"/.28	800/577-7526	3259	640	Fast, with a big hard disk and a quad-speed CD-ROM drive.
2X	ISA, PCI	15"/.28	800/856-6688	3260	641	Multimedia-capable system at a reasonable price.
4X	ISA, PCI	15"/.28	800/846-2000	3232	646	Inexpensive system has a roomy hard drive and a fast CD-ROM drive.
2X	ISA, VL	14"/.28	800/999-1278	3194	642	Low-cost business starter with small monitor outruns many Pentiums and is priced right.
—	ISA, PCI	15"/.28	800/577-7526	3214	643	Big hard drive and very good performance on this low-cost Pentium-66.
—	ISA, PCI	14"/.28	800/989-7253	3211	644	Great price and good performance, but small monitor and no CD-ROM drive.
4X	ISA, PCI	14"/.28	800/808-4334	3238	645	Only DX2-66 on this chart has decent performance and a quad-speed CD-ROM drive.
2X	ISA, VL	15"/.28	800/999-1278	3261	647	Fastest DX4-100 on the chart comes with 16MB of EDO RAM.
2X	ISA, PCI	14"/.28	800/999-1278	3231	648	Lots of RAM, good price, and good performance make this system an attractive buy.
2X	ISA, PCI	14"/.28	800/752-1577	3262	649	Fast performance for its CPU class, and a big hard drive.
2X	ISA, VL	14"/.28	800/999-1278	3219	650	Solid home computer features respectable performance and an attractive price.
—	ISA, PCI	15"/.28	800/677-6477	3263	651	Good performance for a budget system, lots of RAM and hard disk space.
2X	ISA, VL	15"/.28	800/999-1278	3146	652	Speedy, affordable Pentium-66 desktop performs on a par with Pentium-75 systems.
2X	ISA, PCI	15"/.28	800/989-7253	3233	653	Similar to Diamond DT DX4-100 VIP but has more RAM, a CD-ROM drive—and a higher price.
4X	ISA, PCI	15"/.28	800/808-4334	3264	654	Fast multimedia Pentium-60 with 14.4-kbps fax-modem.

advance (The Top 20 Flash Report, $9.95; available June 21). 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. 906.

Top 20 Budget Desktops

THIS MONTH'S PCS REVAMPED THE BUDGET Desktops Top 20 chart. There are seven new entries, including two new Best Buys.

The Pentium-75 PC bears watching. The Vektron PCI P75—a nicely decked-out system for an amazing $1695—debuted at the top of the chart. Meanwhile, Dell's multimedia-ready Pentium-75 PC held its Best Buy status for the third month in a row. The Dimension XPS P75 is slow for a Pentium-75, but this $2163 minitower has a solid configuration, including a 545MB hard disk, a 15-inch monitor, and a CD-ROM drive; and Dell provides highly reputable service and support. Right behind the Dell is Netis's Pentium-75 PC, new this month. Netis's support doesn't stand out, but the $2115 N575 is a bruiser—as fast as some of the slower P-90–based units we've tested. It comes with a cavernous 1278MB hard drive and multimedia components, including a quad-speed CD-ROM drive.

Expect prices to keep dropping as rival CPU makers keep the pressure on Intel. Six of this month's budget PCs are based on AMD processors, the most ever in any category. AMD's presence should grow—Compaq plans to use the company's 90- and 100-MHz 486 chips in its Presario line. Compaq also plans to use Pentium-level NexGen processors in future systems.

1 Vektron PCI P75

NEW THIS MONTH

PROS: Fastest PC available under $2000, good expandability, large hard disk

CONS: Short one-year warranty

This Vektron's $1695 price is so low, we thought it was a typo, especially after our benchmark testing clocked this Pentium-75 PC at speeds comparable to those of most Pentium-90 systems we've seen. We're used to seeing machines this fast at twice the price. This minitower features a roomy 852MB hard drive and 256K of secondary cache upgradable to 512K, and most users will be satisfied with the graphics subsystem, which consists of a 2MB Stealth 64-bit card and a 15-inch monitor.

Upgraders will be pleased to find plenty of expansion space: three free drive bays and six free slots. Unfortunately, Vektron's support policies are less generous: a one-year warranty, optional on-site service, and a two-day turnaround on factory repairs. Tech support is toll-free, but you can call only during business hours.

Vektron

Bottom line? Budget PC seekers will be hard-pressed to find a better price on a high-speed system. This machine is so inexpensive that it would still be a great deal even if you spent extra money adding multimedia features. The Vektron PCI P75 absolutely deserves its number one ranking this month.

2 Micro Express MicroFlex-VL/80

REVIEWED: March 1995

PROS: Fast PC for a great price, good expandability

CONS: Small 425MB hard drive, some cable clutter inside case

This nice AMD Am486DX2-80 minitower with 8MB of RAM, a 425MB hard disk, a respectable 15-inch monitor, a 2MB graphics controller, and good expandability performs almost at the level of a typical Pentium-60—and has a fantastic $1383 price.

3 Micro Express MicroFlex-PCI/104

NEW THIS MONTH

PROS: Fantastic price, 16MB of RAM, solid feature set

CONS: None

It's amazing to find a multimedia system with Pentium-level speed from a reasonably well known company for only $1599. Even though the competition is keener than ever, the MicroFlex-PCI/104 is an astounding deal and an obvious budget desktops Best Buy. This roomy AmDX4-100 minitower moved briskly through our benchmarks, turning in speeds comparable to those of Pentium-60 systems. The 540MB hard drive and 256K of secondary cache are par for the course, but we were pleased to find 16MB of RAM and a double-speed CD-ROM drive. And the graphics subsystem is okay—the 2MB 32-bit PCI accelerator is paired with a 15-inch monitor. Upgradability? You get three free slots, including one for PCI; four free drive bays, three of them externally accessible; and three free SIMM sockets for cost-effective RAM expandability.

Micro Express

Micro Express's support policies are solid, including a two-year warranty and free on-site service for the first year. You get only 9 hours of toll-free support on weekdays, but during evenings and weekends you can call a toll number, leave a message, and get a callback (usually within a few hours, according to the company). All in all, the Micro Express MicroFlex-PCI/104 is a tremendous package for the price.

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*PC Magazine, Nov. 22, 1994, Annual Printer Review

Circle 124 on reader service card

4 Micron 4100 Magnum

REVIEWED: August 1994

PROS: Good DX4-100 performance, great price

CONS: One-year warranty, 14-inch monitor, small 425MB hard drive

This unit, like most good DX4-100s, performs much like a Pentium-60. It provides a basic 8MB of RAM, a small 14-inch monitor and 425MB hard drive, and just a one-year warranty. But the low $1799 price is the big factor that makes this PC number four.

5 Dell Dimension XPS P75

REVIEWED: March 1995

PROS: Good basic multimedia configuration, great reliability and service

CONS: One-year warranty on Dimension series PCs, graphics controller has just 1MB of RAM

A number four Best Buy just last month, this $2163 Pentium-75 multimedia minitower's price puts it near our $2250 ceiling for budget desktops. It comes with 8MB of RAM, a solid 545MB hard drive, and a 15-inch monitor. Its performance is sluggish for a 75-MHz machine, but its rock-solid reliability and service ratings help this Dimension retain a Best Buy.

6 Netis N575

NEW THIS MONTH

PROS: Fast performance, 1278MB hard drive, quadruple-speed CD-ROM drive

CONS: Short one-year warranty, documentation too techie for typical users

We're seeing more and more budget Pentium-75 PCs, and this latest Netis machine is a good example. The N575's fine performance almost earns it a Best Buy.

Netis

The Netis's performance is excellent, with scores falling between those of the average Pentium-75 and Pentium-90 systems. You also get some great components, like a cavernous 1278MB hard drive, a quad-speed CD-ROM drive, a sound card, and speakers. Together, the 2MB PCI graphics adapter and 15-inch monitor support resolutions up to 1280 by 1024.

This compact has decent expandability—you get four free drive bays and four free slots, including two for PCI. But the support package is just so-so, with a minimal one-year warranty and tech support available just 10 hours a day, Monday through Saturday. Also, the manuals are too technical and confusing, lacking illustrations and detail. Still, the N575 is a superb deal for $2115.

7 PerComp 4100VIP

NEW THIS MONTH

PROS: Low price, good multimedia bundle, excellent support policies

CONS: Only 1MB of DRAM on the graphics card, awkward on-screen monitor controls

If your quest for a multimedia computer dressed to the nines is being tripped up by a shoestring budget, you should check out PerComp's latest offering, the 4100VIP.

Modestly priced at $1849, PerComp's 4100VIP multimedia desktop vaults high onto our Budget Desktops Top 20. Despite its pedestrian 8MB of RAM, this AmDX4-100–based computer performs on a par with a typical Pentium-60–class PC. In addition to a big 850MB hard drive, you get a double-speed CD-ROM drive, a 16-bit sound card, a set of speakers, and a good selection of Microsoft CD titles, including the Works integrated package and Encarta. The graphics setup is middle of the road: A 15-inch monitor teams up with Diamond's Stealth 64 1MB PCI graphics accelerator to provide images at up to 1024 by 768 resolution. You can install four more cards (three PCI), four free bays allow room for more drives, and one free SIMM socket gives you room to upgrade RAM. PerComp backs its PC with a long three-year warranty; seven-day-a-week, 24-hour toll-free technical support; and a promise to turn around factory repairs within a single business day. All things considered, the PerComp 4100VIP's aggressive low price, solid performance, decent multimedia bundle, and impressive support package earn it a comfortable spot on this month's Budget Desktops Top 20.

PerComp

8 Gateway 2000 P5-60

REVIEWED: October 1994

PROS: Good Pentium-60 performance on basic business box with quad-speed CD-ROM drive

CONS: Some less expensive DX4-100 systems offer similar performance

9 Polywell Poly 486-80VB

REVIEWED: February 1995

PROS: Slightly higher price of $1695 is still low and now buys 2MB of DRAM

CONS: 14-inch monitor, some cable clutter

10 Netis N566

REVIEWED: March 1995

PROS: $1935 price is very good for a fast Pentium-66 with a 732MB hard drive

CONS: One-year warranty is a short standard offering these days, some cable clutter inside

11 Diamond DT DX4-100 VIP

REVIEWED: March 1995

PROS: Unusually low price for a DX4-100 system

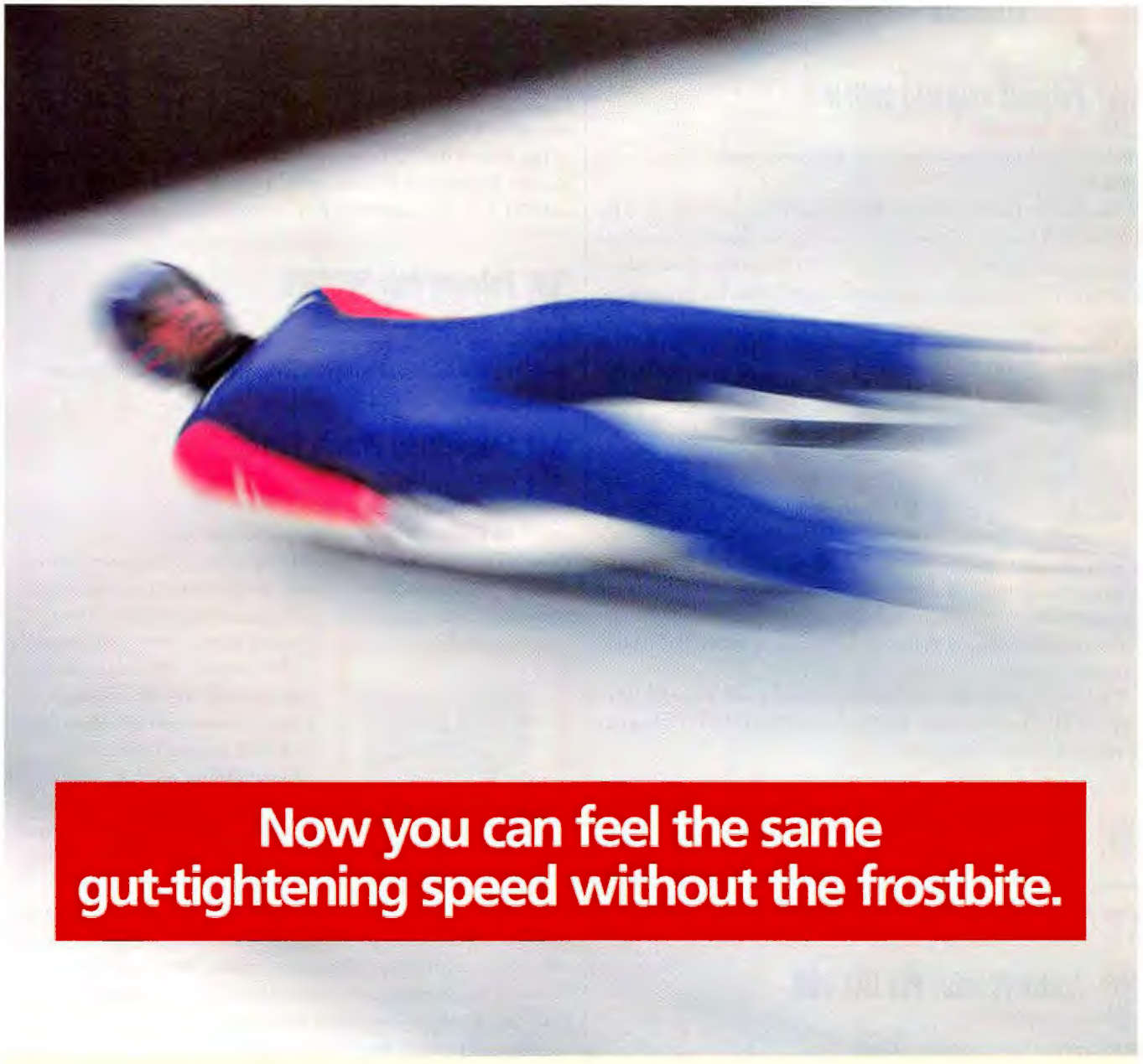
CONS: No toll-free tech support, 14-inch monitor, no CD-ROM drive

12 DFI Diamond 66

REVIEWED: February 1995

PROS: Solid multimedia configuration, 14.4-kbps modem, decent DX2-66 performance

CONS: $1800 price is a little high for a 486DX2-66 with 8MB of RAM and a 540MB hard drive



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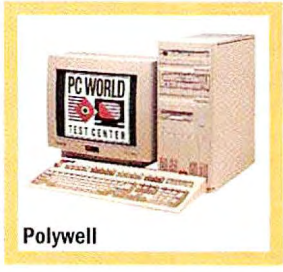
13 Polywell Poly DX4-100ED

NEW THIS MONTH

PROS: Strong performance, plenty of expandability, five-year labor warranty

CONS: None

What, *another* Polywell PC on the Budget Desktops Top 20? The DX4-100ED earns its spot with a potent mix of performance and support at an attractive $1950 price. This DX4-100 performs like a Pentium-75—especially impressive considering that the unit we tested had no secondary cache. However, it came with 16MB of high-performance EDO RAM, the likeliest cause of the excellent performance. This minitower also comes with a 540MB hard drive, a 15-inch monitor with a 2MB 64-bit graphics accelerator, and a double-speed CD-ROM drive. And there's plenty of room to add components: You get five free bus slots (including one for a VL card) plus four free bays. Polywell stands behind all its systems with an excellent warranty for five years on labor and two years on parts. Tech support is available Monday through Saturday.



Polywell

Pentium-75–level speed, good expandability, and above-par support for $1950—no wonder the Polywell DX4-100ED makes our Budget Desktops Top 20 chart.

14 Polywell Poly DX4-100VP4

REVIEWED: May 1995

PROS: Fine AmDX4-100 system performs like many Pentium-60s, multimedia configuration

CONS: The 14-inch monitor is small, and there's a lot of cable clutter inside the case

15 Austin Premier PCI DX4-100

NEW THIS MONTH

PROS: Great price for a reasonably fast multimedia PC

CONS: Small monitor, substandard manuals, no free SIMM sockets

With impressive test results, a decent feature set, and a bargain price, the Austin Premier PCI DX4-100 has vaulted its way onto the Budget Desktops Top 20 chart. For $1999, this DX4-100 system offers Pentium-60–level speed, 8MB of RAM, and a large 732MB hard drive, as well as above-par multimedia: a double-speed CD-ROM drive, a sound card, and a pair of external speakers. The Premier's graphics subsystem is a mixed bag—the 2MB 64-bit PCI graphics accelerator is nice, but we were disappointed by the fuzzy 14-inch monitor.

Austin

Expandability is okay for a loaded compact: You get four free expansion slots and three free drive bays. However, both SIMM sockets are filled, so you must dispose of one or both of the existing SIMMs to add RAM. Austin's support policies are good. This PC comes with substandard manuals but is backed by a three-year warranty and 24-hour tech support.

The bottom line? Despite quibbles about design and upgradability, the Premier PCI DX4-100 is an exceptional deal even in today's ferociously competitive PC market.

16 Polywell Poly 560MPC

REVIEWED: January 1995

PROS: Low $1995 price for a solid Pentium-60 computer with a voice-enabled fax-modem

CONS: The 14-inch monitor is a small standard offering these days, even with a budget system

17 CompuTrend Premio P75

NEW THIS MONTH

PROS: Low cost, 1083MB hard drive

CONS: A little slow for a Pentium-75, minimal service-and-support policies

CompuTrend's Premio P75 challenges the $2000 price barrier while delivering midlevel Pentium performance. This minitower costs just $2063 on the street yet outpaces most of the DX4-100 systems found in this price range. This Pentium-75 PC comes with a large 1083MB hard drive, 16MB of RAM, a 15-inch monitor, and a fast 2MB PCI graphics board.

CompuTrend

CompuTrend doesn't include a CD-ROM drive, but there's plenty of room to add your own: The Premio P75 boasts three free drive bays and five free slots, including two for PCI cards.

CompuTrend's support policies are thin. The two-year warranty is decent coverage, but the company doesn't offer on-site service or any guaranteed turnaround times on repairs. Worse, reps are available only 8.5 hours per weekday. These meager policies nearly kept the Premio off our charts, but this system comes with good features and is one of the fastest budget PCs you can buy.

18 Polywell Poly 566V1

REVIEWED: October 1994

PROS: Price drop to $1947 helps this Pentium-66 break into the Top 20

CONS: Small 425MB hard drive, only 1MB of VRAM

19 Diamond DX4-100

REVIEWED: May 1995

PROS: Great price for an AmDX4-100 multimedia PC that performs almost like a Pentium-60

CONS: Sparse documentation, 15-month parts warranty is on the short side

20 DFI Diamond P60

REVIEWED: February 1995

PROS: Slight price drop to $2129 propels this Pentium-60 onto the Top 20 for the first time

CONS: No toll-free technical support

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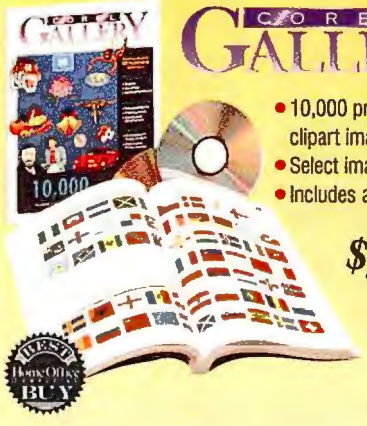

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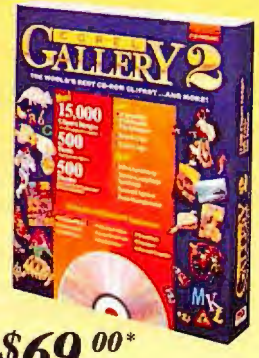

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THE TOP 20 PC WORLD NOTEBOOK PCs

1 **Gateway 2000 Liberty DX4-100**
Covers all the bases.

POWER SYSTEMS

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Gateway 2000 Liberty DX4-100	–	1	current	95	54	[3]	$2979	DX4-100	8	352
2 Toshiba T4900CT	2	5	Mar 95	95	54	80/73	$6499	Pentium-75	8	810
3 WinBook XP DX4-100 8/520 TFT	6	2	June 95	94	48	[3]	$3676	DX4-100	8	810
4 AST Ascentia 910N	1	4	Apr 95	94	42	[3]	$4199	DX4-75	8	510
5 Toshiba Satellite Pro T2150CDT	–	1	current	93	48	80/73	$5199	DX4-75	8	500
6 Compaq LTE Elite	4	10	Oct 94	93	37	83/82	$4729	DX4-75	8	340
7 Dell Latitude XP 4100CX	3	4	Apr 95	93	42	[3]	$4199	DX4-100	8	340
8 WinBook XP DX4-100 8/520 Dual-Scan	5	3	May 95	92	48	[3]	$2799	DX4-100	8	520
9 IBM ThinkPad 755CE	7	3	Apr 95	91	48	78/77	$6924	DX4-100	8	540
10 MidWest Micro SoundBook Plus P-90 Color	13	3	Apr 95	91	67	[3]	$4999	Pentium-90	16	720

BUDGET SYSTEMS

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 WinBook XP SX-33 Monochrome	1	3	May 95	92	27	[3]	$1739	486SX-33	8	260
2 WinBook XP DX2-50 Monochrome	3	6	Feb 95	91	28	[3]	$1799	486DX2-50	8	260
3 MPC TouchNote 700	–	1	current	90	33	[3]	$2345	DX4-75	8	528
4 Dell Latitude 450C	4	4	Jan 95	89	30	[3]	$2698	486DX2-50	8	523
5 Dell Latitude 475C	5	3	May 95	88	41	[3]	$2698	DX4-75	8	340
6 Acom Patriot 4000 DX4-100	6	3	May 95	87	45	[3]	$2725	DX4-100	8	520
7 Austin Business Audio 4/75	7	6	Feb 95	87	36	[3]	$2279	DX4-75	8	250
8 Acom Patriot 4000 DX2-66	10	5	Mar 95	86	35	[3]	$1990	486DX2-66	8	344
9 Sceptre Soundx Series 1000 DX2-66	8	3	May 95	86	37	[3]	$1775	486DX2-66	8	340
10 ArmNote TS30M	14	3	Mar 95	84	26	[3]	$1549	486DX2-50	8	260

BEST BUY

[1] CA = color active, CD = color dual-scan, CP = color passive, MD = mono dual-scan, MP = mono passive. [2] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for phone 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).

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WinBook XP DX2-50 Monochrome
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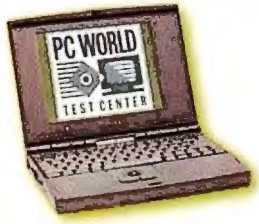


	Weight (pounds)	Battery life (hours)	Screen type/ size [1]	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments
	6.6	6:47	CD/10.4"	800/846-2000	3700	655	Fast performance, big screen, light weight, and long battery life—an easy Best Buy.
	7.6	3:57	CA/10.4"	800/457-7777	3677	656	Big $900 price drop makes this all-around performer an even better Best Buy.
	7.6	3:27	CA/9.4"	800/468-2162	3696	657	Fast, well designed, affordable. Price cut and sizable hard disk nearly earn it a Best Buy.
	7	7:55	CA/10.4"	800/876-4278	3683	658	Sleek design, excellent screen, and super battery life.
	8.8	5:20	CA/10.4"	800/457-7777	3701	659	Multimedia note includes 2X CD-ROM drive, 16-bit sound, and 65,536-color screen.
	7.2	6:32	CA/9.5"	800/345-1518	3650	660	Slowest Top 20 power notebook, but well designed and has excellent reliability and support.
	7.4	6:46	CA/9.5"	800/613-3355	3685	661	Nice all-around package, including long battery life.
	7.4	3:32	CD/10.3"	800/468-2162	3690	662	Good speed and affordable. Similar to third-ranked WinBook but with dual-scan screen.
	7.4	3:33	CA/10.4"	800/426-2968	3687	—	Big Blue quality in a classy note with big active-matrix screen, but you pay a lot.
	8.2	3:28	CA/10.4"	800/728-8582	3686	663	Fastest notebook on chart; $600 price drop; good battery life for a Pentium-90 note.
	6.8	8:45	MP/9.5"	800/468-2162	3692	664	Lightweight unit has longest-lasting battery we've seen. Very inexpensive.
	6.8	6:46	MP/9.5"	800/468-2162	3673	665	Monochrome notebook has a low price, excellent battery life, and lots of features.
	7.6	4:53	CD/9.4"	800/672-9979	3702	666	Good balance of speed and battery life from a color note, plus an ample hard drive.
	7	3:13	CD/9.5"	800/613-3355	3689	667	Solid color budget notebook plus a large hard drive at a reasonable price.
	7.2	3:16	CD/9.5"	800/613-3355	3693	668	Faster than its fourth-ranked budget sibling. Costs the same but has a smaller hard drive.
	8.4	2:47	CD/10.3"	800/898-2665	3694	669	Fastest budget notebook has a reasonable price, but it's a bit heavy and battery life is short.
	8.2	3:57	CD/9.5"	800/752-1577	3676	670	Good audio features and a great price, but a small hard drive.
	8.4	3:30	CP/10.3"	800/898-2665	3682	671	Good price on a DX2-66 passive color note; a bit on the heavy side.
	7.8	2:28	CD/10.3"	800/788-2878	3695	672	Very affordable color notebook with good audio features but poor battery life.
	7.2	4:05	MP/9.5"	800/765-1767	3681	673	Monochrome notebook is lowest-priced on list, but it's slow and has a small hard drive.

You can also order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available June 21). 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. 907.

Top 20 Notebooks

TWO NEW POWER NOTEBOOKS HIT THE Notebook PCs Top 20 this month. Gateway 2000's Liberty DX4-100 soared right to the top with impressive power, a long 6.8-hour battery life, and a light 6.6-pound weight. If you're looking for a true multimedia notebook, check out Toshiba's Satellite Pro T2150CDT, the number five note in the power section. At $5199 it's expensive, and it weighs a heavy 8.8 pounds, but it offers a built-in double-speed CD-ROM drive, 16-bit sound, a color-rich active-matrix screen, and a long 5.3-hour battery life. MPC's TouchNote 700, number three in the budget section, is the sole new budget entry this month, and a worthy one: $2345 buys you fast DX4-75 speed, a 528MB hard disk, built-in sound, and a near 5-hour battery life.

Notebook features have improved across the board. Nearly all our Top 20 units have color screens: vivid active-matrix on the power units and dual-scan on the budgets. The average hard disk size on the budget units is over 300MB, and over 500MB on the power portables. Meanwhile, the price of the power number ten MidWest Micro SoundBook Plus P-90 Color (reviewed in April) dropped by over $600. This superspeedy Pentium-90 note is among the fastest you can buy, and it's now a lot more affordable.

Power Notebooks

1 Gateway 2000 Liberty DX4-100

NEW THIS MONTH

PROS: Fast DX4-100 performance, outstanding battery life

CONS: Dull screen, awkward pointing device

A portable computer has to have a lot of things to finish high in the power portion of our Notebook PCs Top 20 chart—speedy performance, light weight, outstanding battery life, and good expandability, as well as decent backing from the company. Gateway 2000's Liberty DX4-100 delivers so well on all counts that it's this month's top choice for a power notebook.

The Liberty is one of the fastest DX4-100s we've ever tested. The battery life is excellent as well—almost 7 hours on a single charge. An extra nickel–metal-hydride (NiMH) battery is included, and the Liberty will accept lithium-ion battery packs when they become available for this unit. You also get 8MB of RAM, a 352MB removable hard disk (useful for data security), and 256K of secondary cache. The 10.4-inch dual-scan color screen is one of the largest you can buy, and it displays 640 by 480 resolution at 256 colors. It may not be your first choice for presentations or heavy-duty graphics, but most users will be satisfied. Plus, the system lets you display up to 1024 by 768 resolution onto an external monitor. The price for all this? Only $2979, not too much above our budget category's price ceiling for notebook computers.

Gateway 2000

There's more good news. The Liberty is exceptionally portable, weighing only 5.8 pounds without the external 3½-inch floppy drive. If you take the drive with you, the notebook ensemble tops out at a still-light 6.6 pounds. At just over 1 inch thick, this is one of the thinnest notebooks we've seen, yet it still has good expandability. If you need to plug in a fax-modem, you can use the PC Card (formerly called PCMCIA) slot, which accepts either one Type III card or two Type II cards.

Some users may find the EZ Point pointing device awkward because of its stiff action and its placement away in the upper right corner, but the keyboard feels solid and comfortable. The Liberty DX4-100 has a convenient pair of flip-out hind feet to tilt the keyboard slightly forward for those who prefer it that way.

No, it's not always a perfect world even when you're number one. This PC's dual-scan passive color suffers from a dull gray-blue tint. Also, Gateway's support policies are unexceptional. While the company backs its notebook with a 30-day money-back guarantee and 18 hours of toll-free technical support Monday through Saturday, the one-year warranty is short. Still, with tremendous DX4-100 performance, great battery life, and a low $2979 price, it's no wonder the Liberty DX4-100 soared to number one in the power section of our Notebook PCs Top 20.

2 Toshiba T4900CT

REVIEWED: March 1995

PROS: Great performance, large color screen, giant hard disk, three-year warranty

CONS: This computer is one of the highest-priced notebooks available

Hot-performing 7.6-pound Pentium-75 world-class notebook has 8MB of RAM, an 810MB hard drive, a brilliant 10.4-inch color-active screen, 65,536 simultaneous colors, a near 4-hour battery life, 24-hour tech support, and a high $6499 price.

3 WinBook XP DX4-100 8/520 TFT

REVIEWED: June 1995

PROS: Very fast, sturdy design, crisp display, 810MB hard drive, 14.4-kbps fax-modem

CONS: The one-year warranty is short these days, even for a notebook computer

4 AST Ascentia 910N

REVIEWED: April 1995

PROS: Super lithium-ion battery, brilliant screen, speedy, three-year warranty

CONS: Some looseness noticeable in review unit's screen hinge

This fast 7-pound DX4-75 has 8MB of RAM, a 510MB hard drive, a 10.4-inch color-active screen, and a lithium-ion battery that lasts nearly 8 hours on a charge and takes over three times the recharges of an NiMH battery. The great $4199 price makes this one a steal.

5 Toshiba Satellite Pro T2150CDT

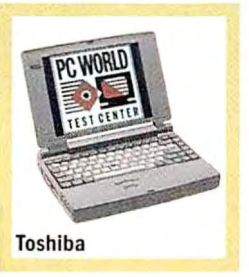
NEW THIS MONTH

PROS: Excellent performance, built-in CD-ROM drive, integrated audio, long battery life

CONS: Expensive, heavy, awkward battery-swapping method

It takes an extraordinary notable PC to fly by the competition and land near the top of the power section in our Top 20 chart, but the speedy Satellite Pro T2150CDT did just that. Its fast DX4-75 performance, impressive battery life, and great run of components make it a mobile multimedia powerhouse.

True, $5199 is a lot of money. But if you're looking for a powerful notebook that's excellent for presentations, this Toshiba can't be beat. Its performance is great—the Satellite Pro raced through our tests faster than a typical DX4-100 unit. And the spacious 10.4-inch active-matrix screen provides more than 65,000 colors, yielding much richer images than most notebook screens, which are capable of displaying only 256 colors at once. You also get 8MB of RAM expandable to 32MB, a roomy 500MB hard drive, and a built-in double-speed CD-ROM drive that's conveniently accessible on the right side of the notebook. There's also an external floppy drive, speakers, a microphone, and a PC Card (formerly called PCMCIA) slot that accepts either two Type II cards or a single Type III card. Despite all the high-end components, however, the Satellite Pro managed to run for a very lengthy 5.3 hours in our battery run-down test.



Toshiba

The Satellite Pro T2150CDT isn't perfect. Its traveling weight, including the external floppy drive and AC adapter, is a hefty 8.8 pounds. Also, the screen's brightness control is hard to find. Finally, swapping the nickel–metal-hydride (NiMH) battery pack can be a hassle: It's hidden below the keyboard's palm rest, which is confusing to open and requires some force to pry loose. These few gripes aside, we found the system very comfortable to use. The Accupoint pointing device, which looks like a green eraser in the middle of the keyboard, is easy to use and works in tandem with the mouse buttons on the palm rest.

Toshiba's lengthy three-year warranty includes on-site service—a rare extra among notebook vendors—for $50 a year. If you run into trouble, you can call the company's technical support around the clock. And according to our reliability-and-service fax-back survey, a clear majority of Toshiba notebook owners were satisfied with the help that they received from the company.

Simply put, the Satellite Pro T2150CDT has it all—blazing benchmark scores, great features, long battery life, and excellent support. If you need full multimedia capabilities for your on-the-road presentations, this portable is a must-see.

6 Compaq LTE Elite

REVIEWED: October 1994

PROS: Fine design and screen, 6.5-hour battery life, PC Card hot-swapping, top-rated support

CONS: Performance on this DX4-75 was just so-so when compared with many other notebooks'

7 Dell Latitude XP 4100CX

REVIEWED: April 1995

PROS: Outstanding design, lithium-ion battery with long 6.8-hour life, great three-year warranty

CONS: A number of our readers report long waits on hold after dialing in on sales lines

8 WinBook XP DX4-100 8/520 Dual-Scan

REVIEWED: May 1995

PROS: Fast DX4-100 with large 10.3-inch color screen, 14.4-kbps fax-modem, 7.4-pound weight

CONS: The one-year warranty is on the short side these days, even for a notebook computer

9 IBM ThinkPad 755CE

REVIEWED: April 1995

PROS: Great keyboard, super reliability and service, screen has extra viewability in bright light

CONS: One of the highest-priced notebooks on the market

10 MidWest Micro SoundBook Plus P-90 Color

REVIEWED: April 1995

PROS: Blazing speed, 720MB hard drive, price is now down to $4999

CONS: 8.2-pound traveling weight is a little heavy, pointing device is a bit difficult to use

Budget Notebooks

1 WinBook XP SX-33 Monochrome

REVIEWED: May 1995

PROS: Attractive price, 8.8-hour battery life, light 6.8-pound weight, 14.4-kbps fax-modem

CONS: One-year warranty, small 260MB hard drive, no battery hot-swapping

New low $1739 price and the best battery life yet. Monochrome note's pluses outweigh the small hard drive and short warranty.

