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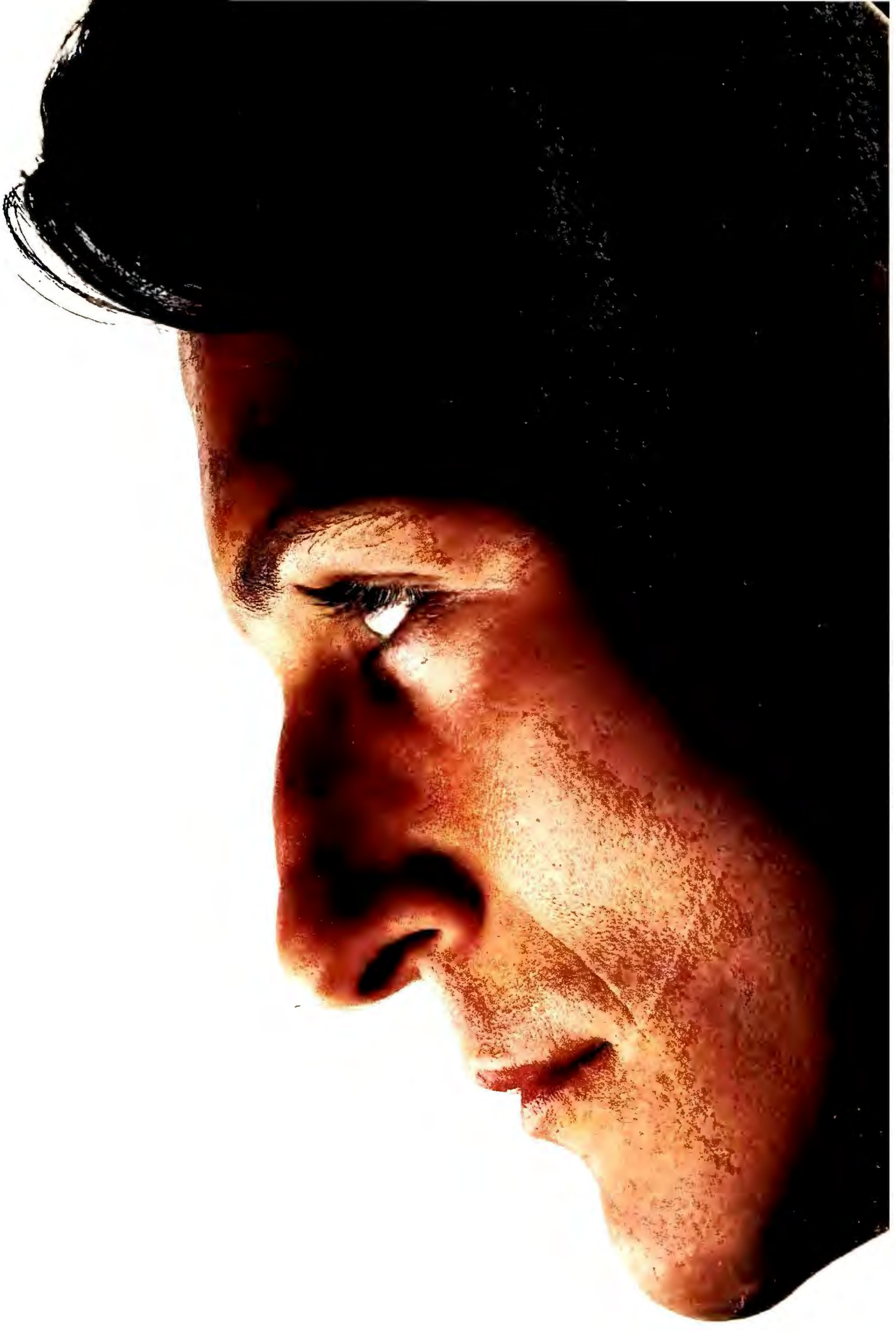