2 WinBook XP DX2-50 Monochrome

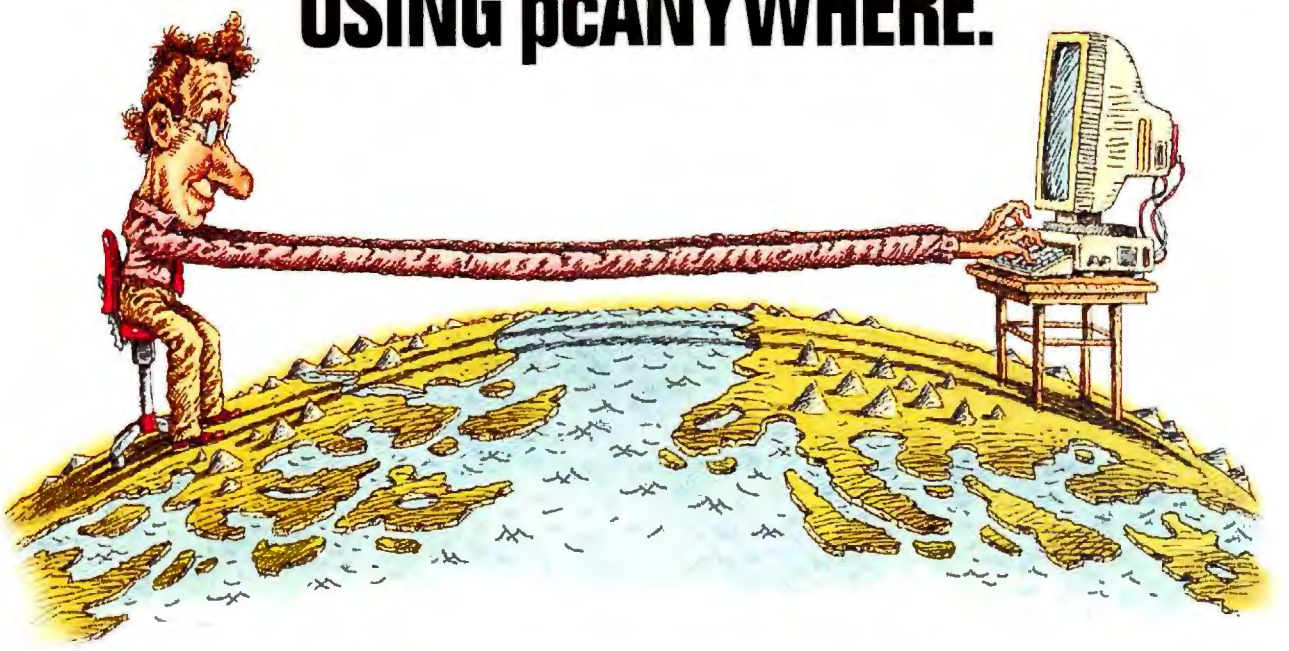
REVIEWED: February 1995

PROS: Long 6.8-hour battery life, light 6.8-pound weight, low price, 14.4-kbps fax-modem

CONS: One-year warranty, small 260MB hard drive, no battery hot-swapping

Price cut to $1799 lands the WinBook XP DX2-50 Monochrome a Best Buy again. Long 6.8-hour battery life and low 6.8-pound traveling weight more than make up for this monochrome notebook's small 260MB hard drive and short one-year warranty.

IF YOU THINK REMOTE COMPUTING IS A HASSLE, YOU'RE PROBABLY NOT ONE OF THE MILLIONS OF PEOPLE USING pcANYWHERE.



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Circle 167 on reader service card

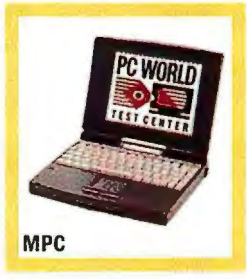
3 MPC TouchNote 700

NEW THIS MONTH

PROS: Great price, long battery life, convenient touchpad pointing device, good built-in sound

CONS: Subpar support policies, mushy keyboard

Every so often we find a well-equipped system with a price so affordable we do a double take. Such is the case with the MPC TouchNote 700. At a time when many DX4-75 notes cost up to $4000, the TouchNote sells for an amazing $2345. No wonder this portable achieved its laudable ranking high up in the budget section of the ultracompetitive Notebook PCs Top 20.



MPC

There's much to commend in this tiny titan. One plus is its long battery life—almost 5 hours in our test. Another is its generous 528MB removable hard drive, which is upgradable to 810MB. We were also impressed by the touchpad—a device beneath the <Space> bar that allows you to move the on-screen pointer simply by dragging a finger across the touch-sensitive pad. This device is very easy to use and makes a great substitute for a trackball or mouse. Also built into the notebook are 16-bit stereo sound, a microphone, and speakers.

In areas where the MPC TouchNote 700 didn't excel, it at least held its own. The 9.4-inch dual-scan screen displays at 640 by 480 resolution and in 256 colors. This system is reasonably fast, too, achieving speeds typical of a DX2-66 notebook—putting the TouchNote 700 in the middle of the pack of the top ten budget notes in terms of performance. The machine also comes with 8MB of RAM expandable to 32MB, as well as a PC Card (formerly known as PCMCIA) Type III slot and a connector for hooking up a docking station. The PC Card slot alternatively accepts two Type II cards. The TouchNote 700's traveling weight is a highly manageable 7.6 pounds.

The keyboard has a slightly mushy feel, a characteristic that got mixed reviews from our judges. But where MPC falls down most is in its service-and-support policies. You get a scant one-year warranty and no specified turnaround time on factory repairs. Tech support is toll-free but available only during business hours. BBS and toll-free fax-back assistance is available, however, and the company offers a 30-day money-back guarantee on all its systems. We haven't received enough responses to our reader fax-back survey to comment on MPC's service-and-reliability record.

Even given the keyboard and support drawbacks, the TouchNote 700 is an excellent deal. This notebook provides more-than-acceptable performance, great battery life, and a nice feature set, all for an affordable price. If your bottom line really is the bottom line, this near Best Buy warrants serious consideration.

4 Dell Latitude 450C

REVIEWED: January 1995

PROS: Fast for a DX2-50, 7-pound weight, 523MB hard drive, fax-modem, price drop to $2698

CONS: One-year warranty is minimal coverage on today's systems

5 Dell Latitude 475C

REVIEWED: May 1995

PROS: Solid DX4-75 performance, 24-hour tech support, price cut to $2698

CONS: One-year warranty is minimal coverage on today's systems

6 Acom Patriot 4000 DX4-100

REVIEWED: May 1995

PROS: Fine performance, large dual-scan color screen, 14.4-kbps fax-modem, fair price

CONS: Short 2.8-hour battery life, hefty 8.4-pound traveling weight, short one-year warranty

7 Austin Business Audio 4/75

REVIEWED: February 1995

PROS: Great price, decent DX4-75 performance, audio, 24-hour tech support

CONS: One-year warranty, 8.2-pound traveling weight, limited power management

8 Acom Patriot 4000 DX2-66

REVIEWED: March 1995

PROS: Price cut, great 486DX2-66 performance, audio, 10.3-inch passive color screen

CONS: Dull screen colors, 8.4-pound traveling weight, no set turnaround policy on repairs

9 Sceptre Soundx Series 1000 DX2-66

REVIEWED: May 1995

PROS: Fast for a DX2-66 notebook, low price, large color screen, integrated audio

CONS: Short battery life, poor display quality, brief one-year warranty, short tech support hours

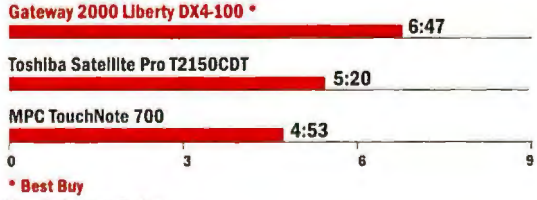
10 ArmNote TS30M

REVIEWED: March 1995

PROS: Low price, good monochrome screen, 7.2-pound traveling weight, 4-hour battery life

CONS: One-year warranty on parts, small 260MB hard drive

TEST REPORT Battery Life



• Best Buy

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 various applications, saving periodically, and notebooks also have regular idle periods. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

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

FEATURES COMPARISON This Month's Contenders–Desktops

● = Yes ○ = No
n/a = not applicable

Standard features	AT&T Globalyst 630	Austin PowerPlus 100	Austin Premier PCI DX4-100	CompuTrend Premio P75	Everex Step SP/120
Street price as of 3/31/95 [1]	$4007	$3899	$1999	$2063	$3395
CPU	Pentium-100	Pentium-100	DX4-100	Pentium-75	Pentium-120
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	237-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	Phoenix 2/24/95	AMI 1/12/95	AMI 9/18/94	AMI 7/25/94	Award 2/2/95
Installed/maximum RAM (MB)	16/192	16/128	8/64	16/196	16/192
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	6/4	4/2	2/0	6/4	6/4
Secondary RAM cache installed/maximum (K)	256/256	256/256	256/256	256/1024	256/1024
Case style	tower	compact	compact	minitower	minitower
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/1	0/1	1/2	1/3
Free internal 3½-inch/5¼-inch drive bays	1/0	2/0	2/0	0/0	2/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/3/0	0/1/0 [2]	0/3/0 [2]	0/4/0 [2]	0/4/0 [2]
PCI or VL bus slots/number free	3 PCI/3	4 PCI/3 [2]	3 PCI/2 [2]	3 PCI/2 [2]	3 PCI/2 [2]
Hard disk	WD Caviar 31000	WD Caviar 31000	Quantum Lightning 730A	WD Caviar 31000	Conner CFA 1275A
Size (MB)	1084	1083	732	1083	1278
Adapter	integrated	integrated	integrated	integrated	integrated
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44
Graphics adapter	integrated	Stealth 64 VRAM	ATI Mach 64/WinTurbo	ATI WinTurbo	ATI Graphics Pro Turbo
Installed VRAM/DRAM (MB)	2/0	4/0	2/0	2/0	2/0
Monitor	AT&T TX-D1751L	Smile Int'l CA 1718M2	Austin P/N MN2404B	Sceptre CC-615G	Everex AS6G
Screen diagonal (inches)/viewable area (inches)/dot pitch (mm)	17/15.7/.27	17/15.8/.26	14/13.3/.28	15/13.8/.28	17/15.8/.28
Modem speed for fax/data (kbps)	14.4/14.4	28.8/28.8	n/a	n/a	n/a
Sound board	OEM 16-bit	Media Magic ISP-16	Midi Magic ISP-16	n/a	n/a
CD-ROM drive	Sony CDU76E	Toshiba XM 5302B	Sony CDU55E	n/a	n/a
Data transfer rate (K/sec)	684	605	300	n/a	n/a
Parallel/serial/mouse/SCSI ports	1/2/1/0	1/2/0/0	1/2/0/0	1/2/1/0	1/2/0/0
Service and support					
Warranty (years)	3	3	3	2	3
30-day money-back guarantee	●	●	●	○	●
On-site service first-year price	free	free	free	○	free
Repair turnaround policy (days)	2	2	2	○	3
Daily toll-free phone support (hours)	24	24	24	8.5	24
Weekend support	●	●	●	○	○
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 all PCI slots are filled, and vice versa.

Micro Express MicroFlex-PCI/104	NEC Ready 9510	Netis N575	PerComp 4100VIP	Polywell Poly DX4-100ED	Vektron PCI P75	Vektron Ultimate Power Station P100
$1599	$3006	$2115	$1849	$1950	$1695	$4040
AmDX4-100	Pentium-90	Pentium-75	AmDX4-100	DX4-100	Pentium-75	Pentium-100
237-pin ZIF	320-pin ZIF	320-pin ZIF	237-pin ZIF	237-pin ZIF	320-pin ZIF	320-pin ZIF
Phoenix 11/18/94	Phoenix 1/31/95	AMI 11/30/94	Award 9/29/94	MR 10/6/94	Award 1/10/95	Award 1/10/95
16/64	16/128	8/128	8/256	16/96	8/128	16/128
72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
4/3	4/2	4/2	4/1	4/2	4/2	4/2
256/512	256/256	256/256	256/1024	0/0	256/512	256/256
minitower	minitower	compact	desktop	minitower	minitower	tower
1/2	0/2	1/2	1/2	1/2	1/2	1/2
1/0	1/0	1/0	1/0	1/0	0/0	2/0
0/3/0 [2]	0/3/0 [2]	0/3/0 [2]	0/1/0 [2]	0/3/1	0/4/0 [2]	0/4/0 [2]
3 PCI/1 [2]	2 PCI/2 [2]	3 PCI/2 [2]	4 PCI/3, 2 VL/1 [2]	3 VL/1	4 PCI/3 [2]	4 PCI/2 [2]
WD Caviar 2540	Conner CFA 1275A	Conner CFA 1275A	WD Caviar 2850	Maxtor 7540U	Conner CFA 850A	Seagate ST32550W
540	1278	1278	850	540	852	2147
Promise DC 5050 IDE	Integrated	Integrated	DTC 2278S EIDE	OEM S1345 VL IDE + I/O Controller	Integrated	Adaptec AHA-2940W SCSI 2
1.44	1.44	1.44	1.44	1.44	1.44	1.44
OEM ET4000-W32p	Integrated	ATI WinBoost	Stealth 64 DRAM PCI	Actix Graphics Engine 64 Series	Stealth 64 DRAM T PCI	ATI Graphics Pro Turbo
2/0	0/1	0/2	0/1	2/0	0/2	2/0
Micro Express Multifrequency FM-590	NEC XV15	View Magic 1565CL	Daewoo CMC-1502B	Sampo KDM-1566V	ADI Micro Scan 4V	ADI Micro Scan 5AP
15/13.8/.28	15/13.8/.28	15/13.8/.28	15/14/.28	15/14/.28	15/13.6/.28	17/15.5/.26
n/a	14.4/14.4	n/a	n/a	n/a	n/a	n/a
n/a	Boca Research Combo Card SE-1440M	Sound Blaster 16	Media Magic ISP-16	n/a	n/a	n/a
Matsushita CR-562-B	Mitsumi CRMC-FX400	Mitsumi CRMC-FX400	Sony CDU55E	Matsushita CR-562-J	n/a	Toshiba TXM 3501 B/E1
300	600	600	300	300	n/a	600
1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/1

2	3	1	3	5 [3]	1	1
●	○	○	●	●	●	●
free	free	$75	free	$75	$50	$50
2	1	2	1	3	2	2
9	11.5	10	24	24	8	8
● [4]	○	● [5]	●	● [5]	○	○
○	●	●	●	●	●	●
●	●	●	●	●	●	●

[3] Two years parts, five years labor.

[4] For weekday evenings and weekends, support is a toll call; you must leave a message for callback.

[5] Saturdays only.

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.

AMS MediaPro Pentium 90

PROS: Blazing notebook performance, 16-bit sound

CONS: Bulky and heavy, short battery life, one-year warranty

This $4450 Pentium-90 note boasts an active-matrix color screen, 16-bit sound, and a 528MB hard disk. But it has only a 1.8-hour battery life and weighs 9.6 pounds. *AMS, Inc., 800/886-2671* **Reader service no. 833**

AMS SoundPro DX4-75

PROS: Fast, great sound capabilities, elegant design

CONS: Minimal one-year warranty

$2767 note has near DX4-100 speed, a color-active screen, a 352MB hard drive, and 16-bit sound. Almost Top 20 material. *AMS, Inc., 800/886-2671* **Reader service no. 834**

Aspen Universa CD

PROS: Rip-roaring speed, internal CD-ROM drive

CONS: Heavy, short battery life

Super DX4-100–level speed, CD-ROM drive, active-matrix color screen—all for just $2675. But hobbled by 9.6-pound weight and 2.3-hour battery life. *Aspen Computer, Inc., 800/472-3273* **Reader service no. 835**

Austin PowerPlus 75

PROS: Very fast, three-year warranty, 24-hour tech support

CONS: 14-inch monitor

This $2145 Pentium-75 desktop runs as fast as the average P-90. It's backed by great policies but comes with few extras. *Austin Direct, 800/752-1577* **Reader service no. 836**

Darwin Pentium-S 100

PROS: Nice performance for the price

CONS: Poor upgradability, meager tech support policies

At $3325, this decked-out 100-MHz Pentium performs like a P-120 and is priced like a P-90, with a 17-inch monitor and a 1.2GB hard drive. Slim support policies keep it off our chart. *Darwin Micro Systems, 800/886-9888* **Reader service no. 837**

Diamond P75

PROS: Speedy, multimedia configuration, three-year warranty

CONS: Some cable clutter inside desktop case

For $2450 you get a multimedia Pentium-75 desktop with a 1085MB hard drive—a fair, but not Top 20, value. *Diamond Technologies, 800/989-7253* **Reader service no. 838**

Gateway 2000 Liberty DX2-50

PROS: 6.6-pound traveling weight, built-in infrared port

CONS: No internal floppy drive, one-year warranty

It's pricey at $2799, but this small, light DX2-50 subnote offers a 340MB hard drive and near 5-hour battery life. *Gateway 2000, Inc., 800/846-2000* **Reader service no. 839**

HiQ Neptune PowerStation P100

PROS: Fast, 1GB hard drive, excellent expandability

CONS: Short one-year parts warranty, bare-bones manuals

Swift, expandable Pentium-100 tower needs only speakers to be a full multimedia machine. This $2995 system just missed our Top 20 list. *HiQ Computers, Inc., 800/827-5836* **Reader service no. 840**

Intelesys Stargate Pro 90

PROS: Quick, 1.3GB hard drive, quad-speed CD-ROM drive

CONS: Cable clutter makes it inconvenient to reach slots

The $3299 price is fair for this fast multimedia Pentium-90 tower with an MPEG video playback board and a fax-data-voice-sound card. *Intelligent Computers and Technologies, 510/226-6300* **Reader service no. 841**

MidWest Micro SoundBook Plus P-75

PROS: Fast, 720MB hard drive, three-year warranty, audio

CONS: 8.2-pound traveling weight is heavy for a notebook

This $3837 unit is a fast Pentium-75 notebook with 16MB of RAM, a 720MB hard drive, a large dual-scan color screen, and a three-year warranty, all making this totable near Top 20 material. *MidWest Micro, Inc., 800/728-8582* **Reader service no. 843**

MidWest Micro SoundBook Plus P-90 Dual-Scan

PROS: Fast, three-year warranty, 14.4-kbps fax-modem

CONS: Battery life is less than 3 hours

$3999 gets you a fast P-90 note with a 720MB hard drive, 16MB of RAM, and a PC Card (formerly PCMCIA) fax-modem. But battery life is short. *MidWest Micro, Inc., 800/728-8582* **Reader service no. 842**

Packard Bell Pentium 100 Multimedia

PROS: 14.4-kbps fax-modem, voice mail, 24-hour support

CONS: Slower-than-average Pentium-100, one-year warranty

This $3200 multimedia tower packs a 1GB hard drive, a quad-speed CD-ROM drive, and a telephony card. But speed and warranty could be better. *Packard Bell Electronics, 800/733-5858* **Reader service no. 844**

PerComp P100 Professional

PROS: Fast, 1GB hard drive, 17-inch monitor

CONS: Slight cable clutter inside the full-tower case

This Pentium-100 PC is a whole lotta system for $3399, including a big hard disk and 32MB of RAM. It almost makes the Power Desktops Top 20. *PerComp Microsystems, Inc., 800/856-6688* **Reader service no. 845**

Polywell Poly 575T1

PROS: Attractive price, multimedia extras

CONS: Limited manuals, poor-quality mouse and keyboard

The Polywell Poly 575T1 offers Pentium-75 speed, a 545MB hard drive, multimedia, and some CD-ROM titles—not a bad deal for $2280. *Polywell Computers, Inc., 800/999-1278* **Reader service no. 846**

Robotech Cobra RS p100 Graphics Workstation

PROS: Superfast, 1GB hard disk, very good software bundle

CONS: Pricey, expensive, CD-ROM drive slow for a quad-speed

The $4099 Cobra isn't cheap, but it combines top-notch graphics with killer speed. This tower is almost Top 20 material. *Robotech, Inc., 800/533-0633* **Reader service no. 847**

SmartWorks MT90PI

PROS: 17-inch monitor, 1GB hard drive

CONS: Slow compared with a typical Pentium-90

This $3195 Pentium-90 tower has great features, including a large monitor, a capacious hard disk, and a quadruple-speed CD-ROM drive, but it's on the slow side for its CPU class. *SmartWorks Corp., 800/441-2210* **Reader service no. 848**

Introducing ABC FlowCharter 4.0. The reigning business graphics heavyweight.

When it comes to creating high-quality business diagrams, new ABC FlowCharter 4.0 gives you ultimate power, flexibility and control. The program is loaded with four fully-integrated modules specifically designed to meet the demands of the business graphics user. Whether you need to create complex flowcharts for TQM and BPR, analyze your statistical data, or simply pull together clean, colorful presentation charts in a matter of minutes, ABC FlowCharter 4.0 can help you accomplish your mission. Only ABC FlowCharter 4.0 features automatic line crossovers, intelligent line routing and data fields. And those are just a few of the features we've added to make your life easier. Right now you can get ABC Flowcharter 4.0 for as little as $99.95 upgrade. And you can upgrade from any business graphics program you already own. No other program gives you such complete power for so little. If you want to settle for less, it's your business. Contact your favorite reseller or call **1-800-775-6131.**

FEATURES	ABC FlowCharter	Visio 3.0	CorelFLOW2.0
Intelligent line routing	★		
Automatic add/delete shapes	★		
Automatic line crossovers	★		
Data fields	★		
OLE 2.0 automation	★	★	
Royalty free flowchart viewer (ABC Viewer™)	★		
Statistical Process Control Charting (ABC DataAnalyzer™)	★		
21 pre-defined diagram templates (ABC SnapGraphics™)	★		

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Circle 182 on reader service card

Tadpole P1000

PROS: Superfast, 810MB hard disk, 10.4-inch active-matrix color screen, integrated sound

CONS: Ultrapricey, 9.2-pound weight, 2-hour battery life

Here's the first Pentium notebook to hit 100 MHz. This Pentium-100 has blazing speed, 32MB of RAM; a spacious, vivid active-matrix color screen; and one of the roomiest hard disks you can find in a notebook computer. But short battery life, heavy weight, and an ultrasteep $9995 price put the brakes on this speedster. *Tadpole Technology, Inc., 800/232-6656* **Reader service no. 849**

USA Flex 100MHz Pentium Power System

PROS: Fast, multimedia, 17-inch monitor, three-year warranty

CONS: High price, limited expandability

Pricey ($4995) multimedia P-100 with a 1GB hard drive and 17-inch monitor. *USA Flex, Inc., 800/872-3539* **Reader service no. 851**

FEATURES COMPARISON This Month's Contenders—Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	Gateway 2000 Liberty DX4-100	MPC TouchNote 700	Toshiba Satellite Pro T2150CDT
Street price as of 3/31/95 [1]	$2979	$2345	$5199
CPU	DX4-100	DX4-75	DX4-75
Traveling weight (pounds) [2]	6.6	7.6	8.8
Width x depth x height (inches)	10 x 8 x 1.1	11.1 x 8.5 x 2	11.7 x 8.8 x 2
Installed/maximum RAM (MB)	8/24	8/32	8/32
Secondary RAM cache installed/maximum (K)	256/256	0/0	0/0
Installed/maximum hard disk (MB)	352/720	528/810	500/500
Removable hard disk	●	●	○
Display type	color dual-scan	color dual-scan	color active
Screen diagonal (inches)	10.4	9.4	10.4
Maximum colors or gray shades of LCD	256	256	65,536
Simultaneous LCD and external monitor	●	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768
Mouse/keyboard ports	1/0 [3]	1/0 [3]	0/1
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
Docking station available	○	●	●
PC Card (PCMCIA) slot Type II/III	0/1 [4]	0/1 [4]	0/1 [4]
Power management			
Supports APM	●	●	●
Type of battery	NiMH	NiMH	NiMH
Suspend button	●	●	○
Suspends when case closed	●	●	●
Service and support			
Warranty (years)	1	1	3
30-day money-back guarantee	●	●	○
On-site/replacement service first-year price	○	○	$50
Repair turnaround policy (days)	○	○	2
Daily toll-free phone support (hours)	18	8.5	24
Weekend support	● [5]	○	●
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 keyboard port.

[4] Type III slot alternatively holds two Type II devices.

[5] Saturdays only.

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The LitePro 580 has built-in video support and stereo speakers. Yet it's about the size of an ordinary slide projector. It's packed with other features, too, like a zoom lens that will fill a 25-foot wall with your image. And a remote control with trackball that operates your PC or Mac like a wireless mouse.

New polysilicon active matrix means you get the highest image quality of any LCD projector.

Plus, it's got the latest polysilicon active matrix LCD. Together with advanced dichroic optics, it gives you the brightest image (over 200 lumens reflected off the screen) and the truest, most saturated colors of any LCD projector. So you can give outstanding full-motion multimedia presentations and training sessions without dimming the lights.

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Circle 132 on reader service card

How Apple is making it easier to move a refrigerator like this.

Today's sales environment is more competitive than ever. Which is why Whirlpool armed its field force with the ultimate sales weapon: the Macintosh® PowerBook® computer.

The reason? Says Erv Barnes, "After evaluating all the notebooks on the market, we chose PowerBook because it was by far the easiest for any salesperson to learn. Instead of becoming a doorstop, the PowerBook is being adopted by the field with unbelievable enthusiasm."

Salespeople are able to tap into Whirlpool's information base at the home office to get competitive information, pricing, inventory data—instantly, during a sales call. This way, they can answer questions more quickly and accurately, make better-informed decisions, appear more professional and, ultimately, close more sales. Plus, with the built-in multimedia capabilities of the PowerBook computer, salespeople can show videos and animations, making a normal sales presentation more persuasive than ever.

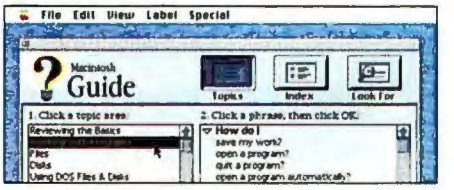
All of which can give your salespeople a new power, too. The power to be more responsive, more productive, more effective. The power of Macintosh. The power to be your best.®

Erv Barnes (left), Director of Information Technology, and Ed Herrelko (right), Executive Vice President of Group Sales, at Whirlpool Corporation, Benton Harbor, Michigan

"Making the sale means having the answer. With this computer, we can get the information our customers need, right on the spot. Making the sale means being persuasive. By delivering presentations on the PowerBook, we can get our point across with enormous impact. Combine this with the fact that it works with our mainframes, Intel-based PCs and Windows, and we're talking about a tool that's not just giving us a competitive edge. It's transforming the way we do business."

–Ed Herrelko

This is Whirlpool's interactive on-screen sales presentation. With it, salespeople can show video clips of Whirlpool commercials and product demonstrations—a more dramatic and impactful way to sell competitive product advantages.



Your salespeople want to sell, without being confused by complex technology. With features like Apple® guide—which takes users step-by-step through the Macintosh—Whirlpool's people mastered the computer with minimal training. Yours can too.

The Macintosh PowerBook is compatible with Whirlpool's PCs and mainframes.* From any remote location, their salespeople can effortlessly tap into Whirlpool's vast store of product information—for immediate answers to customers' questions

To learn more about how you can arm yourself—and your sales force—with the Macintosh PowerBook, call **1-800-332-2932** (ask for **ext. 100**), to receive the free Apple Mobile Solutions kit.

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Apple

*Whirlpool uses Remoteware from Xcellenet, Inc. for access to the IBM mainframe. Passport for Macintosh from Advantis for IBM 3270 terminal emulation and cc:Mail Mobile from Lotus Development Corporation to exchange e-mail between Macintosh and Windows environments.

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USA Flex 486DX4/100MHz System

PROS: Multimedia configuration, 14.4-kbps fax-modem

CONS: Case crowded with wires, all VL slots occupied

Multimedia, DX4-100 speed, fax-modem, 850MB hard drive—okay for $2289. *USA Flex, Inc., 800/872-3539* **Reader service no. 850**

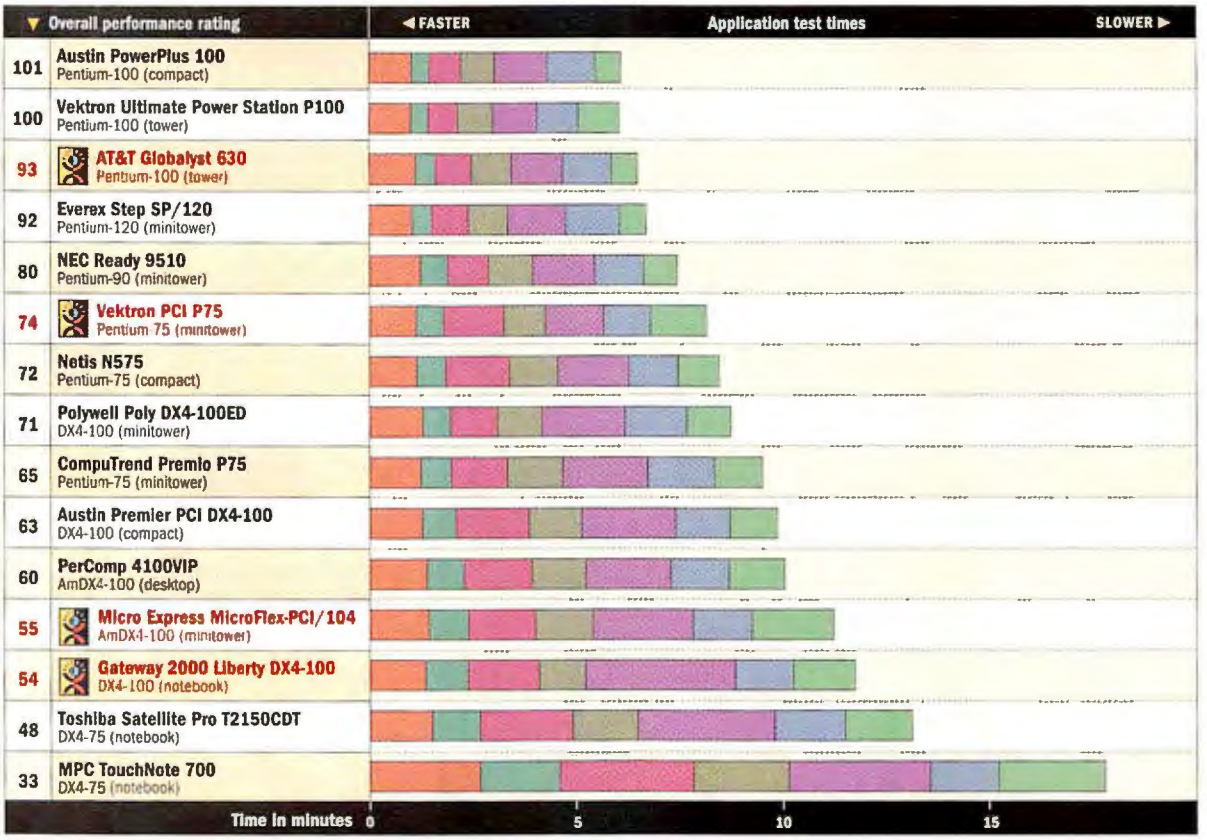
WinBook XP DX4-100 8/260 Dual-Scan

PROS: Excellent performance for a low price

CONS: Short battery life, one-year warranty

This WinBook DX4-100 performs well for its CPU class and is decently appointed for its low $2348 price. The 260MB hard disk is considered small these days, but you get a large 10.3-inch dual-scan color screen and a 14.4-kbps fax-modem. However, the battery delivers only 2.5 hours of life, which keeps this budget-priced unit off our Notebook PCs Top 20 chart. *WinBook Computer Corp., 800/468-2162* **Reader service no. 852**

This Month's Contenders



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.

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

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BUT THEY AREN'T, SO DON'T.

*Overall performance scores (measured in WITS) as published in the March issue of PC World.
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RELIABILITY AND SERVICE MONITOR

Win an HP Vectra VL3 5/120

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 Hewlett-Packard Vectra VL3 5/120, a Best Buy Pentium-120 PC.

HOW TO ENTER: 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 7-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by July 31.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact 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 ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin ○ Axik ○ Blackship ○ Canon ○ Compaq ○ CompuAdd
○ Compudyne ○ Comtrade ○ Cornell ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ Eltech ○ EPS ○ Epson ○ Everex
○ Future Tech ○ Gateway 2000 ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS
○ Mitac ○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ Pionex ○ Polywell ○ Quantex ○ Samsung ○ Sharp ○ Swan ○ Tandy
○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ Twinhead ○ USA Flex ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ 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 ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 90 ○ 91 ○ 92 ○ 93 ○ 94 ○ 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 ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

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 ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 90 ○ 91 ○ 92 ○ 93 ○ 94 ○ 95

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Wrong configuration ○ Device conflicts ○ Other ○ Incorrectly installed software ○ Faulty peripheral ○ OS problem ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer ○ Dealer/store where purchased ○ Manufacturer's authorized repair technician ○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 1½–4 weeks ○ More than 1 month ○ Never resolved ○ Awaiting resolution

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

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Circle 181 on reader service card

Top 10 Windows Accelerators: Meet the Video Generation

If you're not convinced yet that multimedia is here to stay, take a look at this month's Top 10 accelerators. Our list features four value-packed newcomers that combine full-motion video capabilities with impressive graphics talents, letting you run the latest graphical business apps and video-heavy CD-ROM titles with equal aplomb. Of the 12 video accelerators we review this month (see "Fast Forward: Full-Motion Video Boards"), the Diamond Stealth Video, STB Velocity 64V, Hercules Stingray 64/Video, and miroVideo 12PD all made it onto our Top 10. Whether you're scrolling through a Microsoft Excel worksheet or looking up a video clip in Compton's Encyclopedia, video-enabled Windows accelerators offer terrific value.

Four newcomers run graphical business apps and CD-ROMs with equal aplomb.

How do they do it? By combining excellent graphics performance with affordable prices. The $299 STB Velocity 64V landed at number six on our list thanks to an astounding 82.4 WITS score—due in part to its new video-capable S3 Vision968 chip. The $233 Diamond Stealth Video used the DRAM version of this chip—the Vision868—to race to an 80.7 WITS score and a fourth-place finish. Number eight, the Hercules Stingray 64/Video, came in with a WITS score of 75, making it the slowest board on our list. But with its low $195 price, the Stingray is the cheapest video-enabled board on the street. Meanwhile, the $229 miroVideo 12PD clocks in at number ten with a respectable 77.4 WITS score and good video performance.

But speed alone doesn't propel a board onto our Top 10. The Number Nine 9FX Motion 771 and Genoa VideoBlitz III AV produced the best WITS scores we've ever seen, but their high prices ($329 and $369, respectively) kept them out of the running. The best accelerators also give you a little extra for your money—like pan and zoom functions and easy resolution and color switching. Diamond has added a video playback and frame counter module to its InControl Tools software, and STB, Hercules, and ATI all stand out with excellent utilities. Boards from Number Nine and Matrox also boast impressive ease of use.

WITS was developed by Jon Peddie Associates, a PC graphics consulting firm. Jon Peddie and Fred Dunn are the firm's principal officers.

TOP 10 ACCELERATORS

▶ New this month
▲ Up from last month
◀ No change from last month
▼ Down from last month

		Overall value	Street price	Windows Integrated Test Suite scores: Word 2.0 for Windows	Excel 4.0	CorelDraw 3.0	PhotoStyler 1.1	QuarkXPress 3.11	Freelance Graphics 2.01	Overall WITS score	RAM (MB/type)[1] Bus type	Chip Driver date	Reader service number
1	◀ Hercules Terminator 64 DRAM 800/532-0600	100	$199	14.3	17.3	13.7	12.8	17.0	7	82.1	2 / D PCI	Trio64 2/16/95	605
2	◀ STB Powergraph 64 800/234-4334	99	$180	13.6	16.5	13.7	11.7	16.7	6.1	78.2	2 / D PCI	Trio64 7/11/94	606
3	◀ rPC FireStorm64 800/541-7680	98	$200	13.9	16.9	13.8	11.6	17	6.8	79.9	2 / D PCI	Vision864 3/1/95	607
4	▶ Diamond Stealth Video [2] 800/468-5846	97	$233	14.4	17.5	13.6	11.6	17.2	6.4	80.7	2 / D PCI	Vision868 3/9/95	608
5	▼ Diamond Stealth 64 DRAM [3] 800/468-5846	96	$219	14.2	17.1	14.3	11.7	16.8	6.1	80.1	2 / D PCI	Trio64 10/29/94	609
6	▶ STB Velocity 64V [2] 800/234-4334	96	$299	14.3	18	14.4	11.6	17	7.1	82.4	2 / V PCI	Vision968 3/10/95	610
7	▼ Paradise Bahamas 64 800/568-9272	96	$179	13.7	16.4	13.3	11.3	16.6	6.3	77.4	2 / D PCI	Vision864 7/11/94	611
8	▶ Hercules Stingray 64/Video [2] 800/532-0600	96	$195	13.8	16	13.7	11.8	16	3.8	75	2 / D PCI	Ark2000PV 10/27/94	612
9	▼ ATI Graphics Xpression 905/882-2600	95	$209	13.4	16.6	13.2	11.6	15.6	4.8	75.1	2 / D PCI	88800CX 4/11/94	613
10	▶ miroVideo 12PD [2] 800/249-6476	94	$229	14	16.9	12.7	12.3	15.8	5.8	77.4	2 / D PCI	Promotion	614

Methodology Boards were tested at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall value score balances performance, estimated street price, and features. The overall WITS score is the aggregate of the application scores. For all scores, higher is better.

[1] D = DRAM, V = VRAM. [2] Also includes video acceleration on board. [3] Comparable value offered by other bus versions tested. **For more information about all products in this table, circle reader service no. 903.**

Pentium® processor power at an entry-level price.

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- 1MB of video RAM standard, expandable to 2MB
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- Integrated 32-bit PCI Fast SCSI-2 and Enhanced-IDE interfaces
- Integrated 64-bit PCI, S3 Vision-964 graphics with 1280 x 1024 resolution or Matrox Impression Plus graphics with up to 1600 x 1200 resolution
- 8 or 16MB of RAM standard, expandable to 256MB
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- Pre-loaded Desktop Management Interface (DMI)
- Free three-year limited warranty for parts and labor[2]

from
$2,529*

intel inside
pentium PROCESSOR

yes NetWare Tested and Approved

[1]In Canada, call 1-800-387-3867. *Average U.S. street price. Monitor not included. [2]Source: 1994 J.D. Power and Associates Desktop PC Customer Satisfaction Study.[SM] Study conducted among business. Second and third year, return to dealer. MS-DOS is a U.S. registered trademark and Windows is a U.S. trademark of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. registered

How to compare

HP PCs

with IBM's and Compaq's:

start at the bottom line and work up.

No matter whose PCs you look at, you won't find a better value than HP's.

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We believe this commitment helped us to be ranked highest in customer satisfaction among desktop PC business users by J.D. Power and Associates.[1] And made us the fastest-growing desktop PC brand for business in 1994. For more information or the name of your nearest HP dealer, call us at 1-800-322-HPPC, Ext. 9386.[2] Encouraging comparison really works for us.

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sers and based on 1,528 user respondents. **Other capacities available. All HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse and keyboard. ²First year, on-site, 24-hour service.
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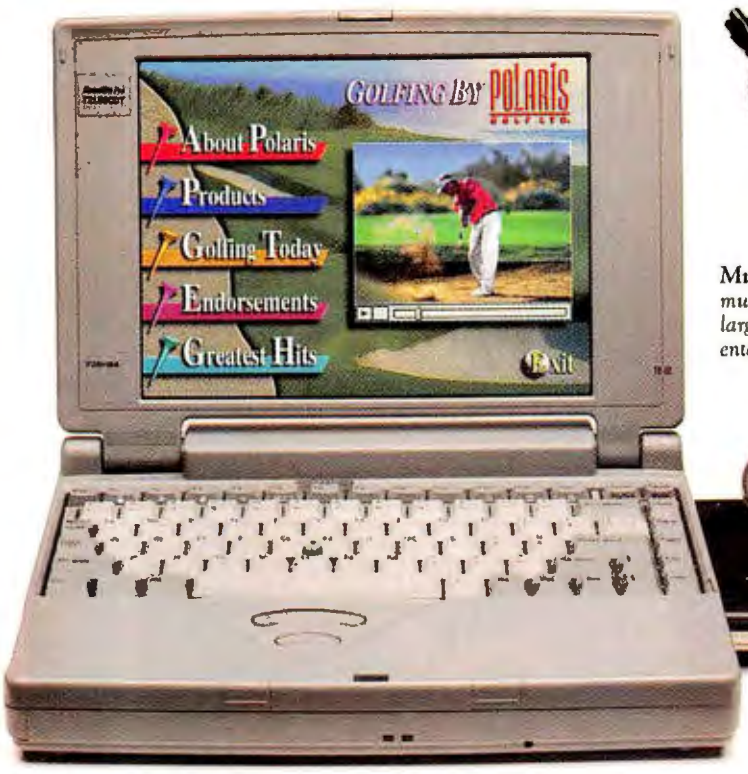
AT A PRICE YOU CAN TAKE.



Built-in power supply: *Engineered for ultimate portability, there's no bulky external AC adapter to carry, just a slim power cord.*

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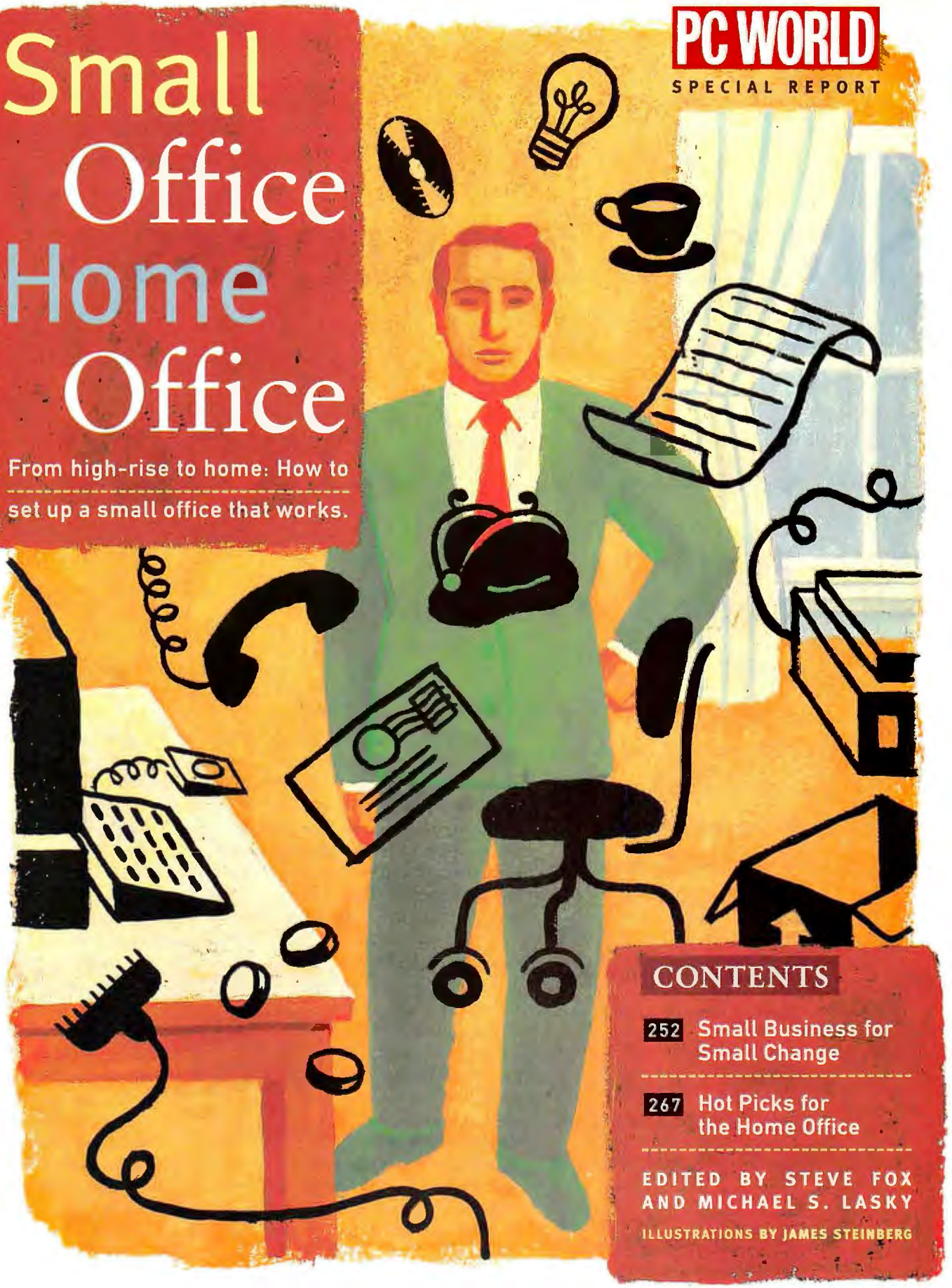
*T2150CDS product is sold at selected resellers as T2155CDS with Microsoft Windows and additional pre-installed software.

Circle 226 on reader service card

PC WORLD
SPECIAL REPORT

Small Office Home Office

From high-rise to home: How to set up a small office that works.



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267 Hot Picks for the Home Office

EDITED BY STEVE FOX AND MICHAEL S. LASKY

ILLUSTRATIONS BY JAMES STEINBERG

Small Business *for* Small Change

Tips for running your business on a shoestring.

FOR MANY SMALL BUSINESSES, every penny saved can be a vital link in the survival chain. But occasionally, as the adage says, you can be penny-wise and pound-foolish. How can independent entrepreneurs do things cheaply without compromising quality or expending too much valuable time? Answers to the following frequently asked questions offer inexpensive solutions for businesses with limited capital.

By Kristin Anundsen

Where can I get the best deals on software?

Mail-order outfits offer software for as little as half the suggested retail price. Check out the ads for mail-order companies in computer publications such as *PC World*. Generally, you'll find the listings in the back of each issue. Remember that ordering from a firm outside your state will often save you sales tax as well, though you'll have to pay for shipping.

National chains such as Price Club/Costco and Sam's Club offer prices close to wholesale on selected major office applications. For a greater variety of titles, check out major computer and office supply outlets like CompUSA, Egghead Software, and Office Depot. It's not uncommon for these stores to offer discounts of up to 50 percent off the suggested retail price.

If you are in the market for a new computer, many retailers offer special software bundles as an incentive to buy. Often the application you need will be part of that package. But if it isn't, don't be afraid to ask for the software to be thrown in as part of your hardware deal.

You can also download shareware from bulletin boards or commercial online services like CompuServe, America Online, and Prodigy. Once you've evaluated a program, you pay a small fee—usually between $5 and $50—to register.

If you are modemless, consider getting a collection of shareware on CD-ROM. While the majority of these compilation discs are a potpourri of applications, utilities, and games, some of them—Quantum Axcess's Home Office Executive for Windows, for example—offer appli-

cations tailored to the needs of the small or home office.

• Home Office Executive for Windows $14.95; Quantum Axcess; 800/867-4890

Reader service no. 695

When should I invest in multiple phone lines?

An extra line costs extra money—typically from $12 to $32 per month plus installation, depending on where you live and whether you are listed as a business or a residence. That extra expense, however, can be money well spent. You'll need a separate line for your business if you live with other people who use your phone, have a high volume of phone *and* fax work, use E-mail as well as phone and fax, or need to keep your business phone charges separate from your personal ones.

But don't go to the expense of an additional line until you're sure you need it. And consider less expensive options. For instance, check with your local phone company about prices for special services, such as voice mail that takes messages while you are on the phone. But beware of call waiting, which irritates some callers and can interrupt data transmissions inadvertently.

Should I buy a multipurpose (fax, printer, scanner, photocopier) machine rather than separate equipment?

When multipurpose machines first hit the market, you were likely to pay a premium of $100 to $150 over what you'd spend if you bought the components separately—just to save space.

Now, for around $700 total, you can buy an HP OfficeJet, a combination ink jet printer, plain-paper fax, and low-end scanner/photocopier; separate comparable components would cost $1200. Lexmark's new Medley 4sx provides similar functions, plus color, for roughly $900—about the

The Canon Color Scanner that's *really* just an

The Canon* IX-4015 is the smallest flatbed color scanner there is. But even though it can fit in a small cubbyhole, it will open up a world of possibilities for you.

At the click of the Autoscan button, you'll be able to scan in artwork, a photo or a line drawing. And easily give all your fliers, brochures, even family projects, that professionally polished look.

The OFOTO* 2.0 software does all the hard stuff--cropping, straightening and sharpening the image--while Caere's OmniPage* Direct OCR software scans your documents right into your word

*When used with the PC version and a color printer. †The IX-4015 sells for under $799, but dealer prices may vary. ©1995 Canon Computer Systems, Inc. Canon is a registered trademark of Canon

Perfect for the corner office office in the corner.

Project a worldly professional image. Or just have fun with the family.

processor, just as if you typed them yourself. (FYI, the Canon IX-4015 can double as a color copier.*)

You'll also be happy to know, the Canon IX-4015 comes with a two-year limited warranty, as well as a price tag that fits nicely in even the tightest family budget!

For more information on the Canon IX-4015 scanner, just give us a call at 1-800-848-4123, Ext. 600. Remember, we're in your corner.

Canon

imPage Direct is a registered trademark of Canon Corporation. All other trademarks are properties of their respective owners. CCSI, 2995 Redhill Ave., Costa Mesa, CA 92626. In Canada, call (800) 263-1121, Ext. 600.

Claude Whitmyer, coauthor of *Running a One-Person Business*, says it's best to not depend on accounting software alone.

same street price as the Xerox 3002.

There is an obvious drawback to these machines, however: When the printer component breaks down and you have to send the unit in for repair, you're suddenly without a fax, copier, and scanner as well.

• HP OfficeJet $860; Hewlett-Packard; 800/752-0900

Reader service no. 696

• Lexmark Medley 4sx $999; Lexmark Int'l; 800/358-5835

Reader service no. 697

• Xerox 3002 $1549; Xerox Corp.; 800/275-9376

Reader service no. 698

Does it pay to incorporate?

For a home business, probably not. For a small business, it depends. Most home businesses are sole proprietorships: There is no legal wrangling; you simply announce that you're in business.

Incorporation, on the other hand, will cost you—initially and every year thereafter. Moreover, your paperwork will multiply. For instance, after incorporation you'll have to file corporate as well as personal income taxes.

According to San Francisco small-business consultant Paul Terry, people generally incorporate to get a tax advantage, to sell shares or parts of the business, and to avoid liability (unlike with a sole proprietorship, debts and damages that have been incurred by a corporation cannot be assessed against the owner personally). In certain situations, however, you and your business can be sued separately, so incorporation is not a complete shield against liability.

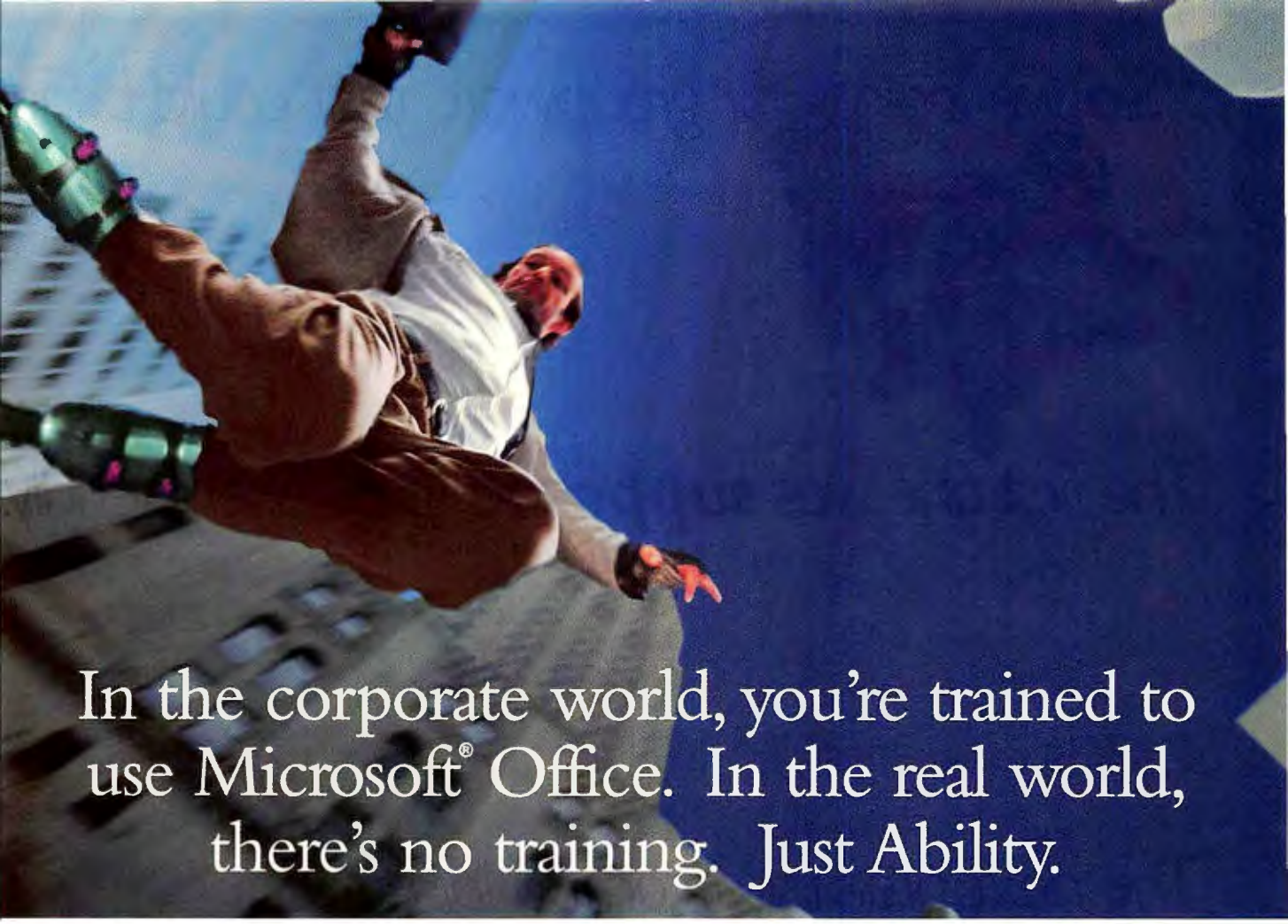
The amount of tax savings depends on the dollar volume of your business as well as the state in which you live, and may be negligible. (Before you do anything, check with your accountant.) One other downside to incorporation: You can't use business losses to offset income on your personal tax return, as you can in a sole proprietorship.

How can I build a client list inexpensively?

The best source of new clients is referrals from current clients. The next best source: everyone else you know. Put every potential lead into a database right away, and update names and addresses quarterly. If you're looking to build a quick list, association or convention directories are an inexpensive way to go.

"The more specific your list, the better your response rate will be," points out Alan Cundall of Hayes Orlie Cundall Advertising in Sausalito, California. "You can get a list of left-handed Hispanic paperhangers, if that's your target." List brokers and mailing houses rent lists for $30 up to $200 per thousand names, per use. (The more targeted the list, the pricier it is.) Investigate the broker and the source of the data to make sure the list is accurate. To get broker referrals, contact the Direct Marketing Association in New York (212/768-7277).

ANDY FREEBERG



In the corporate world, you're trained to use Microsoft® Office. In the real world, there's no training. Just Ability.

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Ability gives you everything you need to get to work fast. No training course. No phone-book-sized how-to manual. No confusing or unnecessary features. Just all the tools you need, organized the way you want them.

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System Requirements: Minimum 386 w/ 4 MB RAM Windows 3.1; 20 MB of hard disk space Optimal 486 SX w/ 8MB RAM © APS (America) Ltd., 1995 **Ability Plus Software** 6816 Morrison Boulevard, Charlotte, NC 28211-3579 Phone (704) 364-3346 or 1-800-522-3340 FAX (704) 364-5676 Compuserve GO ABILITY E-MAIL: info@ability.com URL: http://www.ability.com/ Microsoft® is a registered trademark of Microsoft Corporation.

Circle 71 on reader service card

"**So** we looked for groupware that could bring

The first one was **supposed** to be user friendly.

The next promised compatibility.

been okay. If we had lots of **time** to waste.

group, isn't there something that can turn us

us all together.

Not exactly.

They lied. *One would have*

Come on, we've got a good

into a ***team?"***

All it takes is TeamWare™ Office: the complete suite of productivity applications that turns any group into a team, fast.

TeamWare Office includes e-mail, info sharing, document library, work flow, and a team scheduler, all fully integrated. It supports the Windows™ applications you're probably already

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There is simply no other product like it. TeamWare Office. Less work, more teamwork.

TeamWARE

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Circle 43 on reader service card

Which is cheaper: printing or photocopying?

	Your printer		Copy shop[1]		
	Laser (HP LaserJet 4L)	Ink jet (HP DeskJet 540)	Chicago	New York	San Francisco
10 copies	$0.35	$0.43	$0.50	$1.00	$0.50
100 copies	3.50	4.30	2.00	10.00	2.00
500 copies	17.50	23.00	9.50	50.00	9.50
1000 copies	35.00	43.00	19.00	80.00	18.00
5000 copies	1750.00	2150.00	95.00	260.00	90.00

[1] Lowest price quoted in calls to three photocopy shops in each city.

Except in New York, it's cheaper to send jobs of over 100 copies to a copy shop. Your printer might be more convenient, but you pay a premium.

Can I save money by photocopying instead of printing?

It's generally cheaper to print out small jobs—especially if you have a laser printer—than to use the copy shop. Studies show that laser printing costs about 3.5 cents per page. (For example, a $70 toner cartridge for the Hewlett-Packard 4L laser printer is good for 3000 pages—a bit more than 2 cents per page. If you figure paper costs a minimum of a penny a page, then a laser printout will average 3.5 cents per page.) Photocopying, on the other hand, can cost up to 10 cents per page for 100 pages or less. (See chart at left.)

The more pages you reproduce, however, the less this principle applies. When you duplicate a page more than 100 times, photocopying costs fall rapidly—to as little as a 1.8 cents each in the most competitive markets. And relying on your printer can mean tying up your PC until the print job is done, thus costing you work time—and that equals money.

If you're making more than 1000 copies, check your copy shop's prices for offset printing, which frequently costs less than photocopying.

Wear and tear on the printer is *not* a factor worth a home office user's consideration, says HP product marketing manager Linda Crozier. "We don't even specify life expectancy of a printer in terms of pages."

Business Advice for Free

When Hal Smith's Minneapolis employer eliminated his division but gave Smith the rights to the laboratory equipment–testing product he'd been working on, Smith decided to strike out on his own and become self-employed. However, he lacked not only capital but also business expertise. So he turned to the Minneapolis office of SCORE (the Service Corps of Retired Executives), a division of the U.S. Small Business Administration (SBA).

SCORE's Bud Levinger, whose varied business background includes marketing, finance, and engineering, became Smith's personal counselor. Over the course of a few free, hour-long sessions, Levinger instructed Smith in some of the basics: how to write a business plan, keep records, and take a product to market. He also provided a list of venture capitalists in the Twin Cities area. Smith was soon launched in a thriving enterprise.

SCORE, which has 13,000 volunteer consultants and 300 offices nationwide, also offers low-cost workshops. And it's only one of many fonts of business lore from which a shoestring entrepreneur can drink. In fact, there's so much free, or almost free, advice to be had that you'll never again be able to reasonably use the excuse "I didn't know how." Here are some more sources:

Government Entities

The SBA maintains a library of publications and videotapes, some free and others cheap. Check your local telephone book, under the United States government listings, or call the national SBA answer desk at 800/827-5722. Some SBA locations feature chapters of ACE, the Active Corps of Executives, as well as of SCORE.

Small Business Development Centers, usually administered by the state and often affiliated with local universities, offer free one-on-one consulting, business data, publications, permit and licensing assistance, and other aid. Such centers may go by a different name in your area; check with your state's Department of Commerce or another economic development organization.

Business Incubators

Business incubators, sometimes called *microenterprise incubators*, are a hot new trend, offering low-cost or (occasionally) free assistance ranging from consulting and workshops to space where you can share office equipment, meeting rooms, and the company of others.

"We target women, minorities, and lower-income people who have traditionally had difficulty starting or growing a business, but we're open to others, too," says Claudia Viek, executive direc-

What's the least expensive approach to shipping?

Short messages: If your clients are information-highway savvy, you can send E-mail to their online service or Internet address. Obviously, you'll save big on postage and paper.

If you rely on faxing, try to do it after 11 p.m., when phone rates are lowest and signal throughput is fastest. Any decent fax machine or fax software package can schedule a fax for later transmission.

1-ounce mailings: Postal regulations are so complex that your first step should be to talk with your local postal business center rep.

In general, you save money by doing as much of the post office's job as possible: presorting, bar coding, bundling, and supplying carrier route numbers. If you mail to ten addresses on the same carrier's route, for example, you may pay as little as 15 cents for third class or 25.4 cents for first class per piece.

The next-cheapest rates are for mail with delivery-point bar codes (16.6 cents third class, 25.8 cents first class) if you meet quantity and package or tray requirements.

The bulk mailing fee of $85 per year is cost-effective only if you mail more than 2000 pieces a year. To do your own bar coding, you need post office–certified software—a common feature of label printing packages.

Packages: For shipment of a 5-pound package from New York to Los Angeles, the U.S. Postal Service's Priority Mail, at $6, beats other

ANDY FREEBERG

"We target women, minorities, and lower-income people," says Claudia Viek, executive director of the San Francisco Renaissance Entrepreneurship Center.

tor of one such outfit, the San Francisco Renaissance Entrepreneurship Center. Renaissance, which receives funding from the Department of Housing and Urban Development as well as from businesses and foundations, is part of a nationwide network of 600 centers. For information, contact the National Business Incubation Association (614/593-4331).

Networking Through the Net

Want to chat with someone who's met and conquered the very problem you're now facing? Go online. Find a forum on your favorite bulletin board, or check in with one of the larger commercial networks. CompuServe, for example, offers both the Entrepreneur's Small Business Forum (**go smallbiz**) and the Working from Home Forum (**go work**). Or head to the Internet, where the SBA offers assistance at **gopher.sbaonline**, and **sba.gov**. Locating addresses on the World Wide Web may require some persistence, but several online sources can direct you, including the news group **misc.entrepreneurs**, and the Web address **http://www.yahoo.com**. Or look at telephone-style directories, such as *The Internet Yellow Pages*.

• *The Internet Yellow Pages*, 2nd ed. (Osborne/McGraw-Hill, $29.95, 1995, 800/822-8158)

Reader service no. 699

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STARTING

A NEW BUSINESS

IS SIMPLY

A MATTER OF

KNOWING WHERE

TO TURN.

The uncertainties of starting a business could corner you. You need information, but don't know where to find it. Quickly and easily. How do you get special government financing? Or build a business plan? What about tax laws? Just to name a few...

But now there's help. Introducing AT&T Resources for New Business.℠ Only from AT&T.

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Circle 30 on reader service card

carriers. However, delivery time isn't guaranteed. For that same 5-pound package, Federal Express guarantees overnight delivery for $32.50. FedEx offers discounts for heavy users.

Can I save by using accounting software rather than an accountant?

Accounting software is inexpensive; for example, you can pick up the popular Peachtree Accounting 3.0 for Windows for about $115. Tax software costs even less—around $35, for example, for TurboTax for Windows. But at tax time you'll probably need an accountant, too. No computer program will give you personalized financial planning advice, provide tips on the latest tax-law changes, or attend your audit.

"Never rely on software to get you the best tax break," advises Claude Whitmyer, coauthor of *Running a One-Person Business.* "It's almost always worth it to have an accountant at least look over your figures before you file; you're likely to save a lot more than the accountant charges you." But using such software to generate the figures will save the accountant's time and thus lower the fee.

- Peachtree Accounting 3.0 for Windows $169; Peachtree Software; 800/228-0068

Reader service no. 700

- TurboTax for Windows $35 (street price); Intuit Inc.; 800/964-1040

Is there an inexpensive way to make my office ergonomic?

"People who exercise or practice yoga for health will put up with the most abusive work environments," points out Gordon Inkeles, the coauthor with Iris Schencke of *Ergonomic Living.* "People can easily transform their offices into user-friendly environments. There are lots of cheap, quick fixes available. For instance, if your computer or printer is noisy, you can put foam pads underneath the machines to reduce the decibel level."

Repetitive-strain injuries, aches, and eyestrain can be costly in terms of both medical expenses and lost productivity. But what if you can't afford fancy ergonomic equipment, such as a $2000 BodyBuilt chair or a $600-or-more workstation? Here are some economical approaches to body-friendly work environments.

Wrist support: When you type, elbows should be roughly at a right angle, with wrists level. If your keyboard is too high, lower it with an under-desk shelf that's long enough to accommodate the keyboard and mouse pad. Alternatively, you can raise your chair *and* use a footrest.

Back and neck support: Sit with both feet flat on the footrest or floor, not under the chair. Place the screen slightly lower than eye level. And remember to take frequent breaks.

Lighting and noise: Don't place your monitor facing or opposite a window—glare and reflection can hurt your eyes. Buy a diffuser for your overhead light, plus a dimmer (each about $3). Clamp a task light with a shielded grill on the desk (on the left side if you're right-handed).

Reduce noise by moving peripherals away from you. Listen to equipment before you buy.

Adds author Schencke: "If you buy one piece of ergonomic equipment, make it a chair. But you don't necessarily have to get an 'ergonomic' chair. Get one that has adjustable arms and good back support. Buying a secondhand chair is a good way to save money and get good value. Check used office furniture outlets or major office furniture companies such as Herman Miller Company and Steelcase Corporation, which sell refurbished equipment from their factories."

- *Ergonomic Living* (Fireside Books, $16, 1994, 800/223-2336)

Reader service no. 701

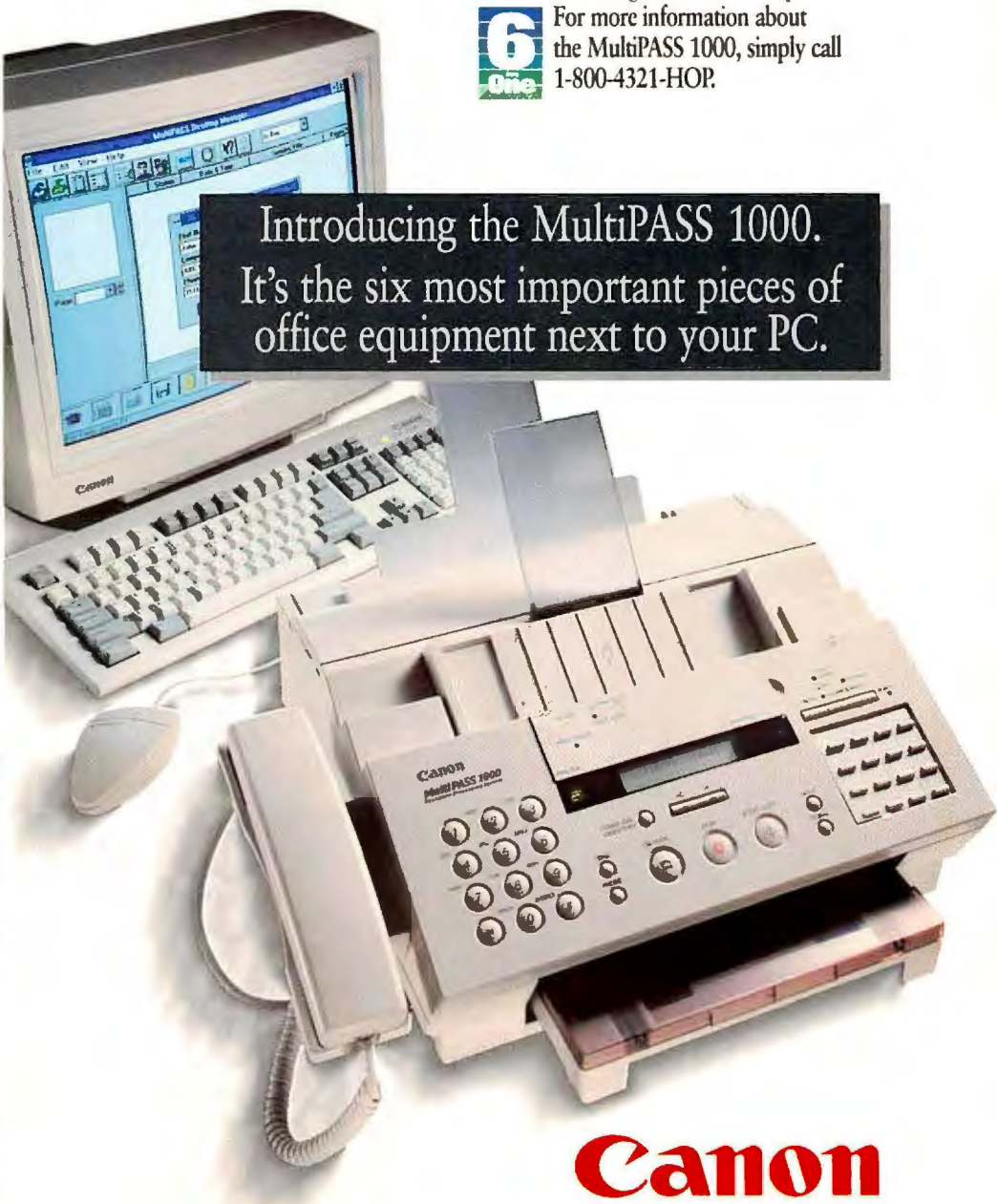
Kristin Anundsen is a business writer and coauthor of Creating Community Anywhere *(Jeremy Tarcher/Putnam Books, 1993, 800/788-6262).*

Cheapest way to ship documents from San Francisco to New York

	Package weighing 1 pound, 8 ounces			Document weighing 8 ounces		
	FedEx	UPS[1]	U.S. Postal Service	FedEx	UPS	U.S. Postal Service
Overnight	$21.75	$16.75	$15	$13	$9.50	$10.75
2-day	$11.50	$7.25	n/a	$9	$6	n/a
Ground	n/a	$4.17	$3 Priority Mail	n/a	$3.46	$1.93 First Class; $3 Priority Mail
Additional express pickup fees	$2.50 per package	$5 per pickup	$4.95 per pickup	$2.50 per package	$5 per pickup[2]	$4.95 per pickup

n/a = not applicable
[1] Price varies by distance.
[2] Except for same-day pickup of overnight letter, which costs an additional $1.75 per letter.

Introducing the MultiPASS 1000. It's the six most important pieces of office equipment next to your PC.

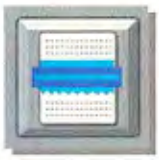


The MultiPASS™ 1000 Document Processing System. It combines a laser-quality printer, plain paper fax, a PC fax, a scanner, a personal copier and telephone — all in one compact unit. MultiPASS Desktop Manager for Windows™ software is included to manage printing, faxing, scanning and telephone functions. Plus you can print and fax from the Windows applications you're using now. MultiPASS is everything you need next to your PC. Everything.

It's a Printer. The MultiPASS 1000 incorporates 360 x 360 dpi award-winning Bubble Jet™ technology. It has a front loading, adjustable 200-sheet letter/legal paper cassette. The easy-to-replace, self-cleaning BX-2 (BC-02) ink cartridge snaps into place. And the MultiPASS 1000 supports popular printer emulations from Canon, IBM® and EPSON.®

It's a Plain Paper Fax. You get a 30-sheet auto document feeder for hard-copy faxing. Transmission speed is only 9 sec/page.* The MultiPASS 1000 uses Canon's Ultra High Quality (UHQ™) technology allowing it to scan photos in 64 halftone levels. Reception memory is 70 pages* and transmission memory is 50 pages.* What's more, you can send faxes even when your PC is off.

It's a PC Fax. With the MultiPASS 1000, you can fax directly from your PC at a speed faster than most faxboards. You can receive faxes while you're printing or when your PC is off. You can view faxes with zoom and full rotation, then save, print, forward or delete them. You can create a custom cover sheet and a virtually unlimited fax address book.



It's a Scanner. The MultiPASS 1000 offers TWAIN-compliant scanning with 200 x 200 dpi resolution and seven-level contrast control. It is compatible with most OCR software, enabling you to edit imported text without keying it in. And the 30-sheet auto document feeder lets you easily scan multi-page documents.

It's a Copier. You can make up to 99 laser-quality plain paper copies. The automatic document feeder holds 30 sheets and the front-loading, adjustable paper cassette holds 200 letter– or legal–size sheets. Canon's exclusive UHQ technology produces excellent copies of fine text and graphics.

It's a full-featured Telephone. The MultiPASS 1000 telephone has on-hook dialing. You get a virtually unlimited telephone address book for point-and-click dialing, plus coded speed dialing to 80 locations. It has a Distinctive Ring Pattern Detector for use with special telephone company services. Plus it has a hold button with melody and an answering machine hookup.

For more information about the MultiPASS 1000, simply call 1-800-4321-HOP.

Based on CCITT #1 Chart (Standard Mode) © 1995 Canon U.S.A., Inc. Canon is a registered trademark and MultiPASS, Bubble Jet and UHQ are trademarks of Canon Inc. Windows is a trademark of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. EPSON is a registered trademark of Seiko Epson Corporation. Canon computer not included.

Canon

Circle 50 on reader service card

Tiny had the hard part. Scanning it was easy.

Introducing HP ScanJet Scanners

They're simple to set up. Even simpler to operate. And with software that makes scanning more automatic, using HP ScanJet scanners has never been easier. The new HP ScanJet 3c now offers internal 30-bit color at 2400-dpi enhanced resolution (600-dpi optical), and also includes free Corel PHOTO-PAINT for PCs.* The HP ScanJet 3p delivers 1200-dpi enhanced resolution (300-dpi optical). Both come with OCR software. For more information, call 1-800-SCANJET, Ext. 9232.†

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Hot Picks *for the* Home Office

These are a few of our favorite things.

By Steve Bass

Fax Me, Call Me, E-Mail Me

Throw away your answering machine. Get rid of your fax. Here's something better: a hot add-in board that sends and receives faxes and E-mail, answers your phone, and—get this—doubles as a sound card. For a $300 street price, Spectrum's OfficeF/X combines a 14.4-kilobits-per-second (kbps) fax-modem (upgradable to 28.8 kbps) and a Sound Blaster–compatible, 16-bit, 32-voice wavetable MIDI sound card. The OfficeF/X is jumperless, so it's relatively easy to hook up; it also has Plug and Play support, so it's likely to be even easier to install when Windows 95 rolls around. Plus, it's smart: It figures out if an incoming call is a voice, fax, or data communication and then routes it to the appropriate software—whether the bundled WinFax Lite for faxes and WinComm Lite for data, or any other fax/communications package. OfficeF/X's voice mail features are pretty snazzy, with call holding and screening, remote message retrieval, and multiple mailboxes. OfficeF/X $349; Spectrum; 800/667-0018, 604/421-5422, 604/421-1754 (fax).

Reader service no. 705

Travel advisory: Scan short blocks of text into your laptop with the 2.7-ounce DataPen.

Lickety-Split File Finds

What's on your hard disk, is dreadfully important, and is impossible to find? Of course...the one file you need. If you used OnFile, you'd have your files available in seconds. It lets you annotate documents with long file names and add summary descriptions and Post-it–style notes. OnFile organizes files into books and chapters, a smart way to store files by project. And if you still can't locate that file, you can search for a word or phrase that you know appears in it. OnFile gives you thumbnail previews and the ability to look at—and print—most file formats. A trial version that runs for 30 days is available as **onfile.zip** on PC World Online. OnFile $49; Software Publishing Corp.; 800/336-8360.

Reader service no. 703

One Line at a Time

Want a quick way to jot down a few lines from a book, a newspaper, or a spreadsheet printout? Just skim the DataPen wand over the text, and it appears in whatever Windows application you're using. The DataPen reads up to 100 characters per sec-

PHOTOS: GIAMPIERO BENVENUTI

ond. Its OCR software—which has a claimed 99 percent accuracy rate—supports 12 languages and recognizes most typefaces, from 8 to 22 points. On the road, the 2.7-ounce DataPen is an easy travel companion, connecting to any available parallel port. I found the pen to be particularly convenient for scanning short blocks of text on the fly. For larger blocks, however, I'd stick with bigger scanners. DataPen $299; Primax Electronic; 800/338-3693.

Reader service no. 704

WordPerfect + Quicken = Suite but Lite

Not everyone needs the power of a Microsoft Office, Lotus SmartSuite, or Novell PerfectOffice—those giant, pricey combo packages that include a full-featured word processor, a spreadsheet, a presentation graphics program, and all the fixins. For users seeking greater simplicity and a shorter learning curve, there's Novell PerfectWorks 2.1 for Windows (formerly WordPerfect Works), a $99 integrated package packed with mini-applications that work well together. The word processing module is especially sharp, with QuickCorrect, which corrects misspellings as you make them (much in the same way as the correction feature in Microsoft Word); and Grammatik, a grammar and style checker. You can drag and drop data between PerfectWorks' applications, and the package includes a copy of Quicken Special Edition for Windows, which you can access from the PerfectWorks menu bar. Novell PerfectWorks 2.1 for Windows $99; Novell Corp.; 800/451-5151, 801/225-5000.

Reader service no. 709

Cram 1.25GB of data on the Pereos, the smallest tape drive we've seen.

Reach Out and Page Someone

Do your most important customers frequently need to reach you when you're out of the office? Instead of forcing them to call you on the telephone and sort through an incomprehensible jumble of voice mail instructions, why not give them Reach Me, a Windows program that enables users of modem-equipped computers to dial out and page you with just a click of the mouse. In addition, if you have a full-text pager (any brand will work), your customers' messages will appear verbatim. Pretty cool, don't you think? You get ten disks, each one preprogrammed with your name, phone number, and pager ID; all your customers have to do is install the disk on their computers. The label of the disk is customized with information about your business, so it can do double duty as a business card for important clients. Reach Me $49.95; Ex Machina; 800/626-8607, 212/843-0000.

Reader service no. 706

Big Backups in a Small Package

Datasonix's 10-ounce Pereos is not only smaller than a breadbox, it's smaller than the bread—and perfect for small offices that need to either synchronize or back up data on more than one computer. The high-capacity storage tape drive, which plugs into a parallel port, runs on two AA batteries or on an optional AC adapter. Though the Pereos's tape cartridges are no larger than a postage stamp, they hold a whopping 1.25GB of compressed data. The included backup software also transfers and synchronizes files between notebook and desktop PCs. While designed primarily for backups, the tiny device is handy for carrying and transferring large files that might otherwise clutter your hard drive. Pereos $749, tape cartridges $34.95; Datasonix; 800/328-2779.

Reader service no. 707

Zap, Your Data's Gone

Does your computer lock up spontaneously? Is your monitor covered with a layer of dust? The culprit: static electricity. Home offices, which often hold vacuum cleaners, lots of furniture, and heavy carpeting, tend to create more static electricity than do traditional offices. Static not only attracts dust, it can also corrupt data on floppies and hard disks and even cause PC crashes. One remedy is the UltraStat, an unobtrusive gadget that sits on your monitor and drains static from your PC. Once you install the unit, a touch on the strip eliminates all static, keeping it dust-free. The unit comes with a 30-day trial period and a five-year warranty. UltraStat $74.95; UltraStat Inc.; 800/460-7828.

Reader service no. 710

If you think a $10,000 hat is rare, try finding someone you trust to ship it.

Brent Black trusts Mail Boxes Etc.® to pack his rare Montecristi Finos© and ship them worldwide.

To Brent Black, Montecristi Finos® are more than just the world's finest Panama hats. They're an endangered species. "There are fewer than a dozen traditional weavers left in Montecristi, Ecuador who can craft the finest quality hats. By creating a market and, in turn, increasing demand, I hope to encourage more people to learn the weaving techniques and carry on the tradition."

After hand-picking the $200 to $10,000 hats in Ecuador, Brent brings them back to John Fay's Kailua, Hawaii Mail Boxes Etc.® for expert packing and international shipping via UPS.®

"Not only does John treat the hats like the works of art they are, he understands they're not just packages, they're my business."

MBE's expert packing is backed by the full range of UPS shipping services. From rapid overnight delivery to scheduled ground service to reaching destinations all over the world, MBE is your UPS connection.

We also provide full-service mailboxes, high quality copies, faxes, office supplies and more.

Mail Boxes Etc. has the support services you need, whether you're trying to save time, money, or even a dying art form. To find a Mail Boxes Etc. near you call 1-800-789-4MBE.

MBE MAIL BOXES ETC.

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Circle 150 on reader service card

AN NEC MULTISYNC® MONITOR?
AT THIS PRICE?
DID SOMETHING FREEZE OVER?

Well, here's something you probably didn't expect. Those premium NEC monitors that always seemed a bit beyond your reach have now eased their way right into your price range. Introducing the NEC MultiSync XV Series. Featuring our new 17" monitor (15.6" viewable image size), the optimum size for today's applications at the incredible price of only $799.*

MultiSync XV Series monitors are not only designed for your budget, but for the eyes of the people who will use them. Eyes that demand sharp detail, bright colors and crystal-clear images. Which is precisely what these monitors deliver.

The XV Series also delivers the legendary quality and reliability you expect from NEC, and is backed by a 3-year limited warranty – one of the best in the industry.

MultiSync XV17™
$799 ESP
17" Flat Square Technology CRT
(15.6" viewable image size)

Max. Res: 1280 x 1024 NI at 60 Hz
Recommended Res:
1024 x 768 NI at 76 Hz**

MultiSync XV15™
$480 ESP
15" Flat Square Technology CRT
(13.8" viewable image size)

Max. Res: 1280 x 1024 NI at 60 Hz
Recommended Res:
1024 x 768 NI at 76 Hz**

MultiSync XV14™
$330 ESP
14" Non-Glare CRT
(13.0" viewable image size)

Max. Res: 1024 x 768 NI at 70 Hz

Plus, the XV Series is ideal for both PC and Macintosh® systems and is one of the only monitor lines in its class to offer Microsoft® Plug and Play compatibility.

In short, the new MultiSync XV17 and the entire XV Series gives you yet another compelling reason why you should consider a separate monitor purchase, and not just settle for the monitor that comes bundled with a system.

The new NEC MultiSync XV Series. Above and beyond your expectations, not your price range. Call 1-800-NEC-INFO for more information. For information sent via fax, call NEC FastFacts™ at 1-800-366-0476 and request catalog #1.

SEE, HEAR AND FEEL THE DIFFERENCE.

NEC

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*Estimated selling price. **Maximum resolutions based on horizontal and vertical frequencies only. NEC cites recommended resolutions for optimal display performance. See, Hear and Feel The Difference, XV17, XV15, XV14 and FastFacts are trademarks and MultiSync is a registered trademark of NEC Technologies, Inc. All other trademarks are the property of their respective owners. NEC GSA#GS00K94AGS5241 ©1995 NEC Technologies, Inc.

NEC
MultiSync XV17
$799
ESTIMATED
SELLING PRICE

Power Up, Power Down

Even as you read this, your monitor is gobbling up energy at an alarming rate. Put a stop to it with PowerMan, a device that shuts down your monitor after a period of inactivity. Plug your monitor into PowerMan, load the software, and if you don't touch your keyboard for, say, 10 minutes (your choice), the monitor turns itself off. Touch the keys, and your monitor springs back into action. The $100 PowerMan isn't cheap, so it will take quite a while to recoup your investment. But at least you'll know you're doing something for the environment. PowerMan $100; Merritt Computer Products; 800/627-7752.

Reader service no. 713

Here's the 411

I hardly ever use my local phone directory anymore. And I certainly avoid calling interstate directory assistance, which can cost up to 75 cents a shot. Why should I pore over pages and pages of impossibly small type when I can get all the phone numbers and addresses I need with PhoneDisc PowerFinder from Digital Directory Assistance. The $249 package, updated quarterly, comes on five CD-ROMs that divvy up the U.S. by region. PowerFinder lets me search by name, business type, address, or zip code, or I can reverse the process—give the phone number and get the name and address. And it can print addresses on envelopes, as well as export addresses and telephone numbers to a variety of digital personal information managers, databases, and word processors. Digital Directory Assistance pulls its information from published phone directories, which Ma Bell and friends update once a year. The downside: Since these CD-ROMs come out quarterly, you'll have to live with wrong or missing numbers and addresses for three disc updates. PhoneDisc PowerFinder, $249; Digital Directory Assistance; 800/284-8353.

Reader service no. 708

Drain without pain: Banish static electricity with the UltraStat.

Quick on the Draw

Need a dirt-cheap precision drawing program that lets you create snappy graphics in minutes? Look no further. SmartSketch has it all: dozens of powerful drawing tools, an excellent interactive tutorial, and a street price of—get ready for this—$49.95. SmartSketch's toolbox includes lassoing, erasing, paint bucket, ink, pencil, and paint brush tools, features you would expect in a higher-priced bit-map–based paint package, not a budget draw program. You can reshape SmartSketch's clip art with amazing flexibility. Just grab a line, and pull it where you want—colors inside the shape follow automatically. The program supports over 16 million colors, multiple undo levels, page sizes up to 40 by 40 inches, and text-handling tools for letter and line spacing. FutureWave offers a 30-day, money-back guarantee and a full working trial version for the cost of shipping. It's also available as **sketch.zip** on PC World Online. SmartSketch $69.95; FutureWave; 800/619-6193, 619/637-6190, 619/637-9032 (fax).

Reader service no. 711

Face the Fax

If you have only one phone line sharing both fax and voice calls, busy days can be a nightmare. Worse, keeping your fax-modem–equipped computer on all night long to field incoming faxes wastes energy and money. Take heart: Delrina Corporation has an innovative (if slightly expensive) solution—Fax MailBox. Your customers simply fax you at an 800 number, and then you pick up the faxes from your computer when you're ready by using Delrina's WinFax Pro. The Fax MailBox is particularly handy if you travel, since you can always dial in from the road; and if you have a pager, Fax MailBox can page you whenever a fax arrives. For an additional fee, you can use the mailbox for your voice mail as well. Delrina Fax MailBox $9.95 per month, plus 35 to 50 cents per page; Delrina Corp.; 800/734-2379, 408/363-2345, 408/363-2340 (fax).

Reader service no. 712

PC World *contributing editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online.* *See page xx for contact information. The files from this special report are available via PC World Online on America Online and on CompuServe.*

For more information about all products in this special report, circle reader service no. 909.

2 in a series

The Mac OS Advantage

How do I gain a competitive edge?

I work hard.

Think fast.

And hire the right people.

I give them computers.

And networks.

Peripherals.

And software.

I seek solutions.

Without creating new problems.

I take time to choose wisely.

And find ways to save time.

I know what to look for.

It looks like this.

Mac OS

The Mac™ OS. It's the operating system that helped make the Macintosh® famous. It helps people do more in less time. In fact, according to an Arthur D. Little study, people using the Mac OS are 44% more productive than those who use Windows.* It's also a great way to get the power of RISC on a desktop PC.

Plug and Play. We invented it. And while many have tried to imitate this perfect union of hardware and software, nobody else actually does it today. Which means nobody else makes it so easy to set up and use all the software, peripherals, accessories and networks you need to help your people be productive.

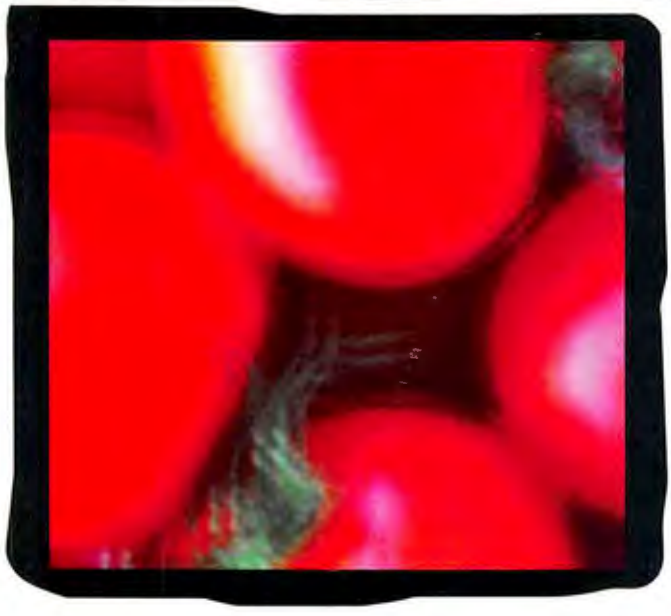
The real beauty of the Mac OS and Apple® advancements like QuickDraw™ 3D and QuickTime® VR is that people don't even know they're there. What they *do* know is that with a PC running Mac OS, it's actually practical to use multimedia, videoconferencing, 3-D visualization and virtual reality.

Thousands of applications now run under the Mac OS. Which means thousands of applications share the intuitive interface pioneered by Macintosh. In the future, people won't even have to think about individual programs at all. They'll just sit down at their Mac OS desktop and get right to work.

Used to be, the only way to get your hands on the Mac OS was to get your hands on an Apple Macintosh. Today, you'll find it on PCs from Radius, Power Computing and more. The same places, in fact, where you'll find our new logo. For more information, call **800-472-4342, ext. 150**, today. Or contact us via the Internet at http://www.info.apple.com/macos/macosmain.html.

Apple

*Productivity comparison. Macintosh versus Windows study by Arthur D. Little, Inc., January 1994. © 1995 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh and QuickTime are registered trademarks of Apple Computer, Inc. Mac, the Mac OS logo and QuickDraw are trademarks of Apple Computer, Inc. Adobe is a trademark of Adobe Systems Incorporated and may be registered in certain jurisdictions. All Apple products are designed to be accessible to individuals with disability. To learn more (U.S. only), call 800 ***6-2333 or TDD 800 833 6223.



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SMEAR TACTICS,
SHADY
CHARACTERIZATION AND
GRAPHIC
VIOLENCE, BUT
PLAIN COPY PAPER
IN YOUR COLOR INK JET PRINTER
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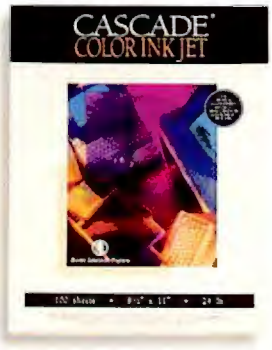
Beware: no matter how cool your computer or how hot your color ink jet printer, without paper like CASCADE Color Ink Jet, you're in for big trouble.

Super bright-white and made with a special coating specifically designed for this demanding technology, CASCADE Color Ink Jet gives you solid, brilliant, true-to-life colors. Crisp, highly defined imaging. And bold, laser-sharp contrast. All that, with none of the bleeding, fuzzy imaging or dull, washed-out colors you'll find with ordinary uncoated paper.

Boise Cascade Papers



Call **1-800-33BOISE**, Ext. 102 for the dealer nearest you offering CASCADE Color Ink Jet, available in value-priced, handy 100-sheet boxes. Then, see for yourself:

Anything less is downright scary!

Circle 40 on reader service card

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Here's How

HELP LINE Q&A

Tip of the Month

MULTIMEDIA ON THE CHEAP: With a fast video board and a big hard drive, you can add modest multimedia capabilities to your Windows PC at minimal expense.

For video, download the latest run-time release of Video for Windows, version 1.1e. Look on CompuServe for vfw11e.zip in the Windows Multimedia Forum (go winmm) or on PC World Online (go pwo), or look on America Online in the PC Multimedia Forum (keyword: multimedia) or on PC World Online (keyword: pc world). Place the file in its own directory, decompress its files with PKunzip, and run Video for Windows' setup.exe. For sound, download the PC Speaker driver (speak.exe), which you'll find in the same forums; place the file in its own directory; decompress it; and then run Control Panel's Driver applet to install it.

With these drivers, you can play .avi video files (samples are in the same forums) in Media Player and .wav sound files in Sound Recorder. You can also create multimedia documents; in WinWord 6.0, for example, use Insert • Object • Create from File and choose the file. You can then play that object with a simple double-click. You can also use Control Panel's Sound applet to assign sounds to specific events.

Shane Rau, Technical Editor

Laptop-to-Desktop Backup

Q I'd like to back up the data on my laptop computer using the tape drive on my desktop system. Can I do the backup directly to tape, or do I have to transfer data to my desktop hard disk and then back up onto tape? I use Conner Backup Exec for Windows and also have DOS 6.0 with Interlink. Is Interlink the way to go?

Robert Ahrens, St. Louis, Missouri

A Interlink lets you transfer your laptop's hard disk data to the tape drive in your desktop system, but LapLink Remote Access—a component of Traveling Software's Commworks that lets your laptop and desktop systems share their disks in a similar way—is faster.

- **CommWorks** $199; Traveling Software; 800/343-8080
  Reader service no. 890

However, if you do full backups often and find the parallel port connection too slow, it may be worthwhile to furnish both your laptop and desktop with ethernet adapters (if they're not already so equipped). You can then use Windows for Workgroups with your backup software to transfer the data as fast as your tape drive can accept it.

Internet Irritation

Q I want to send E-mail from America Online to a friend on GEnie. I have tried many addresses, but nothing works. What's the secret?

Lynn Beck, New York

A To send E-mail from anywhere on the Internet (including America Online) to GEnie, enter *e-mail_address*@genie.geis.com as the destination address. If it bounces back, try sending E-mail explaining the problem to postmaster@genie.geis.com. Just be sure you post your messages to your friend's E-mail address, and not to his or her user ID.

Sharing Modems

Q I would like to know how I can use my computer, which runs Windows for Workgroups, to access a modem attached to a different computer on my home office network. What do I need to buy? Will a remote program like Symantec's pcAnywhere work?

Chris Kopenec, Internet

A Remote programs such as pcAnywhere are useful if you want to run a PC by remote control, but they're really not designed to let you share modems across a LAN. What you need is modem server or asynchronous communications server software. There are many commercial offerings, but most are for Novell NetWare only. The following list is a sampling of products that work with Windows for Workgroups. One of them, nmp2.exe, is a shareware package (you can find it on PC World Online as nmp2.exe). And that's a good thing, because at some of these prices it may make more sense to buy another fax-modem and pay for an additional phone line.

- **nmp2.exe** registration $49; Network Products Corp.; 800/638-7655, 818/441-6504, 818/441-6933 (BBS)
  Reader service no. 874

WAYNE VINCENT

- **WINport for Workgroups** $149; LAN-Source Technologies, Inc.; 800/677-2727, 416/535-3555
  Reader service no. 875
- **Modem Assist Plus** $299; Synergy Solutions, Inc.; 602/545-9797
  Reader service no. 876
- **CoSession ACS for Windows** $345; Triton Technologies, Inc.; 800/322-9440, 908/855-9440
  Reader service no. 877
- **MultiCom Async Gateway TSR** $399; Multi-Tech Systems, Inc.; 800/328-9717, 612/785-3500
  Reader service no. 878

PostScript for LaserJet II

Q I would like to print a PostScript file on my HP LaserJet II printer. Do you know of a way to do it? And is there any conversion program that lets me view it as graphics?
Domtut, America Online

A To print a PostScript file on a LaserJet, you need a PostScript cartridge, a PostScript upgrade board, or a software PostScript interpreter that runs on your PC. Some of the hardware products add RAM to your printer, and some increase the resolution to 600 by 600, or even 1200 by 1200—the equivalent of buying a whole new unit.

If you'd rather have a software upgrade, several commercial software interpreters are available—and one, Ghostscript, is free (you can find it on PC World Online as **gs261win.zip**, **gs261386.zip**, **gsfiles.zip**, and **gs261doc.zip**). Also, some drawing programs, such as CorelDraw, have PostScript interpreters built into them.

If you opt for a hardware product, check out some of these options:

- **HP PostScript Cartridge** $495; Hewlett-Packard; 800/538-8787
  Reader service no. 879
- **ImageUp** $1095 for PCL 4, $1295 for PCL 5; NewGen Systems Corp.; 800/756-0556, 714/641-8600
  Reader service no. 880
- **PacificPage II** $399; **PacificPage PE/XL** $849; Pacific Data Products, Inc.; 800/737-7119, 619/552-0880
  Reader service no. 881
- **TurboScript II** $298; **TurboScript 109-II** $399; Centennial Technologies, Inc.; 800/888-4413, 310/791-4117
  Reader service no. 882
- **WinJet 1200 Plus** $995; LaserMaster Corp.; 800/365-4646, 612/944-9330
  Reader service no. 883

Here are some software PostScript interpreters for DOS and Windows:

- **CorelDraw 5** $695 (CD-ROM), $895 (floppy disks); Corel Corp.; 800/772-6735, 800/394-3729 (Canada), 613/728-8200
  Reader service no. 884
- **Ghostscript** freely redistributable for noncommercial use. Call for commercial licensing. Aladdin Enterprises; 415/322-0103; available via anonymous FTP from **ftp.cs.wisc.edu** (directory **/pub/ghost**)
  Reader service no. 885
- **HiJaak PS** $299; Inset Systems Inc.; 800/828-8088, 203/740-2400
  Reader service no. 886
- **Transverter Pro** $395; TechPool, Inc.; 800/925-6998, 216/382-1234
  Reader service no. 887
- **UltraScript** $195; Valley Software; 619/485-8250
  Reader service no. 888

Fast Floating Point

Q I'm considering a math coprocessor for my 40-MHz 386DX, but I don't know if it's worth the cost. Will a math coprocessor boost the performance of the system? Does it help speed up Windows?
Snapier440, America Online

A No, a math coprocessor will not speed up Windows one bit, nor will it help overall system performance. It helps only if you run math-intensive programs such as spreadsheets—and even then it works only when you're doing floating-point calculations, such

USER GROUP OF THE MONTH

Santa Barbara PC Users Group

July's user group tips come from the Santa Barbara PC Users Group. The group meets monthly at 7:30 p.m. on the last Tuesday of the month (except December), in the County Board of Supervisors room near the corner of Victoria and Uncap. SBPCUG's monthly newsletter offers reviews, discounts to members, and a list of volunteers available to help other members. An Adobe Acrobat version is available. At the meetings, the group sells floppy disks, plus a disk filled with shareware. SIGs include groups for beginners, investors, and those interested in communications. SBPCUG's BBS features a CD-ROM drive with more than 1GB of shareware.

For more information, contact Eric Pedersen, president, at 462 S. San Marcos Rd., Santa Barbara, CA 93111-2726, or call 805/962-7839. Dial SBPCUG's BBS at 805/682-6158. General meetings are free and open to the public. Membership is $20 per year and includes the newsletter, access to the library, and special group offers.

Reader service no. 889

INSTANT FILE COMPARISONS: WinWord's revision marks can help you eyeball the differences between any two files the program supports. For example, to compare a WinWord file to a WordPerfect file, open one file in WinWord, select Tools • Revisions • Compare Versions, and select the second file.

Lori S. Tucker
Santa Barbara PC Users Group

as with financial and trigonometric functions. Since there are no upgrade chips for 40-MHz 386 systems (the fastest Cyrix DRx² is 33 MHz), your best bet is a motherboard upgrade.

A Plurality of Ports

Q I would like to install three or four parallel ports on a dedicated file server. I know how to set up two ports, but if I want more, how do I set the IRQs for the additional ports? Most add-on LPT boards offer only IRQ 5 or IRQ 7.
Jon B. Roeder, Omaha

A Unfortunately, we're all burdened by the fact that the original IBM PC was designed to be exactly what its initials stand for—a "personal" computer—and no provisions were made for the hardware to support more than two parallel ports. You can have three ports if you mix the standard I/O port addresses from both the original PC and the AT (3BC, 378, and 278), but only two ports can be interrupt-driven unless both the card and the file server let you set a different interrupt for the third. (You will usually run into trouble trying to do this, so most file servers allow you to set up the third parallel port for polled rather than interrupt-driven operation. This eliminates the need for a third interrupt.) Adding a fourth port is even more of a challenge, since you need a card that can be set to a nonstandard, unused address, as well as software you can configure to use that address.

If you want your system to be as standard and trouble-free as possible, I recommend using no more than two parallel ports. If you have more than two printers, consider running some of them through direct ethernet connections (which are much, much faster than a parallel port and can take a load off the server) or via serial ports.

Ghost Drives In the SCSI

Q At our office, we have a PC with a built-in SCSI adapter on the motherboard. The PC has only one SCSI hard drive, but it thinks it has two. All the software shows that the machine has a D: drive with contents identical to those of the C: drive. What could make this happen?
KevinM7277, America Online

A The most common causes of "phantom" hard drives on a SCSI system are incorrect termination on the SCSI bus, a duplicate SCSI ID number, or a problem with the configuration of the SCSI host adapter's built-in BIOS. Make sure the devices at both ends of the SCSI bus have terminator resistor packs installed to prevent bus errors. Also check that all devices on the bus have unique SCSI ID numbers; normally, the host is 7 and the first hard drive is 0. Finally, run the configuration software for your motherboard host adapter. Make sure that it's set to control only one hard drive and that emulation of the IBM PC/AT hard drive controller (sometimes called ATA or WD-1003 emulation) is disabled.

You might also try removing any memory management software temporarily to see if

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SYBEX

Circle 112 on reader service card

it might be causing the problem—sometimes its attempts to "shadow" the disk controller's BIOS ROM produce strange results, including phantom drives.

Last Impression

Q The PowerBase Star-Dot-Star Volume 5 disk contains a tip that lets you change the opening graphic you see when Windows starts up. I used it, and it worked fine. But yesterday, when I started Windows, the graphics reverted to the original logo. Why?

Ron Spoto, La Verne, California

A You can change the "splash screen" that appears when Windows starts by rebuilding win.com to include a different bit-map file. If the splash screen changes, it is because some other application has rebuilt win.com. This can happen when you install new graphics drivers, when you upgrade to a newer version of Windows, or when you install certain hardware or software. (Cyrix, for instance, changes the splash screen to show its logo when you install a 386 upgrade chip.) If this occurs and you don't like the new screen, just redo the steps in the tip. Or, if you haven't upgraded Windows, you can restore your old win.com from a backup.

QEMM Quandary

Q I recently tried installing Quarterdeck's memory manager, QEMM 7.5, but I began to get messages warning of a 'video device conflict' or an 'error loading device.drv' when entering Windows. I have a Diamond Stealth 64 video card with 2MB. What's wrong?

John765, America Online

A The Diamond Stealth cards, like some other video adapters, use parts of memory that Quarterdeck's QEMM may try to co-opt for other purposes. To avoid conflicts, configure QEMM so that it doesn't attempt to use upper memory blocks in the region that includes segments A000-BFFF—and in particular, the monochrome text region from B000-B7FF. QEMM's setup program lets you disable use of the monochrome text region; or you can edit config.sys yourself by appending **x=a000-bfff** to the line reading 'device=c:\qemm\qemm386.sys'.

SPEA Snafu

There were some minor errors in the contact information provided for SPEA Software, the new owner of Video-7, in a previous column ["Vanishing Video," *Help Line*, January 1995]. The correct address is: SPEA Software AG, Moosstr. 18b, D-82319 Starnberg, Germany; and the correct phone numbers are: 011-49-8151-2660, 011-49-8151-21258 (fax), 011-49-8151-266241 (BBS).

Johannes W. Busch, Wooster, Ohio

By Brett Glass

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Model	Memory	Part #	Price
Thinkpad 300, Ambra Treka	2mb	33G9288	$128
	8mb	33G9289	368
Thinkpad 350, 350C, 350, PS/Note	8mb	6060378	338
	16mb	6060379	647
Thinkpad 500, 510CS, 2618	4mb	8189098	198
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PS/2, N51, SLC, SX	2mb	07G1826	98
	4mb	07G1827	188
	8mb	07G1828	418
Laptop N33SX, L40SX & PS/NOTE 182	2mb	79F0999	98
	4mb	79F1000	184
L40SX, PS/NOTE 182 only	8mb	79F1001	358

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	6mb	PA2068U	258
	16mb	PA2069U	698
T3400CT	4mb	PA2019V	218
	8mb	PA2020V	399
	16mb	PA2021V	758
T4400 SX, SXC, T6400 SXC, DXC	2mb	PA2003U	125
	4mb	PA2004U	198
	8mb	PA2005U	358
	16mb	PA2010U	698
	32mb		1548
T4500, T4600, T1900C (3.3volts) T4700	4mb	PA2012U	198
	8mb	PA2013U	388
	16mb	PA2014U	858
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SPREADSHEETS Q&A

Calculate the Last-Saved Date in Excel or 1-2-3

Q How can I make my Excel reports display the date they were last saved, and not merely the date they were printed (which I can do using the *Page•Setup•Header/Footer* controls)? I want something that will allow me to check for discrepancies in case someone neglects to save a file.
Melrose Johnson, Tullahoma, Tennessee

A It would be nice if Excel, like 1-2-3 release 5.0, supplied a function to calculate this value. Instead, you can create a macro containing a simple custom function that does the job. (I'd like to thank Robert Davidson of Irving, Texas, who helped us develop this macro via the Internet.)

First, create your worksheet and save it. Then use *Insert•Macro•Module* to create a new macro, and enter the user-defined function shown in **FIGURE 1.** Next, go back to the sheet where you're creating your report and enter **=saveddatetime()**. You'll see the code number for the date and time the file was last saved. Select *Format•Cells•Number* and choose an appropriate *Date* format for the cell.

You also need to set the workbook's recalculation to manual mode so Excel doesn't automatically change the last-saved date to the current date when you open the file. Select *Tools•Options*, click the *Calculation* tab, click *Manual*, and make sure *Recalculate before Save* is checked so the date and other formulas are current when you save the workbook.

For those interested in the macro details, here's a quick note: The expression Application.Caller refers to the cell that holds the function; Parent.Parent refers to the workbook that contains that cell; and FullName is its file name and path.

1-2-3 release 5.0 users get off a lot easier. Just enter the formula **@info("last-revision-date")**. Then format the cell by selecting *Style•Number Format•Dates* and choosing a date format. To make the file recalculate manually, use *Tools•User Setup*, click the *Recalculation* button, and check *Manual*. Just be sure to press **<F9>** or click the *Calc* button on the status bar to recalculate the worksheet before saving it.

And While We're at It, How About Full-Path Footers?

Q At my organization, we use Excel on a LAN. Is it possible to get the footers in my Excel reports to show the entire path of the file name? For example, can a footer display f:\data\finserv-\ir_req.xls, instead of just ir_req.xls?
Richard Aagaard, San Francisco

A You can't do it with the tools Excel provides in the *File•Page Setup•Header/Footer* dialog box, but you can create a simple macro to do it. Create and save your Excel workbook, insert a module with *Insert•Macro•Module*, then enter the macro text shown in **FIGURE 2.** Execute the macro by selecting *Tools•Macro*, then double-click *SetFoot*. Now you're ready to print.

The LeftFooter property puts the text at the lower-left corner of the page, RightFooter puts it at the right, and CenterFooter in the center. (Note: You might want to incorporate a statement like this as part of a macro that prints the current worksheet.)

If you use Quattro Pro or 1-2-3, begin by creating and saving your file. In Quattro Pro 5.0, select *File•Page Setup* and enter **#F** as the footer text. In 1-2-3 release 4.0, choose a cell outside the area you want to print, and enter the formula **@cell("filename",A1)**, which displays the full file name and path. Select *Range•Name* and assign the name **FooterText** to the cell. Then select *File•Page Setup* and enter **\FooterText** as the text of the footer.

```
Function SavedDateTime() As Double
    Application.Volatile
    SavedDateTime =
FileDateTime(Application.Caller.Parent.Parent.FullName)
End Function
```

FIGURE 1: YOU CAN KEEP TABS ON THE LAST TIME THAT YOU SAVED AN EXCEL 5.0 FILE by creating a macro with a simple user-defined function.

```
Sub SetFoot()
    ActiveSheet.PageSetup.LeftFooter = ActiveWorkbook.FullName
End Sub
```

FIGURE 2: ADD PAGE FOOTERS that include the entire path of a file with this Excel macro.

Customized Sort Orders in Windows Spreadsheets

Q I import data from our company's minicomputer into Excel in text format, then I arrange it into a list that I subtotal for a monthly sales report. I want to sort the list by sales region in column A, but Excel's sort feature arranges the regions in alphabetical order. I must later rearrange the regions into the order that's traditional for our company. It takes a lot of cutting and pasting. Isn't there a faster way? And can this be done in Quattro Pro 6.0, which I use at home?
Tak'isha Bennett, Fayetteville, Arkansas

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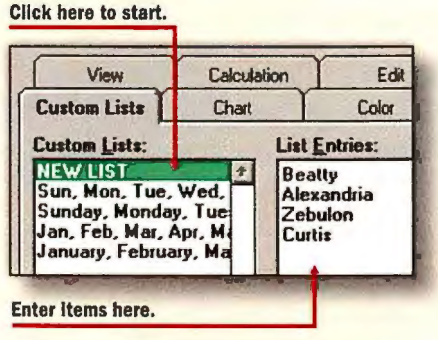
A Fortunately, Excel lets you customize the way you sort lists. For Quattro Pro or 1-2-3, you can create a lookup table to get the same effect.

In Excel, select *Tools•Options*, then click the *Custom Lists* tab in the dialog box. Make sure *New List* is selected in the Custom Lists box, then type your region names in order into the List Entries field, pressing **<Enter>** after each one. When you're done, the dialog box should look like the example below:



Click *OK*, and you're all set. (Alternatively, if your custom sort order has already been typed into a range in the worksheet, you can create a custom list as follows: Simply highlight the list, select *Tools•Options•Custom Lists*, and click the *Import* button at the bottom right of the dialog box.)

Next time you want to sort the data, click in the Region column in your sales data worksheet, select *Data•Sort*, click the *Options* button, and choose your custom sort order in the First Key Sort Order list. Click *OK* twice, and you're finished.

When you're working at home with Quattro Pro 6.0, you'll have to use a more roundabout approach. **FIGURE 3** gives step-by-step instructions for setting up a custom sort order. The lookup table on sheet A, which is shown at the top of Figure 3, assigns a sort order to each region. The formula in column D of sheet B matches the sort order number with each Region entry using the formula @vlookup (A2,$SortTable,1). Just follow the directions in Figure 3 to use the column of formulas as the key column for the sort, and you're all set.

❶ On sheet A, set up a table that lists the regions and sort orders as shown, or create your own.

❷ Use Block•Names and assign the name SortTable to A2..B5.

	A	B
1	Region	Sort Order
2	Alexandria	2
3	Beatty	1
4	Curtis	4
5	Zebulon	3

❸ Enter the data shown below, or your own, on sheet B. In cell D1 enter the formula shown in the formula bar, then copy it into column D for every record in the table.

Data:D2 @VLOOKUP(A2,$SortTable,1)

	A	B	C	D
1	Region	SalesPerson	Sales	Sort Order
2	Beatty	Morgan	614,967	1
3	Beatty	Ferrell	1,367,986	1
4	Zebulon	Appling	1,448,408	3
5	Curtis	Weiss	610,264	4
6	Curtis	Veeck	684,945	4
7	Curtis	Boudreau	658,945	4
8	Alexandria	Charleston	943,696	2
9	Curtis	Gomez	754,249	4
10	Beatty	Frisch	1,410,217	1
11	Zebulon	Anson	1,120,793	3
12	Beatty	Hoyt	566,938	1
13	Zebulon	Spahn	1,342,571	3

❹ Select Block•Sort; specify A2..D13 as the sort block and D2 as the 1st Sort Key.

FIGURE 3: SETTING UP A CUSTOMIZED SORT ORDER IN QUATTRO PRO 6.0 enables you to sort data fields in any order that you specify.

Summing Absolute Values In Excel 5.0

Q I use Excel to track the scoring of road rallies, in which two-person teams compete to finish a course laid out on public roads within a pre-specified time period. Penalty points are assigned for deviations: negative for early finishes, positive for late.

To calculate the overall score, I need to sum the absolute values of the deviations so that, for example, arriving 2 minutes early counts the same as arriving 2 minutes late. I would love to have an absolute value sum function similar to the regular sum function. Any suggestions for solving this problem with a simple formula?

Greg Lester, Akron

A Excel's array formulas let you perform calculations like this using the regular abs (absolute value) and sum functions. Let's say your points are located in A1:A10; just type the formula **=sum(abs(A1:A10))** and make sure to press **<Ctrl>-<Shift>-<Enter>** to enter the formula as an array.

Quattro Pro 6.0 users can perform the same calculation with the formula **@sum(@abs(A1..A10))**; the application requires no special keystroke to enter array formulas. 1-2-3 release 5.0 lacks arrays but lets users employ a pair of functions that selectively sum the negative or positive values in a range. To perform the calculation use the formula **@sumpositive(A1..A10)–@sumnegative(A1..A10)**.

By Richard Scoville

Richard Scoville is a PC World *contributing editor 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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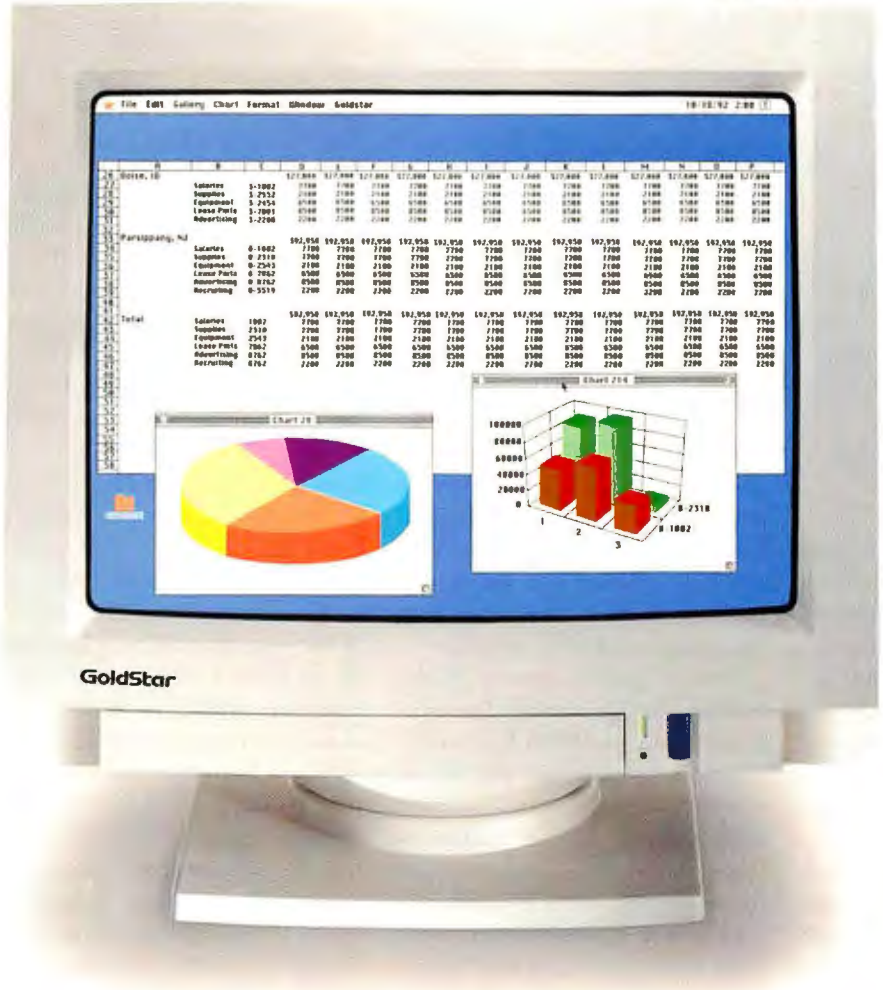

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WORD PROCESSING Q&A

Better-Looking Headlines in Word 6.0 for Windows

Q I use Word 6.0 for Windows to create a newsletter for my business. It works great except for one thing: When I use large fonts in headlines, some characters look like they're either too close together or too far apart. Can I adjust the spacing between characters?
Patricia Wilson, Cleveland

A Yes. WinWord 6.0 makes it fairly easy to adjust the space between two characters (a process desktop publishing types call *kerning*). Kerning problems typically occur when you have a wide letter (like *w*) next to a thin one (like *i*). They're so common that most fonts have information built into them to adjust spacing between certain letter pairs automatically.

To access automatic kerning in WinWord, highlight the entire block of text you want to adjust. Select *Format•Font* and click the *Character Spacing* tab in the Font dialog box. Mark the *Kerning for Fonts* check box and set the *Points and Above* measurement to the size of your font. If you want WinWord to kern smaller fonts, enter a lower number. But remember that kerning isn't necessary at all font sizes, and it slows WinWord down.

Automatic kerning doesn't always do the job, however. For those instances when your letters still don't look right, WinWord lets you manually change the spacing. The trick is to select only the first letter of the pair you want to adjust. (If you select both letters, WinWord also changes the spacing between the second and third letter, which may not be what you want.)

With the first letter selected, display the *Character Spacing* dialog box as described above (see **FIGURE 1**). Go to the Spacing drop-down list and choose *Expanded* or *Condensed*. Enter the amount of space you want to add or remove (measured in points) by clicking the arrows next to the *By* window or typing in a number. When you're done, click *OK* to apply the changes. Odds are you'll have to repeat this operation a few times until your headlines look the way you want.

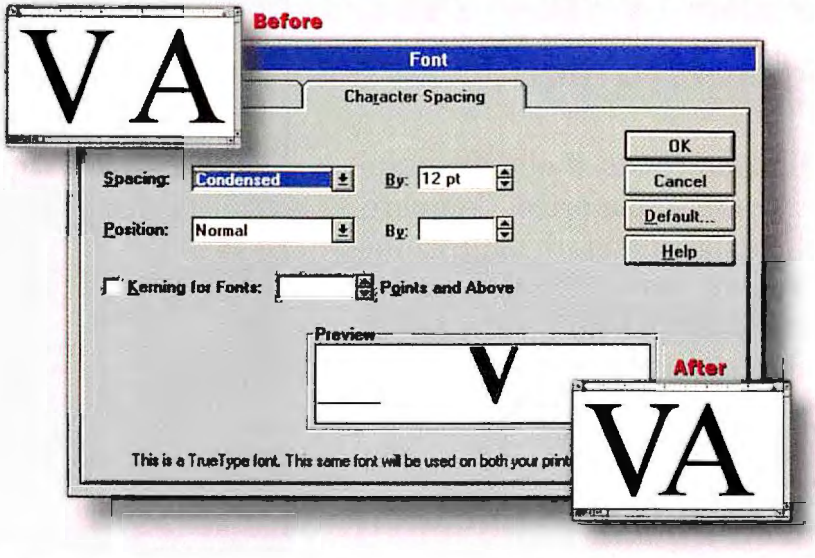

FIGURE 1: ADJUST YOUR HEADS. WinWord 6.0 lets you change the space between characters in large fonts to produce better-looking headlines. Just select the first character of a pair (the *VA* shown here), and use the Character Spacing dialog box to condense or expand spacing.

A WinWord 6.0 Calendar for All Seasons

Q I need to create monthly planning calendars in WinWord 6.0 that let me insert text on a particular date. I've tried to do this using tables, but creating a new table for each month is incredibly time-consuming. I'd also like to put an entire year's calendar on a single page, if that's possible. You'd think there'd be a macro that does this, but I couldn't find one in WinWord. Can you help?
David Sherman, Columbus, Ohio

A You're in luck. I did an online search and found a macro that creates a neat planning calendar for any month of any year. It also creates calendars for 3-, 6-, or 12-month periods on a single page. It's part of STAR File Utilities, a shareware product from STAR Retrieval Systems that includes several other useful macros, most having to do with file management. The entire package is a WinWord document, with buttons you double-click to install any or all of the macros. Best of all, the registration fee for the whole collection is only $15. You can find it on PC World Online as **star16.zip**.

- **STAR File Utilities** $15; STAR Retrieval Systems; 714/747-1415
  Reader service no. 693

Directory Assistance for WinWord 6.0

Q Whenever I try to open a document in WinWord 6.0, the default directory in the Open dialog box is always the WinWord home directory. I store my document files in another directory. How do I change the default so I don't have to switch directories each time?
Jim Brennan, Cambridge, Massachusetts

A Fire up WinWord, then select *Tools•Options* and click the *File Locations* tab. Highlight *Documents* in the File Types list, then click *Modify* to get to the Modify Location dialog box. In

the Directories list, select the directory where you keep your documents, click *OK*, then click *Close* to return to your document. The directory you selected becomes the new default.

Hiding Text in WordPerfect 6.0 for Windows

Q I want to create text in my WordPerfect 6.0 documents that appears on screen but not on the printed page. Try as I might, I can't get to the program's Hidden Text feature. I can see Hidden as an option in the Font dialog box, but the check box is grayed out. What's the deal here?
Alexis Winters, Chicago

A The deal is that you need to select *View•Hidden Text*. That will add a check mark next to the Hidden Text menu item and turn on the Hidden check box in the Font dialog box. As long as the menu item is marked, you can format any text as hidden.

But WordPerfect's implementation of hidden text is awkward at best. Hidden text looks like ordinary text on screen, which makes it easy to hide text you don't want to hide and vice versa. The best way to handle this is to type your text first, highlight it, then select *Layout•Fonts* and click the *Hidden* check box to format the text as hidden. You may also want to make hidden text easier to identify by assigning it a different color or other text attribute from the Font dialog box.

Unfortunately, WordPerfect prints any text that appears on screen, regardless of how you've formatted it. If you don't want the hidden text to print, you'll have to select *View•Hidden Text* again to remove the check mark and hide the text.

Small Fonts in WordPerfect 5.1 for DOS

Q I use WordPerfect 5.1 for DOS. When I use fonts that are smaller than the default font, I have to scroll to the right to see all my text. This is very annoying when I'm editing documents. Is there a way to fix it?
Leon Luey, San Francisco

A Sure, provided you're willing to upgrade to version 5.1+. That version comes with an add-on program called ScreenExtender that expands the number of characters you can view and edit on the screen. The $49 upgrade offers a number of other valuable improvements, including the ability to access TrueType fonts, but it still runs well on older, slower PCs.

If you'd rather stick with the original, I'm afraid you're stuck with this problem, since version 5.1 offers no way to fit text to the screen. In that case, your best solution is to avoid formatting the document until you've finished editing. That way, you'll see all your text without having to scroll.

- **WordPerfect 5.1+ for DOS** $49; Novell-WordPerfect; 800/451-5151, 801/226-6800
  Reader service no. 694

Bigger Cursors in WordPerfect 6.0a for DOS

Q WordPerfect 5.1 for DOS came with a program called cursor.com that let you adjust the cursor's size and shape. I've recently upgraded to version 6.0a, and cursor.com is nowhere to be found. Since I use the program on an old monochrome laptop, I really need this feature to help me find my nearly invisible cursor. Where can I find an update for this utility?
Leslie Morgan, Baltimore

A WordPerfect failed to include an updated version of cursor.com when it released the latest DOS upgrade. Fortunately, a version that's compatible with WordPerfect 6.*x* is available for downloading. You can find it in the WordPerfect forum on CompuServe (**go wpfiles**) as **utils6.zip**, or on PC World Online as **wpcurs.zip**. Or you can call Novell-WordPerfect at 800/451-5151 and order the WordPerfect 6.0 for DOS Utilities Disk for free.

Custom Ami Pro Page Defaults

Q Every time I create a new document in Ami Pro 3.01, I have to change the layout settings manually. Isn't there some way to make those changes permanent?
Phil Knowles, Lenox, Massachusetts

A Sure. What you need to do is save your layout as a style sheet, then tell Ami to use it as the default—the one it loads when you launch the program.

Start by opening a new document, then select *Page•Modify Page Layout* and change the page layout settings to the ones you want to use as the new defaults. Once you've got your page set up correctly, select *Style•Save as a Style Sheet*. Leave all the settings in the Save as a Style Sheet dialog box as they are and click *OK*. When asked if you want to overwrite _default.sty, answer *Yes*. That's it. From now on, your customized page layout will be the default for new documents.

You might want to keep the original default settings in case you decide to switch back later. Simply save the old style sheet with a different name before starting this process.

By George Campbell

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USER GROUP TIP

Save WinWord Space

Spare Word for Windows from having to store a copy of a picture in each file—just link pictures to documents rather than embedding them. Select Insert • Picture, select the picture, click Link to File, and clear the Save Picture in Document check box. To edit the picture, close your file and open the picture in another app; the changes will carry over.

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WINDOWS Q&A

Tracking the Infiltrators

Q I install and delete a lot of Windows applications. How can I keep track of all the new files added by installation routines, so I know which files to delete if I uninstall the program?
Wil Shrader Jr., America Online

A Many Windows applications rudely install multiple files to multiple directories (especially the \windows and \windows\system directories) without warning, and this makes removing programs difficult. If you don't mind shelling out a few bucks, check out Remove-It in this month's *Windows Toolbox*. But if you're on a budget, you can create a couple of batch files to monitor which program puts what files where. The main inconvenience is that you have to remember to run the first batch file, pre.bat (**FIGURE 1**), immediately before you install an application, and the second, post.bat (**FIGURE 2**), right after installation.

```
@echo off
cd\temp
dir c:\windows > win_dir1.txt
dir c:\windows\system > sys_dir1.txt
copy c:\windows\win.ini winini.old
copy c:\windows\system.ini sysini.old
```

FIGURE 1: USE THE BATCH FILE PRE.BAT to keep a record of your Windows system directories and files just before installing another application.

```
@echo off
cd\temp
dir c:\windows > win_dir2.txt
dir c:\windows\system > sys_dir2.txt
fc win_dir1.txt win_dir2.txt > changes.txt
fc sys_dir1.txt sys_dir2.txt >> changes.txt
fc winini.old c:\windows\win.ini >> changes.txt
fc sysini.old c:\windows\system.ini >> changes.txt
del ???ini.old
del win_dir*.txt
del sys_dir*.txt
edit changes.txt
```

FIGURE 2: LOG CHANGES to your Windows directories and configuration with this batch file, post.bat.

Pre.bat first switches to a working directory (\temp in this example). Then it converts the file listings of your \windows and \windows\system directories into two files (win_dir1.txt and sys_dir1.txt). Finally, it copies and renames those all-important configuration files, win.ini and system.ini. Post.bat does much the same thing, creating the same four files under different names. Next, post.bat uses the DOS command fc (file compare) to see what's different and record the changes in changes.txt. It then politely deletes all eight comparison files and loads changes.txt into DOS's editor.

Note that these batch files only track changes to Windows and its \system directories; they don't list the directory in which you installed the program's main files. If you put each application in a unique directory, this shouldn't be a problem.

Remember that post.bat records *all* changes to your Windows directory. If you run pre.bat *immediately* before installing an application and run post.bat *immediately* after, most of the recorded changes will reflect only those made by the installation. However, some sound, wallpaper, and screen saver utilities make frequent changes to win.ini and other files, so if you use such utilities, do not be surprised to see these variations show up in changes.txt; these trivial changes can be ignored.

If you create a Program Manager icon for each batch file, you can just double-click the pre.bat icon before installing a program and then double-click the post.bat icon afterward. Since post.bat overwrites your old changes.txt list each time that you run the batch files, you will probably want to move the text file to the directory in which you installed the new software. Then you will have a record of how to uninstall each application, in the directory where its main files are stored. Happy tracking.

Travelin' Task Man

Q In your November column, Denise Culver asked how to make Windows' Task Manager appear someplace other than the middle of the screen when you call it up ["Moving the Task List"]. There is a way, but you won't find it in the Windows documentation. First, open system.ini in Notepad and look for taskman.exe=taskman.exe in the [boot] section. At the end of this line, add one of the following coordinates: **1 1** to move it to the upper left corner, **1000 1** for the upper right corner, **1 1000** for the bottom left corner; and **1000 1000** for the bottom right corner. Make sure there's a space before each number—for example, to display the Task Manager in the bottom left corner, edit the line so that it reads **taskman.exe=taskman.exe 1 1000**.
Ed Yap, Quezon City, Philippines

A Thanks for this undocumented tip. This technique works when you start Task Manager with the keyboard shortcut **<Ctrl>-<Esc>**, but if you start it by double-clicking on the desktop, the results are less predictable. The Task Manager will still open in one corner, but it may not be the corner you expect.

The ATM Master's Touch

Q I recently installed Adobe Type Manager 3.01 (ATM) for Windows. I wanted to try out ATM's new ability to modify Multiple Master fonts—which are supposed to give me ex-

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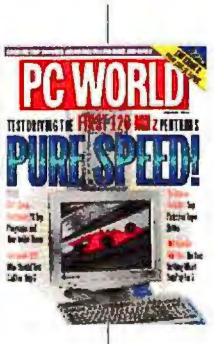

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tremely exact control over font size, width, and optical size—but the Create button in the ATM control panel is grayed out. What gives?
Andrea Lasky, New York

A Apparently you haven't installed any Multiple Master fonts under Windows. Although the normal Adobe Type Manager 3.*x* package includes a number of typefaces, including one Multiple Master font (Tekton), Adobe also ships ATM with a variety of other products, many of which do not include Multiple Master fonts. These fonts can be recognized by the double capital *M* in their name—for example, TektoMM (see **FIGURE 3**). To check whether you have any Multiple Master fonts on the disk from which you installed ATM, put that disk in the disk drive. Start up the ATM Control Panel and click *Add*. Change to the floppy drive and search for any font names that include the MM abbreviation. If you find one, select it and click *Add* to install it. The Create button should now be available.

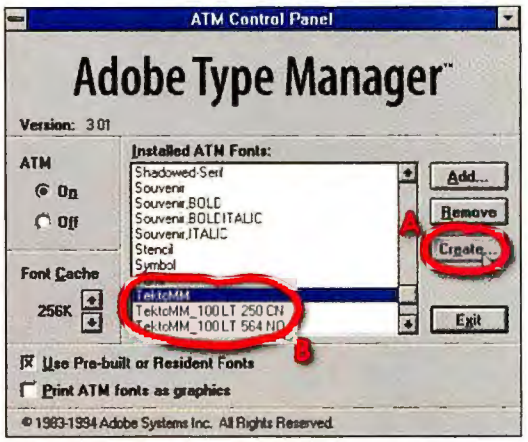


FIGURE 3: TO CREATE NEW VERSIONS OF FONTS using ATM 3.x (A), you must have a font whose name ends in MM, indicating that it's a Multiple Master font (B).

Setup Snafu

Q After installing Windows for Workgroups 3.11, I get a message that wdctrl can't load because of a conflict with another virtual device. Just what is happening? I didn't have this problem with Windows 3.1. How can I fix it?
James C. Bennett, Oakton, Virginia

A This problem can occur if Windows' system.ini file lists more than one virtual device driver for a given device—in this case, your hard drive. To fix it, roll up your shirtsleeves and prepare to modify the [386Enh] section of your system.ini file. Naturally, you'll want to make a backup of system.ini before messing around. Since you'd have to restart Windows to see any of the changes take effect anyway, you may want to exit to DOS and open system.ini with DOS's own text editor. Go to your \Windows directory, and type **edit system.ini** at the DOS prompt.

Once you're in system.ini, scroll down to the [386Enh] section and look for the lines device=*wdctrl and device=*int13. If the latter line is not there, disable the line device=*wdctrl, or add the line **device=*int13**. To disable any line, insert a semicolon at its beginning. If you find both lines, look for yet another line that reads device=multis.386. If it exists, disable it or disable the two lines mentioned above.

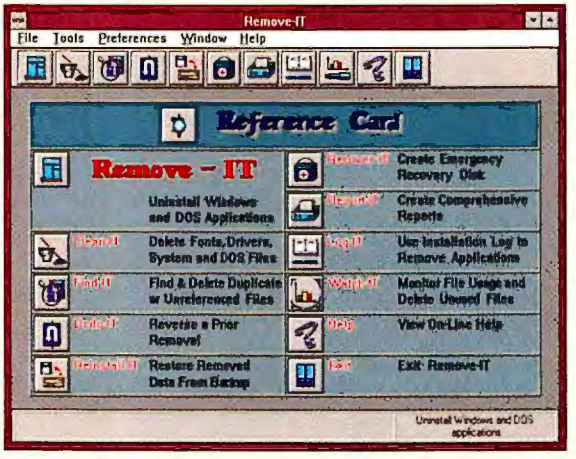
If you find the first two lines but not device=multis.386, the conflict probably lies with some other third-party device driver for your hard disk controller. You'll need to contact your hard disk controller manufacturer or consult its documentation to learn which line is causing the problem. When you find it, try disabling that line or the line device=*wdctrl.

Now save the file and try to start Windows. If you get the message 'Fastdisk validation error', open system.ini again, and disable both the device=*wdctrl and device=*int13 lines Good luck.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips and Tricks *(Peachpit Press, 1992, 800/283-9444). Windows welcomes your questions and pays $50 for published items. See page 12 for contact information.*

Windows Toolbox



Want to get rid of an old Windows application? Deleting a program's main directory usually leaves fragments that take up space and .ini file modifications that may cause trouble. Vertisoft Systems has a capable remedy called Remove-It. This utility stores unwanted fragments (including .ini file lines) in compressed form and lets you undo the removal later. No uninstaller removes previous installations perfectly, but if you load the memory-resident Watch-It and Log-It modules, Remove-It will monitor all future installations and remove them with 100 percent accuracy. There are other good uninstall applications, but I found Remove-It's button-studded interface and plain-English labels easiest to use. Remove-It sells for $39.95 on the street. Vertisoft Systems, Inc.; 800/466-5875.

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WINDOWS 95 ADVISER

What do you need to know about Windows 95? Ask our newest columnist, a former Microsoft product manager who helped design it.

You thought it would be simple. All you wanted was Windows 95, which should finally be available next month. But when you get to the store, alongside those new Windows boxes you're going to see loads of software carrying the "Designed for Windows 95" logo. Does this mean you'll need to upgrade your applications, too?

That depends. Although Windows 95 runs Windows 3.1–style 16-bit applications with aplomb, any app bearing the 95 logo must be 32-bit. There are other logo requirements—support for long file names, for instance—but the 32-bit rule is the most misunderstood. After all, the 16-versus-32 debate focuses on operating systems, not applications. So what are the real differences between 16-bit and 32-bit Windows applications?

Performance

Common wisdom says that 32-bit applications are faster than 16-bit apps. Beware common wisdom. Not only is 32 bits no magic wand for speed, but today's 16-bit Windows applications are the product of years of performance tuning. For example, my simple recalculations ran noticeably faster on 16-bit Excel than on 32-bit Excel. The best advice is to check the product reviews. Unless they say a 32-bit version is faster than its predecessor, assume it isn't.

Multitasking

Like Windows 3.1, Windows 95 cooperatively multitasks 16-bit applications. Cooperative multitasking is like giving ten people an hour to describe themselves: Some will talk for 15 minutes, some for 5, and some not at all. The applications, not the operating system, choose when to cede control of the system—there's no referee. The result is that 16-bit applications don't multitask too smoothly under Windows 95—activities in one application may halt when another is performing a task.

Conversely, Windows 95 preemptively multitasks 32-bit applications, much like a moderator who enforces a 6-minute rule for all participants. The 32-bit applications don't cede control; instead, Windows 95 interrupts them as it sees fit in order to provide the smoothest multitasking, so that everything seems to be happening at once.

From my experience, 32-bit applications are better multitaskers. For example, a macro running in 16-bit Word stopped while I was opening a file in a 16-bit version of the draw program Visio. But when I did the same with 32-bit Visio, the 16-bit Word macro chugged right along. As another example, during a long recalculation in 16-bit Excel, I could only twiddle my thumbs. But I could do anything at all while recalculating in 32-bit Excel. The bottom line: The more 32-bit (and the less 16-bit) software you run, the smoother you'll multitask.

Stability

Windows 95 runs 16-bit applications in a shared memory space, as Windows 3.1 does, but it runs 32-bit applications in separate memory spaces. So the latter should be less likely to crash each other than the former. In some of my tests, one 16-bit application crashed another while a 32-bit program kept going. But that doesn't mean you won't crash Windows 95 if you run only 32-bit applications; you may.

Instead, the key question is, "How much less often will I crash if I run 32-bit applications?" There is no simple answer, since many factors come into play. For example, buggy video drivers—a major cause of crashes under Windows 3.1—should become just a bad memory because of Windows 95's improved video driver architecture. This one improvement may make your system dramatically more stable even when you're running only 16-bit applications. So the extra protection afforded by 32-bit applications may be incremental (but still nice to have).

Long File Names

Although Windows 95 eliminates the antediluvian 8.3 limit on file names, it won't matter unless your applications can also open and save files with long names. Today's Windows and DOS applications can't—they can "see" only 8.3-type file names. So while you could create a file named "LETTER TO RICHARD" in Windows 95's built-in word-processing utility, it would appear as "LETTER~1" in your old word processor. I find that tracking two names—long and short—gets irritating very fast. So if you really want to use long file names, you have to upgrade your applications. It's that simple.

Should you upgrade, then? There's no one answer yet. Some upgraded applications will have a host of new features beyond 32 bits to tempt you; others will simply be 32-bit versions of 16-bit apps, with little else added. For me, long file names and multitasking are enough to justify upgrading my key applications—my word processor and spreadsheet—if their performance is the same or better (still a big if). As for my other applications, I'll wait and see what else they offer before deciding.

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

Picking Your Data Directory in Approach

Q I keep my Approach 3.0 data in a directory called e:\data. Can I make it my default directory?
Steve Pardus, Bolingbrook, Illinois

A The secret's in Windows' Program Manager. Highlight the app's icon, then select *File•Properties* or press **<Alt>-<Enter>**. In the dialog box's Working Directory field, type the path to your data directory (in your case, **e:\data**). Click *OK*. Next time, the Open dialog box will list the e:\data files.

You can start Approach or any other Windows database by double-clicking a data file, including one whose icon you've dragged from File Manager into Program Manager for easier access.

Sorting a Paradox for Windows Tabular Report

Q I've designed a tabular report for listing sales amounts in Paradox 5.0 for Windows. The original table is sorted by invoice number, but I want my report sorted by customer name. I've tried adding a group band, but that gives me a separate table for each customer. What I want is one big table sorted by customer. Is this possible?
Danielle Zale, New York

A Paradox 5.0 makes this easy. Open your report in design mode and click anywhere in the All Records band to select it. Right-click in the band but away from any fields, and choose *Sort* from the properties menu. In the resulting dialog box's Fields list, double-click the name of the field to sort by. Click *OK* to return to your report design. When you run the report, you'll see your records in customer order.

Single-Spacing an Access Report

Q How can I single-space a report in Access 2.0? I can't get anything but double- or one-and-a-half-line spacing.
Tim Brady, Chicago

A What you can do is adjust the detail area of your report design so less space appears after each record. First select your fields and drag them up to get rid of white space at the top of the band. Next, click the Detail band and drag the bottom border of the band up to get rid of white space below.

You may also need to shrink the height of your field controls. The easiest way to make all the controls the same size is to select them together with **<Shift>**-clicks, then right-click any one. Select *Properties*, then change the number for the Height property. If your data doesn't show up completely, you've made the number too small.

Changing Access Text to Proper Case

In February I asked for suggestions on changing an Access text field to proper case—where the first letter in each word is uppercase and the rest are lowercase ("Changing Case in Access Text"). I received many solutions, but the best and easiest came from Robert Walkenhorst via the Internet. He notes that Microsoft's sample Northwind database already has a Proper() function you can copy to your database.

To copy the function, open your database and right-click the margin or a tab of the Database window. Select *Import* from the pop-up menu. In the resulting dialog box, double-click *Microsoft Access*. A standard Windows file-handling dialog box opens; move to your access\sampapps directory and double-click *nwind.mdb*. A third dialog box appears; select the 'Object Type' *Modules* and the 'Objects in NWIND.MDB' *Utility Functions*. Select *Close* to return to the Database window.

To convert existing text to proper case, use your new Proper() function in an update query. First, select the *Query* tab in the Database window and click *New*. Click *New Query* in the next window to open the Add Table window. Double-click the name of the table you want to change, then click *Close* to enter the Query Design window.

Once there, click the *Update Query* button. Drag the name of the field you want to convert into the Field row in the first column of the query grid. In the Update To row directly below, type **Proper([***Field Name***])**, where *Field Name* is the field to convert. When you click *Run* and confirm the change, Access converts the text in that field throughout the table. When you close the query, there's no need for you to save it unless you think that you might need to convert the text again.

To avoid that possibility, use Proper() in your data entry form to correct new text as it's entered. Open your form in Design mode, right-click the control for the field whose values should be in proper case, select *Properties*, and click *After Update* and then the ellipsis (...) on the same line. Choose *Macro Builder* and enter a name like **Proper Case**. In the Macro window, select the Action *SetValue*. In the Item field box, enter **[Forms]![***Form Name***]![***Field Name***]**, where *Form Name* and *Field Name* are the names of your form and field. In the Expression field below Item, enter **Proper([Forms]![***Form Name***]![***Field Name***])**. Then close the Macro window and the Properties dialog box.

When you use that form to enter data, Access converts the text in the field you've altered to proper case. It's not a perfect solution—*LeBlanc* becomes *Leblanc*, for instance, and you can't correct for that except to use another form or edit the data table directly.

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 pays $50 for published items. See page 12 for contact information.*

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Circle 49 on reader service card

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Mr.
Bonaparté

WITH A

100MHz

processor.

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intel inside

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PUBLISHING & PRESENTATIONS MAKEOVER

You'd never hire someone just because his or her résumé looked good. But, then, you'd probably never grant that someone an interview if his or her curriculum vitae looked like it had been slapped together in five minutes on a Selectric. The lesson: When it comes to putting together your own résumé, pay attention to design.

But how do you find the right look for your particular résumé? To give you a few ideas, we asked our expert, Daniel Will-Harris, to redesign the résumé you see below. We created this Before ourselves, basing it on some particularly unfortunate real-life specimens that together defied virtually every rule of good design.

We asked Will-Harris to come up with two designs—one traditional, the other modern. We asked him to do so using only a word processor—in this case, Microsoft Word for Windows. Although the two Afters look dramatically different, both use the same base layout. Will-Harris used Word's Table feature to create this framework. Tables give you the power of columns without the hassle; they also make it easy to add creative border designs. The base layout—headings in a left-hand column, text in column two with a ragged-right margin—is simple, clean, and light.

When résumés are sent into large corporate environments, they must often traverse a maze of fax and copying machines before they arrive at the appropriate desk. And once they arrive, they're often fed into scanners and optical character recognition (OCR) software for screening. That's why, for our traditional design, we used a Bodoni typeface—an easy-to-read choice for humans and machines alike.

We also reorganized the résumé visually. We set different text elements—headings, dates, main text—in different type sizes; we set the dates in italics to highlight our career chronology. To keep the mood brisk, we divided the résumé into distinct sections with short horizontal rules.

The Creative Approach

For our modern alternative, we wanted something appropriate for more free-wheeling, less corporate settings. It's designed for human consumption only; the dotted lines and reverse type would flummox an OCR program.

As a base font, Will-Harris chose Triplex Serif from Emigre, a hip but readable typeface. He also used Word's Draw feature to create the white-on-black type. The page has a lot of borders, and they aren't just for show. The six-point line down the left side of the page gives the résumé a neat, self-contained look, while the ¼-point lines separate the document's sections.

In either design, notice which information stands out: the name, job titles, dates, and education—in other words, the real meat of the document. Both designs are intentionally spare, like a restaurant menu. And like a menu, your résumé should be designed and written to whet your reader's appetite for the real meal—in this case, the interview that will get you the job.

By Valerie Singer and Daniel Will-Harris

Valerie Singer is a freelance writer based in Fairfax, California; Daniel Will-Harris is a designer and author based in Point Reyes, California. Publishing & Presentations *welcomes your questions and makeover candidates.* PC World *pays $50 for published questions and $200 for redesigned items. See page 12 for contact information.*

Before

RESUME

Mavis McManus 1302 Somerset Road Business (201)555 7613
Teaneck, NJ 07666 Home (210) 555 7613

Objective:General Manager
Extensive background--Cut costs, strengthening product lines, reduced inventory, improved cash flow and ROI, building organizations and profits for million dollar companies.

Education:University of California at Berkeley
Master of Business Administration
Graduated 3.5 cume.
University of California at Berkeley
Bachelor of Arts in Economics with Honors
Graduated 3.6 cume.
Additional Graduate Courses: Sales, Advanced Managment Seminars

Business Experience:Gneral Manager, EuroAmerica Products
US subsidiary of major european multiproducts manufacturer (1982 to now)
Established new markets for snowboarding via strategic marketing, customer service, demos and radio spots.Now leading snowboard manufacturer in US with sales of 18 thousand units, for 43% market share and 39% rise in annual profits.
*Positioned company as notable new player in snow products industry;renegoiated supplier contracts with savings of 21% over prior, reduced mature inventory, developed significant new product lines and created dealer incentive programs.
*Reduced overhead by 15%, streamlining staffing needs, and omitting warehouse space. No decrease to cusotmer service, no increase in returns or replacements. Currently negotiating change in manufacturer with expected savings of 3.5%.
*Curtailed advertising costs, and increased media saturation
*Redesigned telecommunications/MIS systems with increased productivity and decreased waiting times in peak seasons.

Vice President; Sales, FatBoards (1978 to 1982)

Responsible for regional sales force of 12. Sales programs increased to $895,000 from initial floor of $325,000. Reporting to President, increased region tc include Western and Southwestern areas of US and parts of Europe. Products: snowboards, double wide skis, apparel, specialty sunglasses.

Began with company as sales representative.

Licensing Agent: LaVida Dolce Software, Inc. (1975 -1978)

As licensing agent for educational entertainment software was responsible for screening, negotiating and licensing outside projects for company distribution. Working on a commission basis, brought in two award winning products which increased company cash flow by 1/2. Identified new markets for existing products, and devloped new syatem for telecommunications surveys of prospective market.

Products:Gallows and Ghosts, role-playing game of increasing difficulty marketed to teenage boys. By casting aside hostile suits of cards that represent the enemy, users are able to socail climb by attempting to don specific suits of armor that protect Achilles heels and endow the player with

After

Mavis McManus

1302 Somerset Road, Teaneck, NJ 07666
Business: 201-555-7613 • Home: 201 555-7613

OBJECTIVE

General Manager: *Extensive background in cutting costs, strengthening product lines, reducing inventory, improving cash flow and ROI, building organizations and profits for million-dollar companies.*

EXPERIENCE

1982 to the Present

General Manager, EuroAmerica Products
U.S. subsidiary of major European multiproducts manufacturer. Established new markets for snowboarding via strategic marketing, customer service, demos and radio spots. Now leading snowboard manufacturer in U.S. with sales of 18 thousand units for a 43% market share and a 39% rise in annual profits. *Accomplishments:*

- Positioned company as notable new player in snow products industry. Renegotiated supplier contracts with a savings of 21% over prior, created dealer incentive programs.
- Reduced overhead by 15%, streamlined staffing needs and omitting warehouse space. No decrease to customer service, no increase in returns or replacements. Currently negotiating change in manufacturer with expected savings of 3.5%.
- Curtailed advertising costs while increasing media saturation.
- Redesigned telecommunications/MIS systems with increased productivity and decreased waiting time in peak seasons.

1978 to 1982

Vice President: Sales, Fatboards
Responsible for regional sales force of 12. Sales programs increased to $895,000 from initial floor of $325,000. Reporting to President, increased region to include Western and Southwestern areas of U.S. and parts of Europe. *Products:* Snowboards, double-wide skis, apparel, specialty sunglasses.

1975 to 1978

Licensing Agent: L
As licensing agent for e… responsible for screeni… for company distributi… in two award-winning p… by ½. Identified new m… new system for telecom… *Product: Gallows and …*

EDUCATION

UC Berkeley Master …
Bachelor…

A simple typeface change—from New Courier beforehand, to Bodoni or Triplex Serif after—provides instant legibility.

Tables make it easy to organize the page and to add embellishments like borders, yet are easier to use than standard columns.

These two dissimilar designs cover any situation, yet the base layouts are identical.

The key to résumé design: Let the layout tell your reader how the content is organized.

Setting the dates flush right in the left-hand column helps define the columns.

Mavis McManus

1302 Somerset Road, Teaneck, NJ 07666
Business: 201-555-7613 • Home: 201 555-7613

Objective

General Manager: Extensive background in cutting costs, strengthening product lines, reducing inventory, improving cash flow and ROI, building organizations and profits for million-dollar companies.

Experience

1982 to the Present

General Manager, EuroAmerica Products
U.S. subsidiary of major European multiproducts manufacturer. Established new markets for snowboarding via strategic marketing, customer service, demos and radio spots. Now leading snowboard manufacturer in U.S. with sales of 18 thousand units for a 43% market share and a 39% rise in annual profits. *Accomplishments:*

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1975 to 1978

Licensing Agent: LaVida Dolce Software, Inc.
As licensing agent for educational entertainment software, was responsible for screening, negotiating and licensing outside projects for company distribution. Working on a commission basis, brought in two award-winning products, which increased company cash flow by ½. Identified new markets for existing products, and developed new system for telecommunications surveys of prospective market. *Product:* Gallows and Ghosts role-playing game.

Education

UC Berkeley **Master of Business Administration**—1974
Bachelor of Arts in Economics with Honors—1972

ONLINE Q&A

Quick Steps to Creating Your Own Web Page

Q I've been cruising the World Wide Web and have noticed that a lot of businesses have Web pages, with pictures of their products and catalogs. It seems like these Web pages would be a great way to advertise (much cheaper than mass mailings or magazine ads). Can I set up my own page? Is it hard?
Mary Poling,
Manchester, New Hampshire

A While cynics say the only people you'll find on the World Wide Web are college students and computer geeks, there's no question that the Web has become the hottest online destination. (For those who've spent the past year playing Doom, the Web is a part of the Internet consisting of hypertext pages full of text, pictures, and even sound.) One of the coolest things about the Web is that just about anyone can set up a Web page.

To do so, you first need to create a file with your content formatted using the HyperText Markup Language (HTML). HTML is a relatively simple scheme for conveying links, graphics, and text (for a sample, take a look at the figure below). You can create HTML files in several ways. While there are stand-alone HTML utilities and HTML add-ons for Word and WordPerfect, it's not that hard to do HTML coding by hand in a simple text editor such as Notepad. Several pages on the Web show you basic HTML coding; you just insert the appropriate codes in your text.

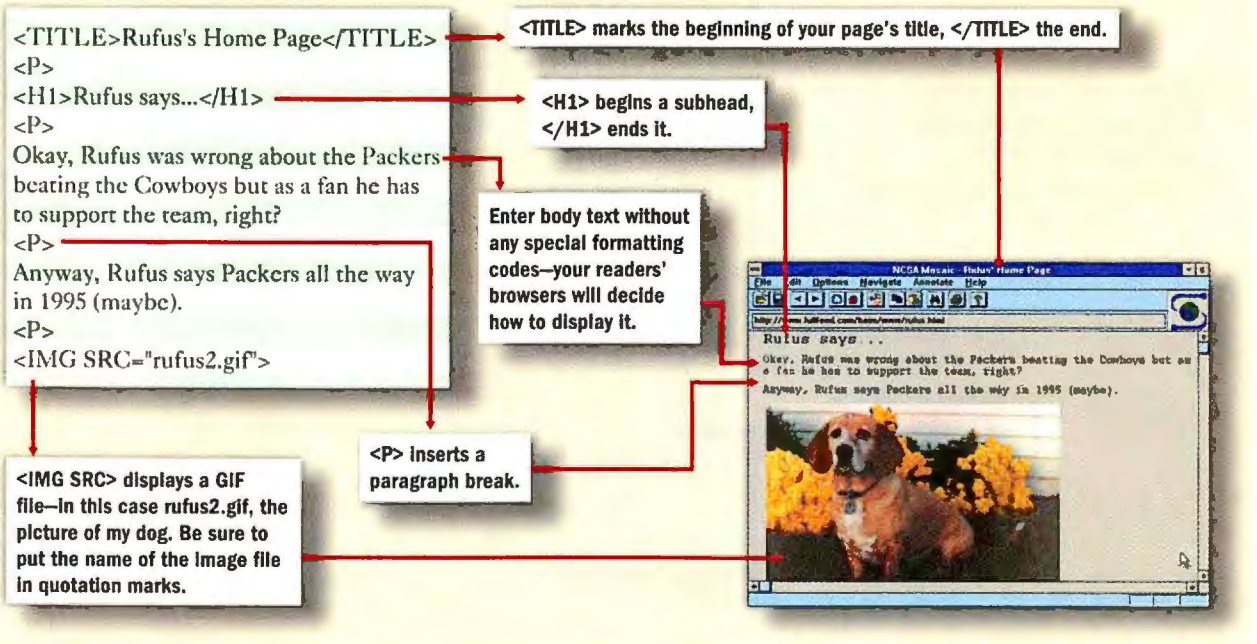
Once you've created your file, save it as plain ASCII text with the extension **.htm**. To preview your page, load it into Mosaic by selecting *File•Open Local File* (you don't need to be online).

You now need to put your HTML file where other Websters can find it. Most users rent space on a *Web server*, usually from an Internet service provider; charges vary wildly, depending on where you live, who you are, and what's on your page. Your provider will assign you a directory on the server and a Web address.

Now you must tell the world about your page. The easiest way is to include your Web page's address in your E-mail signature. Also check out the major directory pages (such as Yahoo) to find out how they add pages to their listings. Finally, you can post a message to the **comp.infosystems.www.announce** Usenet news group. For more information, see "Web Publishing Made Easy" (*Top of the News*, June).

Web Pages Made Easy

Setting up a Web page is so easy—even my dog can do it. He uses this simple Web page to make football predictions. (For some reason, he always picks the Packers.) The original HTML coding is on the left, with the resulting Web page on the right.



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Circle 209 on reader service card

Hot Spot for Interactive Games

Q Can you recommend a low-cost online service that I can log onto to play interactive games with other computer users? I enjoy some of the gaming features on America Online and CompuServe, but I'd like something with more pizzazz—more action and color, if you know what I mean.
Dick Sturgeon, Spring Valley, California

A AT&T's ImagiNation Network, formerly The Sierra Network, is the place for you. You'll find more than 30 interactive games—including Mini-Golf and Paintball—that you play in real time with other subscribers. There are also role-playing games (with names like Shadow of Yserbius and Fates of Twinion); the more sedate will find parlor games like bridge, euchre, and checkers; and for the high rollers, there's an online casino where you can gamble for play money.

The subscribers I contacted online appeared to be almost cultishly addicted. For $9.95 a month you get 5 free hours, after which you pay $2.95 an hour. You can also sign up for 25 free hours online each month for $49.95.

- **ImagiNation Network,** 800/462-4461
  Reader service no. 855

Quick Tip

Want to search the entire World Wide Web for information on a specific topic, such as stocks or SCSI ports? Simply point your Web browser to Carnegie Mellon's Lycos search robot at http://lycos.cs.cmu.edu/. Enter your search terms, and Lycos will come up with a list of names and descriptions for applicable Web pages. One hint: Be sure to increase your search hit number from the default of 10 to get a good selection of pages.

When the World Appears to Be Going Faster Than Your Modem

Q Whenever I log on to my local Internet service provider, I get a message that says I'm connected at 19.2 kilobits per second. That's great, but my modem's fastest speed is 14.4 kbps. What's going on?
Lillian Putten, Whittier, California

A That message is from your modem, not your service provider. Your modem talks to your Internet service at 14.4 kbps, while it talks to your PC at 19.2 kbps. Why? Your modem uses error compression (V.42bis or MNP-5). As data comes from the Net over the phone line at 14.4 kbps, your modem uncompresses it, then passes the uncompressed data via the serial port to your PC. Because more data is going from your modem to your PC than from the phone line to your modem, your modem must communicate with your PC at a faster rate.

By Judy Heim

Judy Heim is a contributing editor for PC World *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 your questions and pays $50 for published items.* *See page 12 for contact information.* ■

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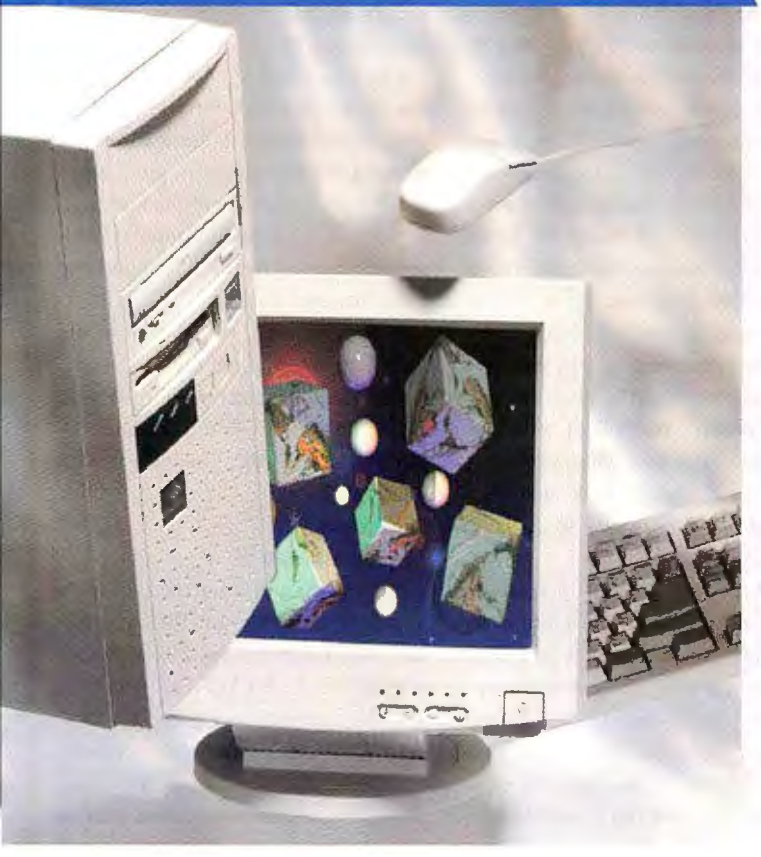
The Perfect System



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  - 16-bit stereo sound card & 1 pair spkrs
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- 15" Princeton Graphics Digital .28mm 1280x1024 NI Flat Screen monitor
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AMD 486

Circle 85 on reader service card

HARDWARE Q&A

Faster Windows with 32-bit File and Disk Access

Q All the articles I've read say that 32-bit file and disk access greatly improve Windows' performance. We have several systems with IDE hard drives larger than 528MB, and we can access every megabyte but can't get 32-bit disk or file access to function. Can you give us some information on the problem?

Larry Phillips, Sugar Hill, Georgia

A You're right. These special Windows features can speed up disk operations considerably—although using them can be tricky. There's a lot of misinformation on this topic, so just to set the record straight: The 32-bit *disk* access feature accelerates performance by enabling Windows to bypass your system BIOS when Windows goes to disk, and in doing so reduces the time your CPU spends switching into real (that is, 8088-compatible) mode.

You generally get a much bigger boost from 32-bit *file* access, which replaces DOS's old-fashioned 16-bit file system with a 32-bit system very similar to the one planned for Windows 95. Enabling 32-bit file access also automatically replaces whatever disk cache you're using with a superior one called Vcache. Used together, disk access and file access are greater than the sum of their parts, because your CPU never needs to flop into real mode when performing disk operations.

The biggest "gotcha" is that 32-bit file access is available only in Windows for Workgroups 3.11. And even if you're running WFW 3.11, you may still need to do some troubleshooting for this scheme to work. Here's a checklist of things to look for if you're having problems:

• Make sure you have a permanent Windows swap file, because temporary swap files cause Windows to switch back into real mode. To see which type you have, double-click Control Panel's *Enhanced* icon and click the *Virtual Memory* button. If you have a temporary swap file, click the *Change* button, choose the Type *Permanent*, accept the recommended swap file size, and reboot as prompted.

• In the [386Enh] section of your system.ini file, look for one of these lines: **NoEMMDriver=On** or **device=c:\nav\symevent.386**. If either appears, put a semicolon at the beginning of the line.

• If you're using the popular print spooler Printcache, disable it and use Print Manager instead.

• Remove any 'subst' statements from your autoexec.bat file.

• In the [386Enh] section of your system.ini file, if you see the line 'device=*BLOCKDEV', replace it with these two lines:

device=ios.386
device=vxdldr.386

• Check that the rmm.d32 driver is in your windows\system directory. If it isn't, you'll need to load it from your original copy of WFW 3.11.

• Make sure there's a line for Windows' ifshlp.sys driver within your config.sys file. But if you don't have one, adding the line **device=c:\windows\ifshlp.sys** should do the trick.

Follow these steps, and WFW 3.11's 32-bit file access should work, although I've probably overlooked some of the more obscure problems and solutions. If you discover any, let me know.

Note that you can adjust the amount of memory used by Vcache in the Virtual Memory dialog box (see **FIGURE 1**), although the default recommendation will probably be fine. Also, Vcache uses *write caching* by default, which speeds disk writes by temporarily writing data to memory instead of to disk—but at the same time, it slightly increases the possibility of data corruption if your system crashes. To turn off write caching for drives C:, D:, and F:, for example, add the line **ForceLazyOff=CDF** to Windows' system.ini file.

Now for your 32-bit *disk* access problem. First, some older hard drives are simply incompatible with this feature.

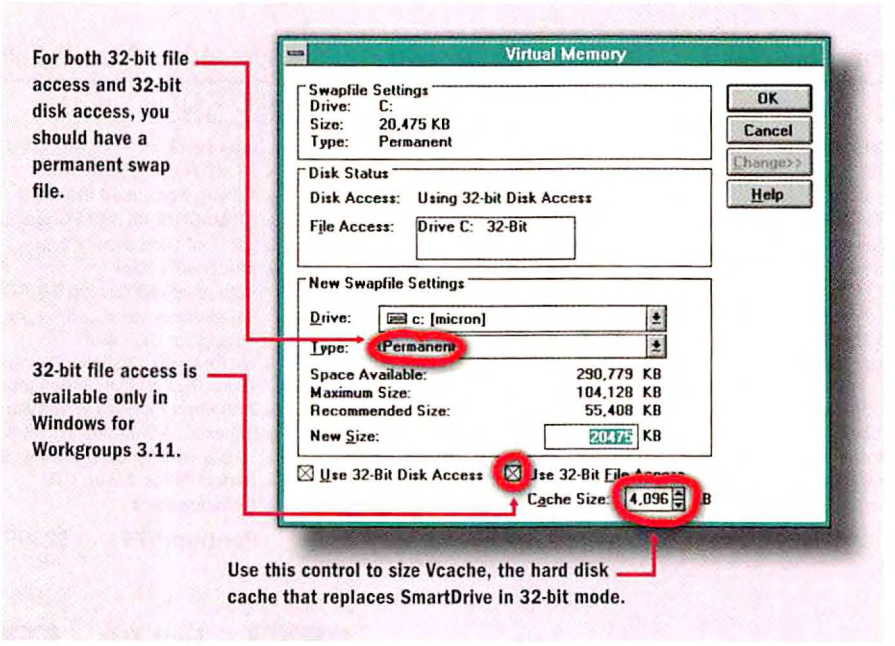

FIGURE 1: ENABLING 32-BIT DISK AND FILE ACCESS. To arrive at this dialog box, launch Control Panel, click the Virtual Memory button, then click the Change button.

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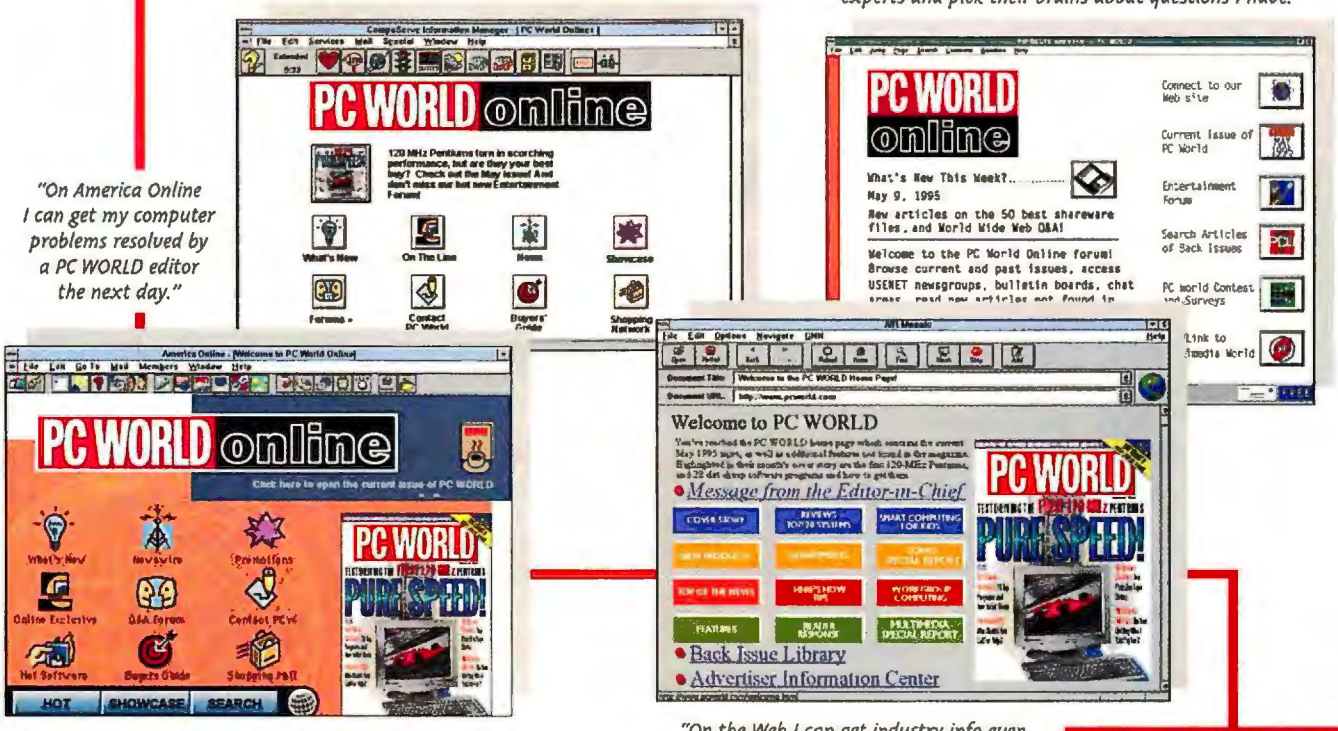

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Second, with IDE hard drives, 32-bit disk access works only if the drive is hooked to your primary IDE interface (the interface assigned IRQ 14). Third, you can't enable 32-bit disk access for IDE CD-ROM drives, and if you hook one to the same interface your hard drive uses, you'll disable 32-bit disk access for the hard drive, too.

Most likely, however, your problem lies in the size of your drives. Any IDE drive over 528MB is considered to be an *Enhanced IDE* drive (see "Enhanced IDE: Myths and Realities," *Hardware*, March 1995). To access the entire drive, you must have one of the following: an Enhanced IDE system BIOS, an Enhanced IDE interface card that bypasses the system BIOS, or special hard disk setup software (the least reliable option). Judging by your question, you've already implemented one of these solutions.

Now, the reason you can't enable 32-bit disk access is that Windows has its own way of detecting drive sizes. When it detects the big drive, it thinks it's receiving bad information and prevents you from using the 32-bit disk access option. But there's a solution: a replacement 32-bit driver downloaded from your drive manufacturer's BBS. For example, Western Digital offers a driver called wdcdrv.386, which you enable by adding the line **device=wdcdrv.386** to your system.ini file and adding the driver itself to your windows\system directory. The wdcdrv.386 driver works for more than one hard disk, as long as there's a Western Digital drive present. Micro House International and Ontrack Computer Systems offer "universal" replacement drivers for drives that have used these companies' hard disk setup software, which comes bundled with drives from many manufacturers.

Quite a mess, isn't it? All I can say is that Microsoft promises that Windows 95 will remedy the situation entirely. We shall see.

Hard Disk–to–Hard Disk Backups?

Q Now that hard disk prices have dropped, is it smart to buy a second hard drive and use it as a backup device?
Gregory Andracke, New York City

A An interesting question, since a medium-size hard disk costs about the same per megabyte as a tape drive and a couple of tapes. And backing up one hard disk with another would be faster.

Nonetheless, using tape is smarter. You'll want a copy you can put in a safe place in case of fire or other disaster. Also, if your machine goes down, you won't be able to access your data on the backup hard disk unless you install that disk in another system, a process that is often painful and data-threatening. Tape, on the other hand, enables you to restore data—file by file if you wish—to any machine with a compatible tape drive. Perhaps most important of all, tape lets you archive any number of files you need to keep but don't want cluttering your hard disk.

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items. See page 12 for contact information.* ■

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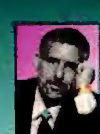
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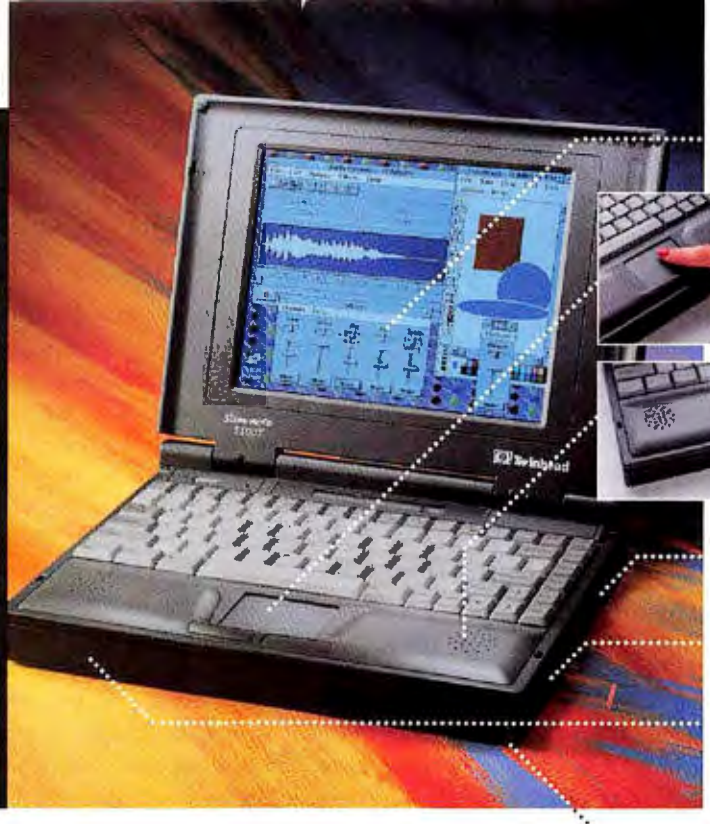

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STAR-DOT-STAR TIPS

Waitaminnit

I needed to find some way to make a batch file pause for a few seconds before it moved onto the next command. So I created one.

Our company's mail server had a problem: If the power went off briefly in the middle of the night, the DOS-based mail server would be up and trying to send and receive mail before the NetWare-based file server was ready for it. So I created a program called Delay and put it in the mail server's autoexec.bat file. Delay simply waits a set number of seconds, holding up the batch file until its count is finished or a user presses <Esc>.

Wong Choong Sheong, Selangor, Malaysia

Editor's note: This program comes in handy for any batch file that needs a timed delay—whether it's needed to allow a disk drive to spin up to speed or a modem to connect. The program counts out a delay in seconds, constantly updating a count on the display.

Sheong wrote the original program in Turbo Pascal. To make the listing useful to more readers, I've translated it into QBASIC, an interpreted language that comes with every version of MS-DOS since 5.0 (but not with current versions of IBM's PC-DOS). To create the program, simply copy the commands in **FIGURE 1** to an ASCII text file called **delay.bas**. Because of QBASIC's limitations, you need to place two commands in your batch file to use the program. The first is **set delay=***n*, where *n* is the length of the delay in seconds; for instance, **set delay=60** will give you a 1-minute delay. The other command, **qbasic /run delay.bas**, runs the program. (If delay.bas is in another directory, you have to give the path to it, as in **qbasic /run c:\utility\delay.bas**.)

Sheong's original program has some definite advantages over the QBASIC version, so I've made the compiled .exe file (which doesn't require Pascal) available on PC World Online. (Look for the file **delay.zip**.) With this version, one simple command, **delay** *n*, where *n* is the number of seconds, can replace the pair of lines that you must use for QBASIC. And if you put delay.exe into a directory in your autoexec.bat's path statement, you won't have to include its path with the command. And what's more, this version does not flash a blue screen as it loads, it sets errorlevel to a nonzero value if the user aborts the delay, and (unlike the QBASIC program) it doesn't leave you in the QBASIC interpreter if you hit <Ctrl>-<Break> while the program is running. For the benefit of any curious Pascal programmers, delay.zip includes Sheong's source code for your examination.

```
DelayTime& = VAL(ENVIRON$("DELAY"))
IF DelayTime& <= 0 THEN
  BEEP
  PRINT "Error: DELAY environment variable"
  PRINT "must be set to a positive integer"
  SYSTEM
END IF
FOR Elapsed& = 0 TO DelayTime& - 1
  LOCATE , 1
  PRINT Elapsed&; "elapsed of"; DelayTime&;
  PRINT "seconds; ESC to abort";
  SLEEP 1
  Check$ = INKEY$
  IF Check$ = CHR$(27) THEN
    PRINT
    BEEP
    PRINT "Delay aborted by user"
    SYSTEM
  END IF
NEXT Elapsed&
SYSTEM
```

FIGURE 1: MAKE YOUR BATCH FILES WAIT up to 2 billion seconds with this QBASIC program.

Extracting Lost Excel Spreadsheets

If one of your Excel 4.0 workbooks becomes corrupted, you may lose access to all the worksheets within it. Here's how I managed to recover my worksheets after Excel reported a bad workbook file.

First, I opened a new worksheet file in the same directory as the damaged one. Next, in cell A1, I entered the formula **=[***workbook***.xlw]***sheet***.xls!a1**, where *workbook* and *sheet* were the names of my workbook file and one of its worksheets. I then clicked the lower-left corner of the cell and dragged it, first across and then down, until it covered at least as many cells as the data in the original worksheet. With those cells still selected, I first ran *Edit•Copy* and then selected *Edit•Paste Special*. This sequence brought up the Paste Special dialog box, where I selected *Values* and clicked *OK*. I then repeated this procedure for each of the spreadsheets in the corrupted workbook to recover my data.

Wendyanne D'Silva, Toronto

Editor's note: A variation of this trick will work with Excel 5.0. The only difference is that your formula should read **=[***workbook***.xls]***sheet***!a1**.

There's no surefire way to save a corrupted file—if the information is gone, it's gone—but importing data to a new file is always worth a try. After all, if an important data file is corrupted and you don't have a backup, you have a lot to gain and virtually nothing to lose, as long as you make a copy of your original file before attempting to recover data from it.

If this procedure works, you'll still lose your formulas, formatting, and charts—only your data will be saved. What's more, every cell that's blank in the corrupted file will contain a zero in the copy. You can eliminate these zeros by replacing the original formula with **=if(not(isblank([***worksheet***.xlw]***sheet***.xls'!a1)), [***worksheet***.xlw]***sheet***.xls'!a1,"")**.

If you fail to recover your data using Excel, and you think it's still buried in a partially corrupted file, you might want to try the importing functions in other programs such as Word for Windows, 1-2-3, or Quattro Pro. One of them may be tolerant enough to let some errors pass, allowing you to get to the data that's still intact.

No Need to Confirm

Star-Dot-Star is one of the best parts of the magazine, but I found a mistake in the tip "Switching Sounds" [February]. In this tip, you say it's necessary to disable the copy command's confirmation message if you're copying files through a batch file in DOS 6.2 or higher. In fact, the confirmation is the default only if you use copy from a DOS prompt. In a batch file, copy automatically skips the confirmation.

David Larson,
Cambridge, Minnesota

Editor's note: You're right. In DOS 6.2 and later, when you run copy from the DOS command prompt, it asks you to confirm any command that overwrites an existing file. (You can override this default by specifying the **/y** parameter on the command line or including **/y** in the copycmd environment variable.) But when you use copy in a batch file, the default is just the opposite. Copy skips the confirmation unless you use the command line parameter **/-y** or include this parameter in the copycmd environment variable.

Room to Expand?

Some DOS programs need expanded memory, and others work best without it. I found I had to create batch files that did one thing if I had expanded memory and another if I didn't—for instance, you probably don't want to load Windows with expanded memory on.

That's why I created emmtest.com, a program that checks for expanded memory and controls your batch files accordingly. It returns an errorlevel of 0 if there's an expanded memory manager in the system, and a nonzero value if there isn't. Emmtest.com works by trying to "open" the driver as if it were a file called emmxxxx0—an operation that, according to standard MS-DOS conventions, works if there's an expanded memory manager around. If it's successful, you have expanded memory.

Daniel A. Smith,
Follansbee, West Virginia

Editor's note: This simple but useful program makes it easy to test for the presence of an expanded memory manager. If you are on PC World Online, you can download emmtest.com directly from our library. Otherwise, you can create the program by entering the text shown in **FIGURE 2** into an ASCII text file called **emmtest.scr**. Then, in the same directory, type **debug < emmtest.scr** at the DOS prompt. Debug will create the file emmtest.com. The batch file in **FIGURE 3** demonstrates how to use the program.

```
@echo off
emmtest.com
if not errorlevel 1 goto emson
echo EMM driver not available
goto done
:emson
echo EMM driver detected
:done
```

FIGURE 2: CREATE AN EXPANDED MEMORY TESTER with this debug script.

```
n emmtest.com
e 100 eb 09 45 4d 4d 58 58 58
e 108 58 30 00 b8 00 3d ba 02
e 110 01 cd 21 72 02 b0 00 b4
e 118 4c cd 21
rcx
001b
w
q
```

FIGURE 3: TEST FOR EXPANDED MEMORY by using the program from Figure 2 in this sample batch file.

Finding Fonts

In "Clean Up Windows Litter" [*Star-Dot-Star*, March], Betty deCarlo recommended moving fonts out of the windows\system directory. She said to edit win.ini to reflect the new location, but I can't find a reference to font location in win.ini. When I moved the fonts, some applications couldn't find them. What's the correct procedure?

Constance H. Shutt,
Cary, North Carolina

Editor's response: Several readers have asked this. Each entry in win.ini's [fonts] section contains a file name on the right side of the equal sign. By default, Windows looks for these files in your windows\system directory. If you move a font from windows\system to another directory, you must provide a full path with its file name, as in **c:\f***filename***.fot**, so Windows still knows where to look. To avoid enlarging win.ini too much—it can't be more than about 64K in length—use a short name for the font directory (in the example above, I've used c:\f, for fonts).

Also consider which font files deCarlo suggested you move. All TrueType fonts on your hard disk, active or not, are .ttf files. When you add a font to the active list with Control Panel's Fonts tool, Windows creates an .fot file, which it deletes automatically when you remove the font (the option to 'Delete Font File From Disk' refers to the .ttf file). Both file types usually land in windows\system. In short, moving .fot files requires editing win.ini. You can put a .ttf file in any directory, as long as you tell Control Panel's Add Fonts dialog box what directory that is.

By Brett Glass

PC WORLD online *The files from this article are available via PC World Online on America Online and CompuServe. Brett Glass is a contributing editor for* PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs and pays $50 to $200 for published items. See page 12 for contact information.*

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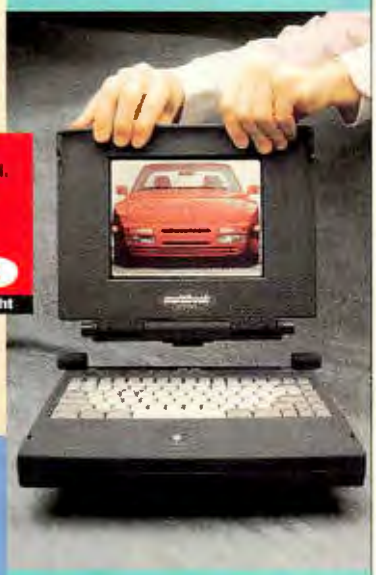

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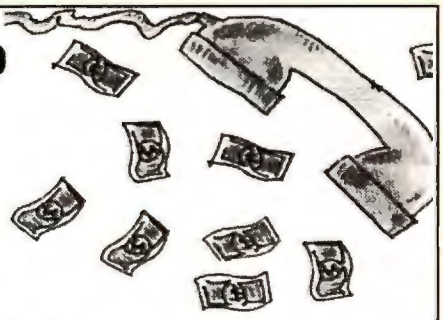

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79% do not read PC Computing
90% do not read Byte

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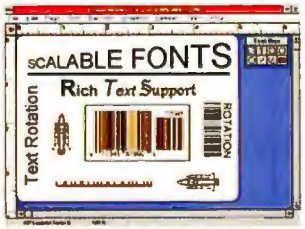

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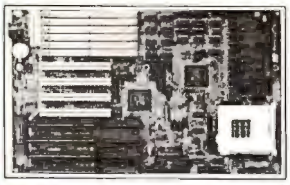

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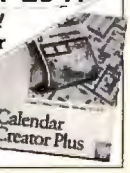

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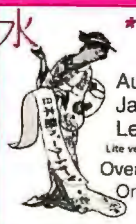

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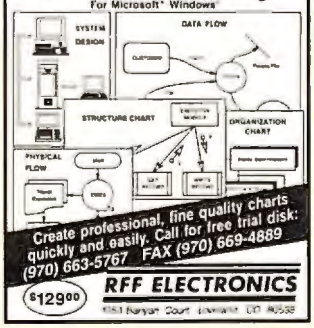

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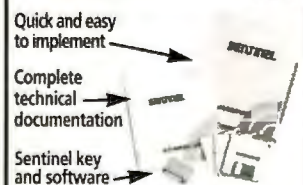

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Mr. Boddy has been murdered, and his killer remains at large. But sometime today before the scheduled 8:00 p.m. reading of Mr. Boddy's last will and testament, the Murderer will change the document to read in his or her favor.

Unfortunately Boddy's closest living relative, Mr. Green, is out of town on business and was not informed of his cousin's death. But those who have gathered at the Boddy mansion for the reading include Mrs. Peacock, his eccentric sister-in-law; Colonel Mustard, an old army buddy; Professor Plum, a dear friend and classmate dirving his days at Yale; Miss Scarlet, a "special friend"; and Mrs. White, his loyal servant of 25 years.

Please help us find the killer by determining who changed the will... where... and with what...

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7:45 p.m. and tensions are high. The anticipated reading of the will is only minutes away. But with so many unique personalities in one room...MidWest Micro's SoundBook II should feel right at home!

When the main course is murder, people tend to lose their appetite—but they still hunger for convenience. And that's where the *NEW* SoundBook II comes in. Featuring a programmable Personal TouchPad, two RAM compartments and a modular design, this MidWest Micro Notebook is dressed to kill. So before we interrogate the other suspects at the table, let's investigate the SoundBook II...

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Who *knows* where this portable was on the night in question? Weighing only 6 lbs., it could have gone *anywhere*! Some eyewitnesses claim they saw the SoundBook II with a built-in floppy drive at 6:37 p.m. While another source swears the same drive bay was carrying an AC adapter at precisely 6:40! What makes the SoundBook II such a master of disguise?—It uses special compact peripherals, A.K.A. Personality Modules, that fit its modular 3.5" drive bay. Enjoy the floppy drive and AC adapter modules that come with your SoundBook II. And feel free to order additional modules like a 3.5" CD-ROM drive, a 14.4 Kbps voicemail fax modem, an extra hard drive and an extra battery.

Evidence Stacked In Your Favor

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Contributing To The Delinquency Of A Diner?

Although it's unlikely that these MidWest Micro Notebooks are capable of murder, they *may* be found guilty of aiding and abetting. In fact, one of these guests may have already used a SoundBook to change Mr. Boddy's will... Perhaps Mrs. Peacock is doing it *right now*!—Or maybe she's just playing a little Microsoft® Golf.

Since we have a little time before Mr. Boddy's lawyer arrives, let's reconstruct another way this heinous crime may have been committed...

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"MidWest Micro wowed us with its Elite Pentium SoundBook Plus, the first Pentium-90 notebook we've tested; its performance blows every other reviewed mobile out of the water."
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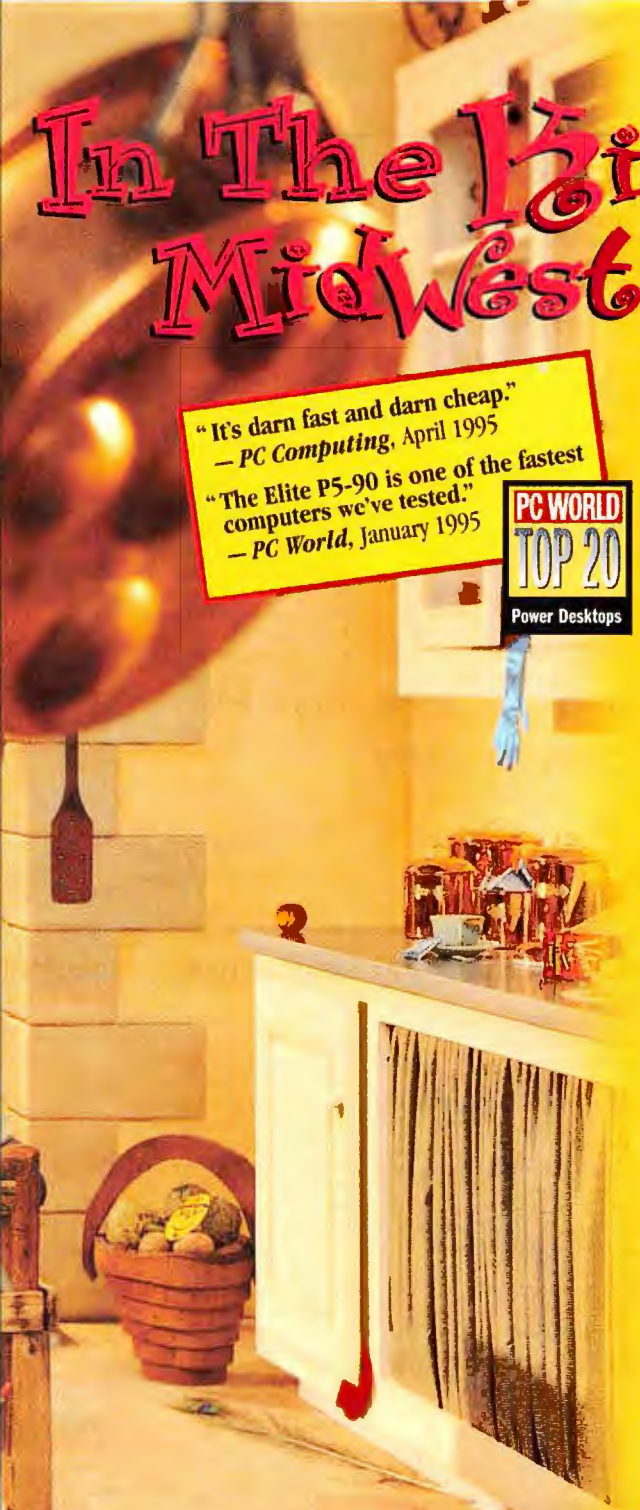

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"The Elite P5-90 is one of the fastest computers we've tested."
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"I can't believe these people didn't put lunch on the itinerary," the Colonel grumbled. "And you would ***think*** *a person with this much money could afford better lunch meat." Was it merely hunger pains that brought Colonel Mustard into the kitchen this afternoon? Or was it Mr. Boddy's MidWest Micro Home PC... and* ***revenge!***...

Mustard hadn't touched a computer since his code cracking days in the Middle East. But this "MidWest Micro Home PC" looked nothing like *that* relic. Typing in the secret password with his one good hand, the Colonel checked his watch again. He knew exactly how long it would take the IntelDX4™ 100 Processor to find the will, make the changes and save them on the Home PC's 850 Mb hard drive. "Not bloody long at all," he said with a smirk.

Colonel Mustard had planned his strategy very carefully. And after reading six computer magazines cover-to-cover, he learned that MidWest Micro Desktop Systems are available with Intel486™ and Pentium™ Processors, double- and quad-speed CD-ROM drives, voicemail fax modems and hard drive capacities up to 1.6 Gb! And whether you order a multimedia-packed Home PC or an Office PC stocked with powerful business software, you should always expect an ambush of high performance. But even nine weeks at boot camp, two wars and a Purple Heart didn't prepare the Colonel for what he was about to witness...

Opening the Home PC's Microsoft® Family Bundle, Mustard found an arsenal of interactive CD-ROM software—Encarta™ 95, Works, Money, Scenes, Dangerous Creatures and Golf were his to conquer. Before he knew it, the 15" color screen had exploded into multimedia mutiny. And he was even *more* impressed with Microsoft Bob™. Featuring eight household management programs in one efficient package, this new recruit had all the makings of a great soldier.

By this time the Colonel was distracted from his original covert operation. So he set a course for the library to see what Mr. Boddy's *120 MHz Office PC* had to offer...

Who killed Mr. Boddy and changed his will? The rest of the investigation is up to you...

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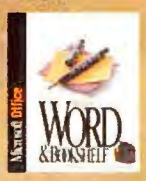

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- Microsoft Bob
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- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
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- 4 ISA, 2 PCI & 1 PCI/ISA Slots
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- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
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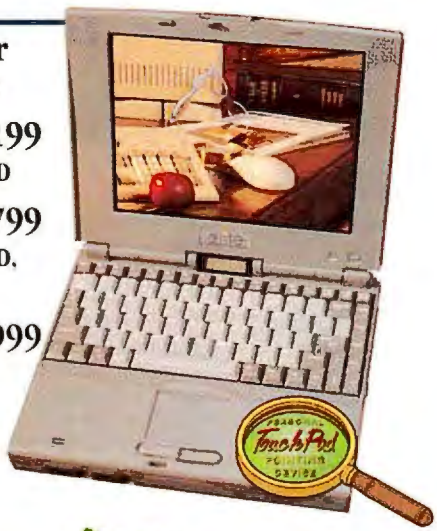

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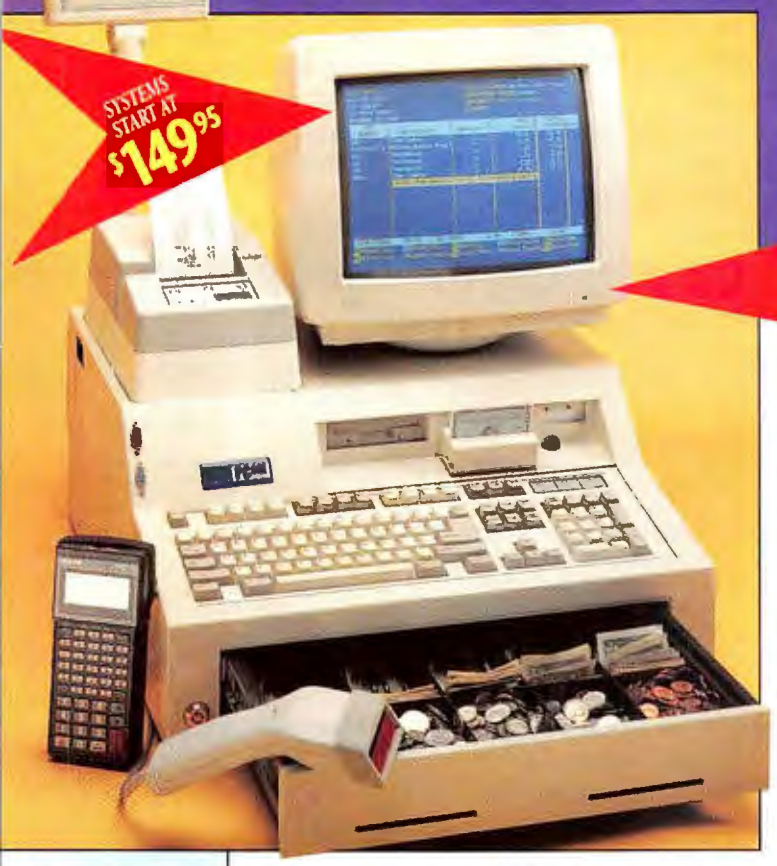

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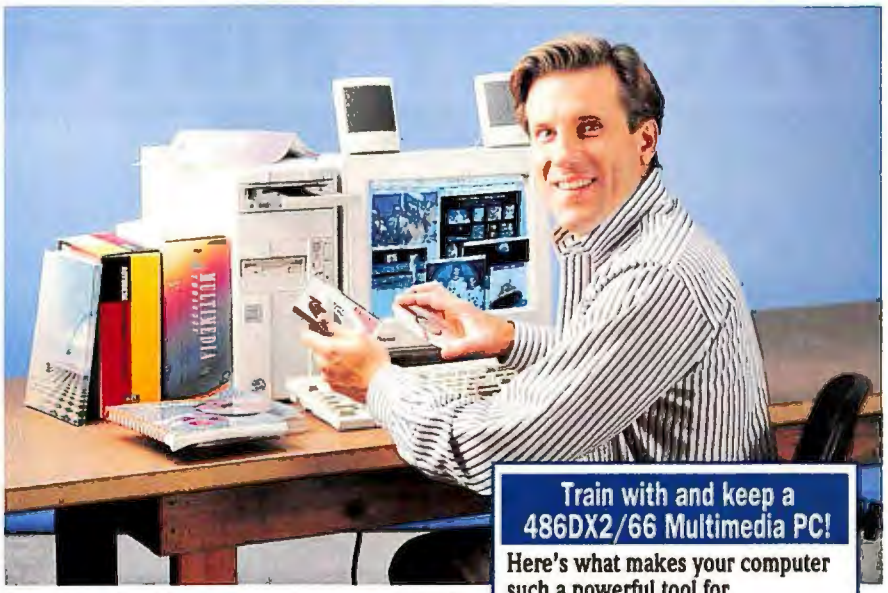

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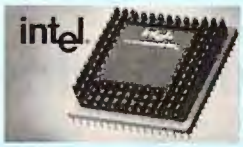

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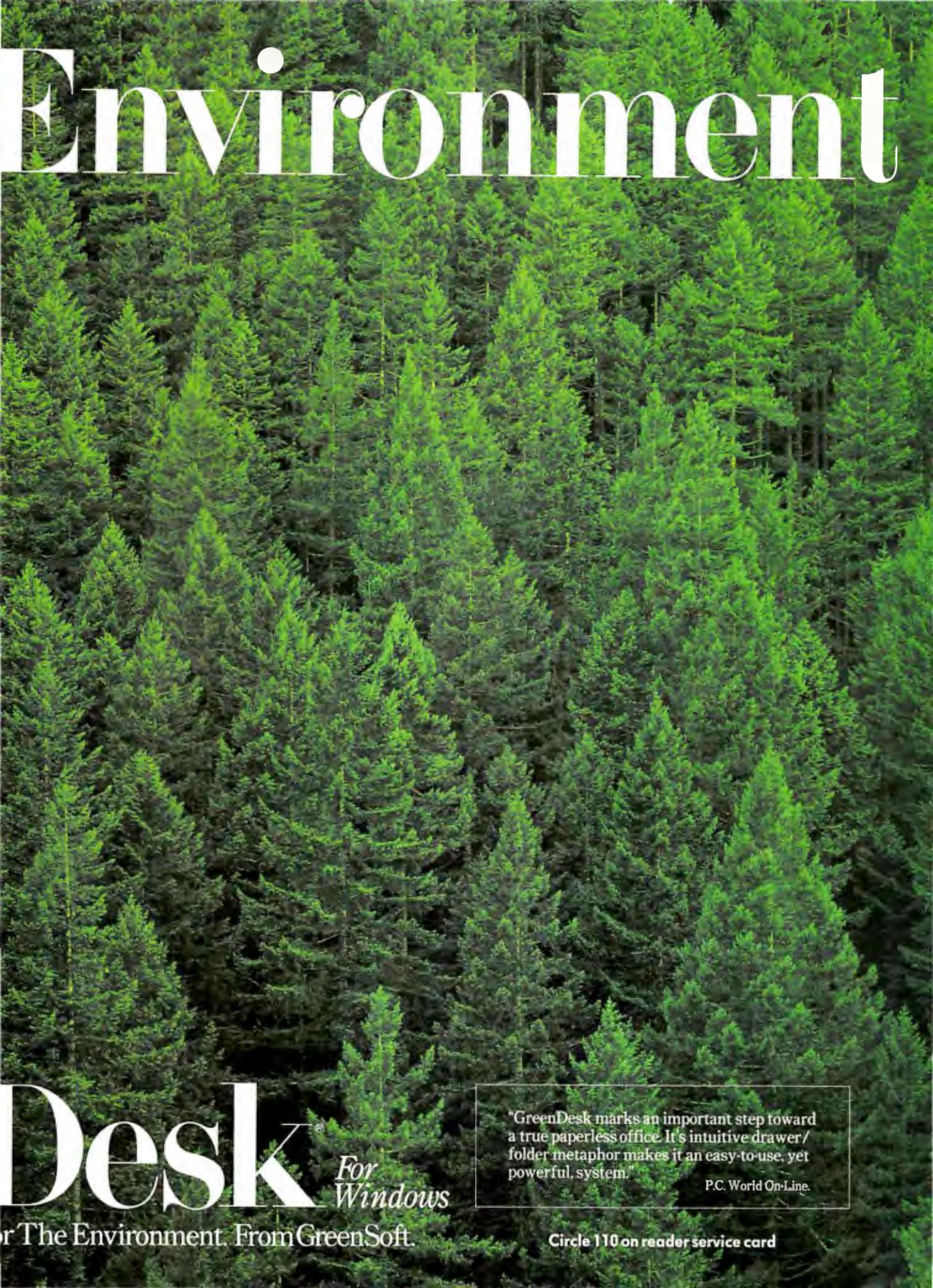
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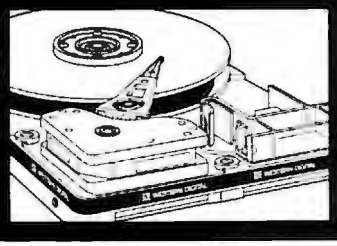

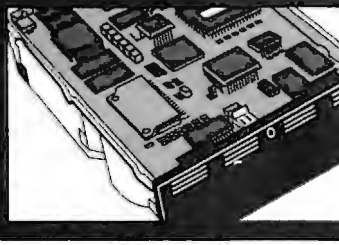

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-SCSI Kit includes 16bit card, DOS or Windows software & 1 tape.

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525MB	Conner	2525	$479	$629
2Gig	HP	35470	$749	$849
2Gig	Conner	CTD2000	$779	$879
2-4Gig	Conner	TSM4000	$539	$609
2-4Gig	Conner	CTD4000	$849	$949
2-4Gig	HP	35480	$869	$969
4-8Gig	Conner	CTD8000	$939	$1039
4-8Gig	HP	C1533A	$1049	$1159

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DC200S 16Bit IDE w/ High Speed IO	$55	$45
DC290N Bus Master PCI	$59	$49
DC600CF 16Bit Caching	$89	$79
DC680C 32Bit Local Bus Cache	$109	$99
DC690C 32Bit PCI Cache	$149	$139
SCSI		
ADAPTEC		
A1522BASIC 16Bit	$129	$109
A1542COREL 16Bit	$235	$225
A2742 EISA	$379	$369
A2842 VESA	$259	$249
A2940Kit PCI	$289	$269
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DC300B 16Bit	$159	$149
DC800B 16Bit Caching	$199	$189
DC380B 32Bit VESA	$179	$169
DC880B 32Bit VESA Cache	$299	$289
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QLOGIC PCI SCSI & WIDE	$325	$315

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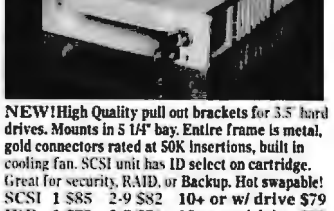

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7850	850MB	11MS	3.5" IDE	249
71260	1.26GB	11MS	3.5" IDE	349

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CFS420A	420MB	12MS	3.5" IDE	$175
CFS540A	540MB	11MS	3.5" IDE	189
CFA850A	850MB	10MS	3.5" IDE	255
CFA1275	1.27GB	10MS	3.5" IDE	365

Seagate — 3 Year Warranty

ST3660	545MB	12MS	3.5" IDE	$190
ST3780A	730MB	10MS	3.5" IDE	239
ST31220A	1.09GB	10MS	3.5" IDE	349

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2850	850MB	10MS	3.5" IDE	249
31200	1.2GB	10MS	3.5" IDE	359

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8mb 352

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HP LJ 4L 1mb 54

IBM 4019, 4019E
2mb 112

IBM 4029 Series 2mb 98

Panasonic 4410, 4430, 4420, 4450i
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4mb 168

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P90	707	737
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P100	877	937
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16X9-70 $579	8X36-70 (32MB) $1089

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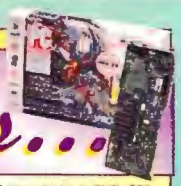

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CX486DLC-33	42
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586 P90	419
586 P100	525

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Tracker 350	329
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3C509B Etherlink III combo	123.77
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3C1627 12 port Linkbuilder 10BT	819.44

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CACHE MEMORY

	12NS	15NS	20NS	25NS
8Kx8	–	6.50	6.00	5.50
32Kx8	10.00	9.00	8.00	7.00
32Kx8 (3.3V)	–	–	14.50	–
64Kx1	–	11.00	9.00	8.00
64Kx4	–	11.00	9.00	8.00
16Kx4	–	8.00	7.00	6.00
128Kx8	–	59.00	39.00	29.00

Individual D-RAM Chips

MEMORY FOR IBM & APPLE				
	50NS	60NS	70NS	80NS	100NS
*Mega1	–	8.85	8.45	5.95	4.95
*Mega4	–	49.00	39.00	32.00	–
*Mega4 (Zip Pkg)	–	24.00	22.00	21.00	–
256x4 Page Exp	–	7.25	6.75	6.50	5.95
256 x1 Static Dip	–	–	9.95	–	–
256x4 Page Zip	–	9.25	9.00	8.95	–
256x4 (300 Zip)	–	–	12.95	11.95	9.95
256x8 SIP	–	29.00	24.00	–	–
256 x1	–	3.25	2.95	2.75	2.25
64x4	–	–	–	3.75	–
64x1	–	–	–	–	2.00
256x16 SOJ	–	–	39.00	–	–
256x16 Video Zip	–	49.00	39.00	–	–

INTEL Math Chips

8087	39.00
8087-2	45.00
8087-1	79.00
80287-XL	49.00
80387-16 DX	39.00
80387-20 DX	44.00
80387-DX (Does All)	74.00
80487-SX (Does All)	199.00
Intel SX (Does All)	69.00
Intel SL Model	69.00
Intel 16SX	39.00
Intel 20SX	49.00

Lowest price on Intel overdrive chips

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DIMM MODULES

4Meg/8Meg/16Meg 194/363/799

SIMM MODULES (Add $5.00 for SIPP)

	40NS	50NS	60NS	70NS	80NS	100NS
256 x 9	–	–	–	10.00	9.00	8.00
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)	–	–	–	–	699.00	–	–

72 PIN SIMMS (EISA)

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	–
4 x 36 16 mg	–	–	569.00	549.00	549.00	–
8 x 36 32 mg	–	–	1189.00	1149.00	1149.00	–
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	–
72 Bit & 64 Bit Simms	Call	Call	Call	Call	Call	Call
EDO Simms	Call	Call	Call	Call	Call	Call

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AST MEMORY

MODEL	AMT. UPGRADED	AST PART #	PRICE
Bravo LC Series, Bravo MT, Bravo MS, MS-I, Advantage Pro DX33, SX25	4Meg	5009987-002	169.00
	8Meg	5009987-003	338.00
	16Meg	5009987-004	479.00
	32Meg	5009987-005	958.00
	64 Meg	5009987-006	1916.00
Premmia LX P/60, M33/66d, 4/100T, P/80	8 Meg	5009987-003	338.00
	16 Meg	501340-002	479.00
	32 Meg	501340-003	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 Q, V Series Server	64 Meg	501159-005	2298.00
Power Premium 3/33, 4/33, 4/33S, 4/50d, 4/66d	8Meg	5007780-001	379.00
Premium 486/25, 486/25E, 486/33, 486/33E			72 pin
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	5007780-005	119.00
Advantage 486/25, 486/33, 486/33P, 486 SX/20			
Premmia SE4/25	8Meg Kit	5007780-001	379.00
Premium SE 4/50, d, 66d, P/60	1 Meg	5007780-003	59.00
Prem. 386/33T 386 SX16 Prem. II 386SX-20 386/25	4Meg	5007780-004	189.00
Premmia GX P/90, P/100	8Meg Kit 16MegKit	501569-001/501566-001	378.99/
	32Meg Kit/64Meg Kit	501567-001/501568-001	958/2298
AST Cupid Board	0-32 Meg	900818-001	179.00

AMBRA

Ambra Pentium-60	4/8/16 Meg	175.00/369.00/599.00
Ambra NC 4255L	2/4/8 Meg	109.00/209.00/449.00
Ambra N Series	4/8/12/16 Meg	189.00/349.00/569.00/679.00
Ambra SN Series	4/16 Meg	189.00/699.00
Ambra Sprinta SLC II	2/8 Meg	89.00/319.00
Ambra N 75, N-100	4/8/16	189.00/369.00/659.00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #	PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME	59.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK	180.00
Z386SX	2Meg	Z-605-1 modules	119.00

MAGNAVOX

286/386SX-16, 386SX-20, 486SX-20 & 386-33 *all are 72PIN SIMM:*
1MEG – 59.00 4MEG – 180.00 8MEG – 349.00 16MEG – 659.00

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0Meg	2Meg	4Meg	8Meg	16Meg
$139.00	**$238.00**	**$319.00**	**$499.00**	**$859.00**

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BATTERIES

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IBM PS/1, PS/2 MEMORY MODULES

IBM PART NO.	WORKS WITH MODEL	PRICE
30F5348 (512K)	30-286	37.00
30F5360 (2Meg)	30-288, 25-286, 50 MTHR BD.	104.00
64S0975 (1Meg)	80-041	79.00
64S0378 (2Meg)	80-111, 311-121, 321, 681, 161	84.00
64S1080 (4Meg)	80-A21 A-81, 80-A31, 80-111, 80-311	189.00
64S0804/92G7196 (2Meg)	70-081, 681, 121, SCC, 55SX, 65SX, P-70	98.00
	55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	
64S0808 (2Meg)	73-A21 A-61, B-21, B-61, 35SX, 35LS, 40SX, Val Pt, 325T	99.00
76X8955 (120M)	25	35.00
34F2533 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS 65LS	175.00
87F9677/92G7199 (4Meg)	55SX, 55LS 65SX 40SX, 365X, 35LS, 40SX, Val Pt, 325T	175.00
1057035 (512K)	P/S1-286	49.00
92F9935 (2Meg)	P/S1 & P/S1-386SX-212*	129.00
92F9894 (4Meg)	P/S1 & P/S1-386SX, Model-2121	179.00
92G7200 (4Meg)	PS/ Expert Consultant, Window	175.00
92G7201 /30J3131 (4Meg)	Value Point Performance, PC Server 4/66	175.00
92G7539 (4Meg)	Aptiva 310 330 350 510 530 710 730	Call
92G7541 (8Meg)	Aptiva 310 330 350 510 530 710 730	Call
92G7543 (16Meg)	Aptiva 310 330 350 510 530 710 730	Call
92G7545 (32Meg)	Aptiva 310 330 350 510 530 710 730	Call
73G3132/92G7203 (8Meg)	Value Point Performance, PC Server 4/66	339.00
00G1822/92G7204 (16Meg)	Value Point Performance, PC Server 4/66	609.00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1239.00
6450902 (2Meg)	56, 57, 57SX, 80, 95, P-75 57SLC	90.00
	Value Point 77 486DX2, 486SX, SVR 85	
6450128/92G7200 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1 386SX, Mod-2123, 2133, 2155, Val Pt 77 486DX2, 486SX, SVR85	175.00
	Value Point 77 486DX2, 486SX, SVR 85	
6450129/92G7428 (8Meg)	35SX, 40SX	339.00
6450130/92G7202 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	339.00
	Value Point 77 486DX2, 486SX, SVR 85	
6451158/92G7298 (4Meg ecc)	486: 95XP, 95A (install in pairs)	199.00
6451158 (8Meg ecc)	486: 95XP, 95A (install in pairs)	398.00
92G7209/92G3730 (16Meg ecc)	9595 OPT	749.00

IBM NOTEBOOK & LAPTOP MEMORY

07G1415,07G1420 (4Meg)	Thinkpad 750 C, 700, C, 720, C CL57SX	189.00
07G1416,07G1421 (8Meg)	Thinkpad 750 C, 750, C, 720 C CL57SX	389.00
56G0095 (16Meg)	Thinkpad 750 C	669.00
56G0094 (4Meg)	Thinkpad 755 360, 355, 340 453	179.00
56G0094 (8Meg)	Thinkpad 755 360 355 340 453	349.00
56G0094 (16Meg)	Thinkpad 755 360 355 340 450	629.00
8189098 (4Meg)	Thinkpad 500, 510CS (3.1 volt)	209.00
8189099 (8Meg)	Thinkpad 500 510CS (3.1 volt)	389.00
8189113 (16Meg)	Thinkpad 500 510CS (3.1 volt)	799.00
79F0099 (2Meg)	LX40, N33SX, PS Note	133.00
79F1000 (4Meg)	LX40, N33SX, PS Note, Thpd 350, 350c, PS Note 425	189.00
79F1001 (8Meg)	LX40, N33SX, PS Note	349.00
Hard Drive (124Meg .710 Mag))	Thinkpad 750, 755, 360, 356	849.00/1149.00
(4Meg/16 Meg = Adat	Thinkpad 755 Drive Modules	209.00/699.00
(4Meg/15 Meg = Adat	Thinkpad 755	299.00/749.00
60G0378 (8Meg)	Thinkpad 350, 350c, PS Note 425	339.00
60G0379 (16Meg)	Thinkpad 350, 350c, PS Note 425	569.00
92F8004 (2Meg)	N45SX	109.00
92G7259 (4Meg)	Thinkpad 701C, CS, Butterfly	Call
92G7281 (8Meg)	Thinkpad 701C CS Butterfly	Call
92G7253 (16Meg)	Thinkpad 701C CS, Butterfly	Call

COMPAQ MEMORY MODULES

MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L, 486/25, 486/33L	2Meg Module	115144-001	109.00
486/25L, 486/33L	8Meg Module	116581-001	399.00
486/25L System Pro	32Meg Module	116582-001	1399.00
DeskPro 386/33L, 486/33L	1Exp Bd	116586-001	279.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	199.00
DeskPro 386S-16/AHz	1Meg Exp Bd	115633-001	149.00
	4Meg Exp Bd	115634-001	279.00
	1Meg Module	113646-001	79.00
	4Meg Module	112534-001	199.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149.00
DeskPro 386/25E	4Meg Exp Bd	113645-001	279.00
	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	199.00
DeskPro 286/i, 386/i, 386SX20 all "M" series, system LT series, all "i" series	1Meg Module	113646-001	59.00
	2Meg Module	116889-001	89.00
	4Meg Module	116890-001	159.00
	8Meg Module	116891-001	339.00
M Series Exp Bd	3-64Meg	129160-001	189.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	299.00
	1-2Meg Exp Bd	108089-001	239.00
DeskPro 286 ALL OF THESE MACHINES USE THESE MODULES	2Meg Exp Bd	108070-001	437.00
DeskPro 5/60, 5/66M, 5/66M	1Meg Kit	113121-001	49.00
Prosignia 5/60	8Meg Kit	149911-001	399.00
Prosignia 200	1Meg Kit	149949-001	699.00
Prolliant 100 /166	32Meg Kit	149912-001	1399.00
Prolliant 2000 4/50 5/66	64Meg Kit	149913-001	2516.00
Prolliant 4000 4/50, 5/66	128Meg Kit	149914-001	5799.00
Prolinea 386 3/25S, 3/25ZS	2Meg	141728-001	90.00
	8Meg	141742-001	316.00
Prolines 486 4/25S, 4/33, 4/50, 4/66 CDS	2Meg	141683-001	95.00
Enhanced Prolinea, Prolserv series	4Meg	141684-001	175.00
	8Meg	141685-001	339.00
Prosignia PC Server, 486/33, 486 DX2/66	8Meg	141685-001	339.00
	16Meg	149320-001	599.00
	32Meg	149147-001	1199.00

COMPAQ LAPTOPS & NOTEBOOKS

LTE/286	4Meg Bd	117081-003	179.00
LTE/386S/20	4Meg Module	121125-002	209.00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	209.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	389.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	769.00
LTE LITE 425C/33C/75E,25L	4Meg Module	142337-002	189.00
LTE LITE 425C/33C/75E,25L	8Meg Module	142337-003	329.00
LTE LITE 425C/33C/75E,25L	16Meg Module	142337-004	639.00
SLT/286	4Meg Module	110237-001	199.00
SLT/386	2Meg Module	113304-001	109.00
SLT/386	4Meg Module	113305-001	219.00
Concerto, LTE Elite	4Meg	144790-001	189.00
	8Meg	144790-002	369.00
	16Meg	144790-003	699.00
Contura 320, 325	2Meg	139497-001	99.00
	4Meg	139498-001	189.00
	8Meg	139499-001	339.00
Contura 400, 410	4Meg/8Meg/16Meg		193/369/709
Contura 4/25, 4/25C, 4/25CX	4Meg	148520-001	189.00
	8Meg	148521-001	339.00
	16Meg	146531-001	699.00
Aero 4/25, 4/33L	4Meg	190532-001	184.00
	8Meg	190597-001	359.00

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MODEL	AMT. UPGRADED	MANU. PART #	PRICE
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T2000SE/T2000SX/T1800 1Meg C	4Meg	PC-PA2001U	189.00
T2000SE/T2000SX/T1800 1Meg C	8Meg	PC PA2002U	359.00
T2100, 2120, 2130, 3100, 3105, 3150	4Meg SIMM		199/369
	16Meg SIMM		729/1249
T4400SX, SXC T6400, T6600	4Meg	PC PA2004U	189.00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	359.00
T4500, C T4600, T4700, T1000, C, T1910, T1950 (3.3 V)	4Meg	PC-PA2012U	189.00
T4500, C T4600, T4700, T1000, C, T1910, T1950 (3.3 V)	8Meg	PC-PA2013U	359.00
T4500, C T4600, T4700, T1000, C, T1910, T1950 (3.3 V)	16Meg	PC-PA2014U	769.00
T4700, 4800, 4850 (Hard Drive)	524Meg/770Meg		949/1149
T3400CT T3400, T3600	4Meg	PC-PA2019U	194.00
T3400CT T3400, T3600	8Meg	PC-PA2020U	359.00
T3400CT T3400, T3600	16Meg	PC-PA2021U	769.00
T3400CT T3400, T3600	32Meg		1549.00
T3100/SX	2Meg	PC1S-PA8326U	99.00
T3100/SX	4Meg	PC1S-PA8310U	189.00
T3200	3Meg	PC6-PA7137U	119.00
T3200/SX	5Meg	PC12-PA8307U	249.00
T3200/SX	8Meg	PC12-PA8309	199.00
T5200/T8500	2Meg	PC12-PA8304U	99.00
T5200/T8500	8Meg	PC15-PA8313U	419.00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 720, 725C, 780, 780	2Meg, 4Meg, 8Meg		109/209/399
ACER 730	4Meg, 8Meg, 16Meg		199/459/799
ALR Venture	4Meg	12407980	209.00
Altima Vegas	4 Meg, 16 Meg		199/579
Altima Vegas III	4Meg, 8Meg, 16Meg		199/379/579
AST Ascentia 900N, 800N	4Meg, 8Meg, 16Meg		199/379/579
AST Bravo & Explorer	4Meg, 16Meg	501255-001, -002	189/679
AST Notebook Pro, Premmia, SXe, 3366X/25/25S/	4Meg	506814-003	189.00
AST Power Exec 3350C, 425/4L, 425SL	4Meg/16Meg	501198-001 -003	199/699
AST Power Exec 4350SL	4Meg/16Meg	501318-001 002	194/769
AT&T Safari NSX/20	4Meg, 8Meg, 16Meg		199/379/679
AT&T Safari NSX/20	4Meg	PEC 37651	259.00
Austin D3A, D3C, D3E, SX Series	4Meg/16Meg		Call
Bondwell B310, Plus	1Meg	23050-09100	69.00
Bondwell B310V, SX	1Meg		109.00
Bondwell B312V, SX	2Meg		129.00
Bondwell B316	5Meg		279.00
Canon Innova Book 150	4Meg		199.269
Canon Innova Book 200LS	4Meg, 8Meg, 12Meg, 24Meg		Call
Canon Innova 486	4Meg, 8Meg, 16Meg, 24Meg		109/209/449
Canon Innova 486-10	4Meg, 16Meg		199/329
Canon Notepet 486	4Meg, 8 Meg		199/339
Chaparral 486	4Meg, 16Meg		199/579
Chicony 8283	4Meg, 16Meg		199/579
Compaq/Intel 425TX Notebook	4Meg, 8Meg, 16Meg		Call
DEC Hiteche	4Meg, 8Meg, 16Meg		199/379/569
Dell Latitude M, M2, M2+	4Meg, 8Meg, 16Meg		219/449/719
Dell Latitude XP, 475, 410D, 410DCX	4Meg, 8Meg, 16Meg		199/449
Dell Latitude 486, 425, 433C, 433CX, 450, 450CD	4 Meg, 16 Meg		199/579
DTK 4710P Notebook	4Meg/8Meg/16Meg/24Meg		Call
Epson ActionNote 650, 650c	4Meg, 8Meg, 16Meg		209/399/659
Epson ActionNote 700, 700c, 700cx	4Meg, 8Meg		199/639
Epson ActionNote 4000 Notebook	4Meg		Call
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50			Call
Everex Tempo LX, LX20, Corner	2Meg	PCA 00053-0001	109.00
Gateway 2000 Colorbook 4/33	4Meg, 16Meg		199/579
Gateway 2000 Nomad 425 DX/LSI,SL	4Meg, 16Meg		199/1199
Gateway 2000 4DX Handbook	4Meg, 16Meg		199/579
Gespotel 83/20 386/SX/16	4Meg	8368-4M	149.00
HP Omnibook 300, 400 425	2Meg, 4Meg		129/269
HP Omnibook 500, 600	4Meg, 8Meg, 16Meg		229/379/579
HP Omnipook 4000	4Meg, 8Meg, 16Meg		199/379/549
Leading Edge Aviva	4Meg, 16Meg		199/579
Lasermate B610	4Meg, 8Meg		199/379
Magnavox Merlin	1Meg, 4Meg	286 386SX	109/199
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Twisted Games Behind the Carnival Tent

Your boss asked you to stay late to be sure that overseas fax comes in. But there's no reason you have to crunch numbers or run reports while you wait. Why not take advantage of the empty office and check out some multimedia entertainment? You'll need something that's simple, unproductive, and utterly meaningless to pass the time. As this month's guest columnist, I'll help you spend your stolen time wisely.

A Blow to the Head

Frivolous entertainment is just what you'll get with Take Your Best Shot, the latest offering from the folks at 7th Level, who completely wasted our time last year with Monty Python's Complete Waste of Time. This time, 7th Level eschewed the search for intergalactic success in favor of a trio of classic distractions featuring slapstick animation from Bill Plympton. You may have seen his characters on MTV.

The three games include Head Shot, a version of the old Breakout and Arkanoid games that features animated heads you blow off the screen with a silver cannonball. Hot Shot is a sick version of Pong in which you bounce the puck off a fatuous head; Line Shot is a digital version of the old baseball dart game you played as a kid.

The subtitle of Best Shot is "Twisted Arcade Games for Twisted Minds," but if your brainpan is really curved, you ought to spend some time behind the curtains at The Residents' Freak Show. Blame it on the old days when I was fascinated by county fair performers such as the Turtle Boy and the Amazing Ape Lady. Or maybe it was the stint I did as a circus roustabout. But I find there's nothing as fascinating as a carnival sideshow.

The Freak Show opens with a roadside carnival that rivals the one in Todd Browning's 1932 cult classic film, *Freaks*. Step right up as Tex the Barker introduces you to Wanda the Worm Woman, Jelly Jack the Boneless Boy, and other performers and human oddities. Then, when Tex isn't looking, slip behind the tent flaps for some real adventure. Learn what goes on inside the mind of Jelly Jack—if you dare. The artwork, animation, sound effects, and odd musical bits make this collection of digital strangeness as entertaining as it is eerily mesmerizing.

In The Residents' Freak Show, you cross paths with strange individuals like Jelly Jack the Boneless Boy.

Armed for Revenge

It takes more than stories to interest some people, though. If you're a Doom or a Steven Segal fan, you probably think plot just gets in the way. In that case, Descent may be for you. Descent is another in a rash of graphical 3-D games that cast you as the hero. This time, you're a renegade pilot hired to undertake mercenary rescue and revenge on behalf of the Post Terrain Mineral Corporation. You live in a scary Third Wave future where the bad guys fly ships bristling with arms.

The graphics and flight control are nothing short of fantastic, although you can easily lose your bearings in the deep mine shafts because of 360-degree rotations. But if you like to fly fast, shoot faster, and die in a hurry, download the shareware version from CompuServe (**go gaming**) or PC World Online, and go for a brief tour of duty.

If futuristic combat isn't your style, you could try the Atari 2600 Action Pack, where the action exists somewhere in the creaky and cobweb-strewn neural pathways of the Pong generation. While Take Your Best Shot uses old games as a launch pad, this collection of arcade nostalgia puts an Atari 2600 right in your Windows PC.

If you're desperate for a blast from the past, you'd be better off tuning in to *Nick at Nite* or the local classic rock station. (Use headphones, please.) The Atari 2600 was the game machine of its day, and I spent more than a few hours of my reckless youth mired in its electronic clutches. But looking at these games now, you've got to wonder how we ever got interested in the first place. If you think it might be cool to share these classics with your kids, be sure to hide the Nintendo and the Sega first.

While old video games try for a comeback, comic books are enjoying a renaissance. Anyone can watch the *X-Men* on TV, but with Comic Creator you can draw your own graphic adventure. Start with one of ten heroes such as Arca, who reads minds and uses the power of persuasion to defeat enemies.

By Peter Scisco

PULL UP MICROSOFT WINE GUIDE when you're wondering which vintage will go perfectly with dinner.

You get a full slate of bad guys too, like the lovable Pustule, who comes in a becoming shade of infectious green and vomits acid that, according to his biography, "makes his opponents ill." I bet it doesn't do much for his friends, either.

Cast these characters in settings ranging from cities to swamps, throw in bystanders and weapons, then click the Idea Dice for suggestions on where to go next. You can save your story to disk, or print it and start your own Marvel empire. The great artwork and endless possibilities will appeal to anyone who's ever dropped three bucks on a mutant adventure.

All right. By this time you've done your duty. The fax came in and all looks well. Time to head home, relax in an armchair with a book, and enjoy a glass of wine. If you're unsure what bouquet goes with the latest Grisham thriller, consult Microsoft Wine Guide. As a guide to everything from choosing the right wine at dinner to starting your own cellar, this multimedia tour is invaluable.

The disc takes you from the vine to the finished bottle, giving you the reasons behind the different flavors in the world's great wine regions. You can search 6000 vintages for the wine that matches your criteria. You can narrow searches by variety, food, and star rating, for example—but unfortunately not by price. You can, however, build and store your own list of personal favorites. Now this is time well spent.

- **Atari 2600 Action Pack** $29.95; Activision; 800/884-8863, 310/473-9200
  Reader service no. 730
- **Comic Creator** $35; Putnam New Media; 703/860-3375
  Reader service no. 731
- **Descent** $39.95; Interplay Productions; 800/468-3775
  Reader service no. 732
- **The Residents' Freak Show** $49.95; The Voyager Company; 800/446-2001
  Reader service no. 733
- **Take Your Best Shot** $19.99; 7th Level; 800/884-8863, 214/498-8100
  Reader service no. 734
- **Wine Guide** $39.95; Microsoft; 800/426-9400
  Reader service no. 735

PC WORLD online *The file from this article is available via PC World Online on America Online and CompuServe. Peter Scisco is a freelance writer based in North Carolina.* ■

COMING UP

Windows 95: What's Important to You

Cutting through half-truths, we've kept it honest, putting Windows 95 through its paces at all beta stages. Now, as the most widely anticipated software release in years rolls out, *PC World* gives you what you need to decide if, when, and how to use the real Windows 95.

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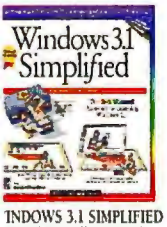

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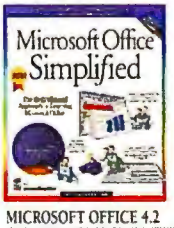

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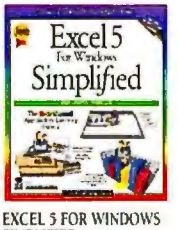

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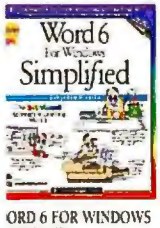

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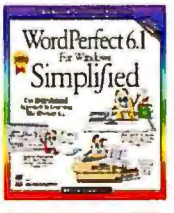

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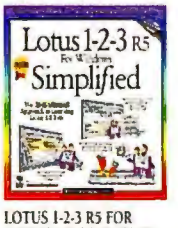

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Clamping Down on Clip Art

Late at night, deep inside my computer, TIFFs were mating with GIFs, multiplying at an alarming rate. There was no other explanation—by morning, another 10MB of new graphics files had appeared on my hard disk.

Well, maybe that isn't the only explanation. More likely, every Tom, Dick, and word processor was dumping a ton of clip art into my system. WinWord added some, as did Microsoft Publisher, Quattro Pro, and CorelDraw. And I've downloaded plenty of pictures from BBSs myself. So I shouldn't have been surprised when I recently discovered I had 1562 clip art files taking up over 30MB of hard disk space. These files included two dozen Santa Claus drawings and more than 60 graphic renditions of a computer.

Just Say No

Now when I install a new application, I seriously consider turning off the 'Install Clip Art?' option. I usually don't, however, because a good piece of clip art is worth its weight in magnetic oxides (who knows, there might be a better Santa Claus image somewhere). So my strategy now is to examine the clip art once it's installed and weed out what I don't like.

Don't bother trying this with Windows' File Manager, though—if you can't see the art, you can't judge it. Programs like Outside In and PC Tools' File Manager replacement let you look at your pictures, and they'll do in a pinch. But the best tools I've found for trimming and organizing my clip art collection are a couple of shareware masterpieces.

My favorite of these is ThumbsPlus, a $55 product by Cerious Software. What first attracted me to ThumbsPlus was its ability to scan my entire hard disk, find all my graphics files, and display 63 of them at a time as tiny thumbnails (I use 1024 by 768 resolution). In minutes I was able to locate and organize each and every picture on my drive, browsing through hundreds of thumbnails, viewing them full size when necessary, and immediately comparing images. I quickly got rid of redundant Santas and dragged and dropped files into more-appropriate directories. ThumbsPlus handles more than 21 file formats, including Kodak Photo CD images and TrueType fonts. And it can convert your files into 7 of those formats.

However, what I really like about ThumbsPlus is how it uses DOS directories. I tend to group files of various types into directories by content or project, and ThumbsPlus makes it easy. Not only can I move and copy files, but I can create new directories and change the volume label on floppies. Try it for yourself; it's on PC World Online as **thmpls.exe**.

If I weren't so enamored of directories, I'd use JASC's Media Center. It's even more powerful than ThumbsPlus, and at $39, it's cheaper. In addition to supporting more than 30 image formats, Media Center catalogs and plays Windows sound and music files (.wav and .mid), as well as video and animation files (.avi and .flc). And when it comes to the art of converting graphics file formats, Media Center beats ThumbsPlus hands down: It offers 24 conversion formats, compared with ThumbsPlus's 7.

Media Center uses an album metaphor to get you organized, letting you gather together, say, your holiday files, independent of what directory they're in. You can add descriptions and keywords to your pictures, making future searches much easier. And since Media Center remembers where your files are, it's great for tracking clip art collections on CD-ROM. Grab yourself a copy on PC World Online, where it's available as **mc20.zip**.

By the way, does anyone out there have any good pictures of the Easter bunny?

- **Media Center 2.0** $39; JASC, Inc.; 800/622-2793; CompuServe 74774,570
  Reader service no. 715
- **ThumbsPlus 2.0d** $55; Cerious Software; 800/242-4775, 704/529-0200, 704/529-0497 (fax); CompuServe 71501,2470
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PC WORLD online *The files mentioned in this article are available via PC World Online on America Online and CompuServe. Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 12 for contact information.*

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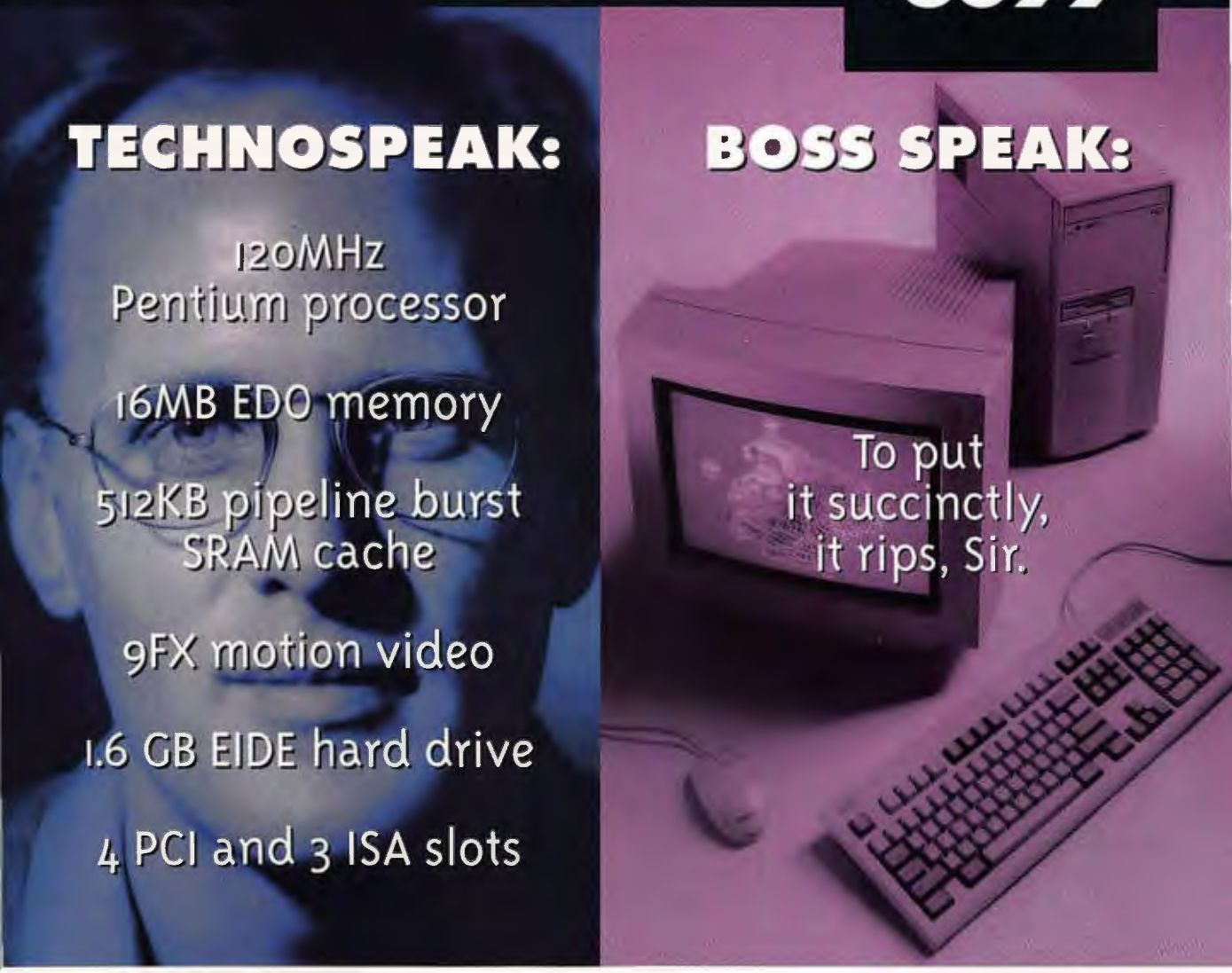

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