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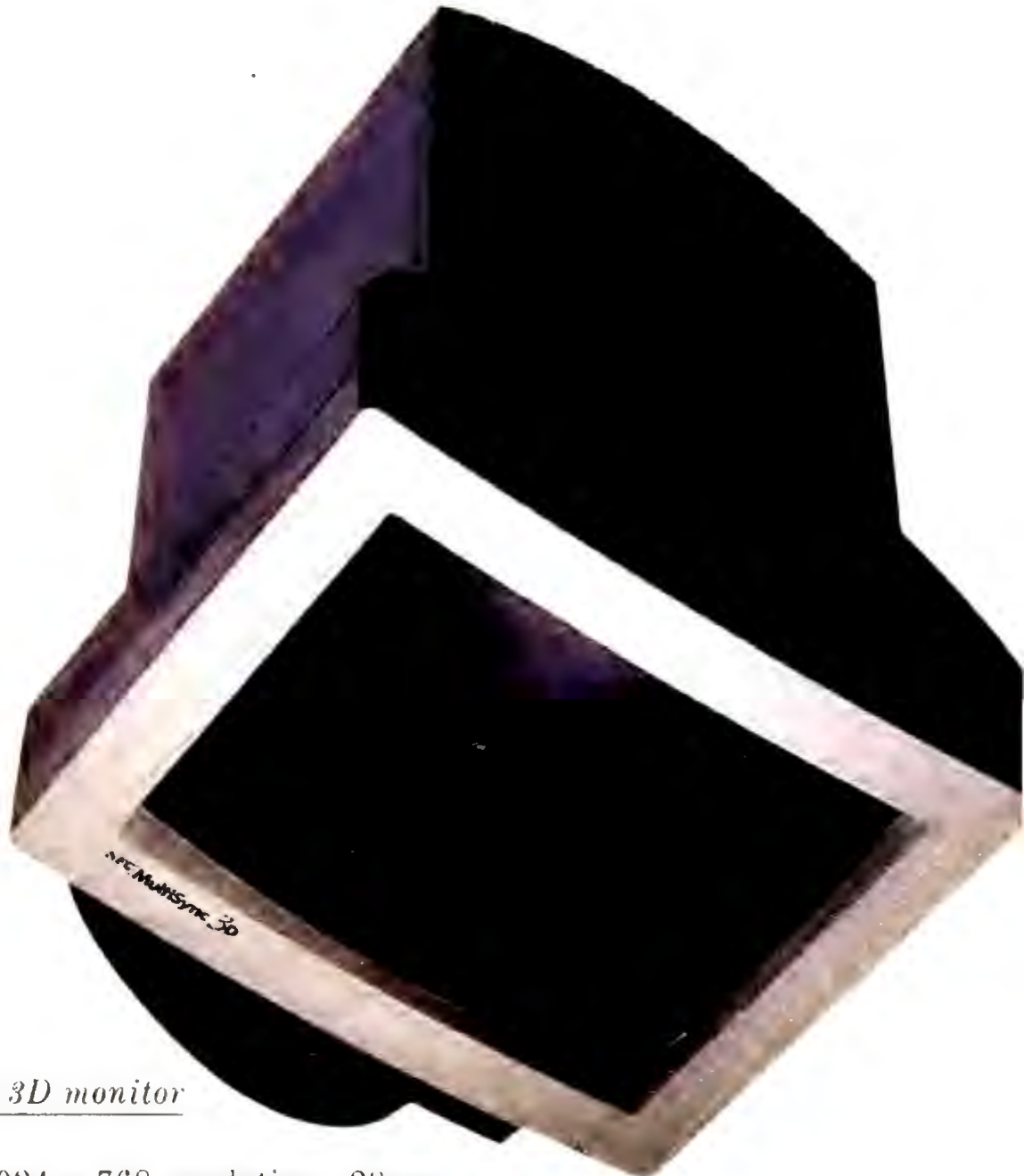

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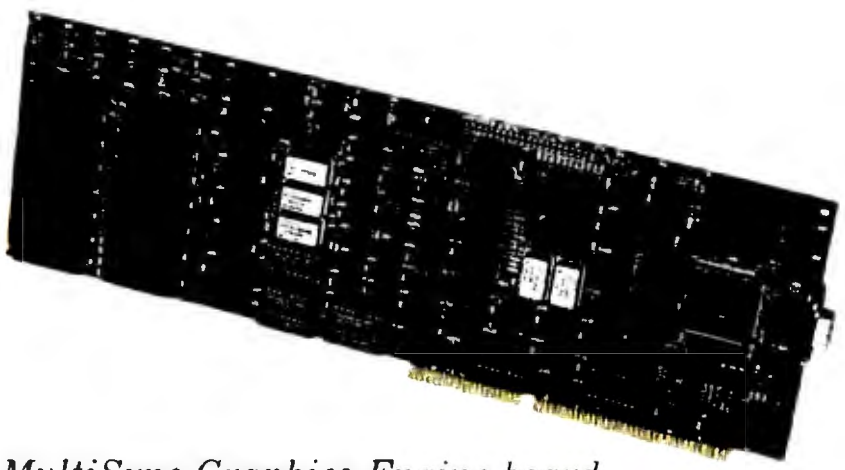

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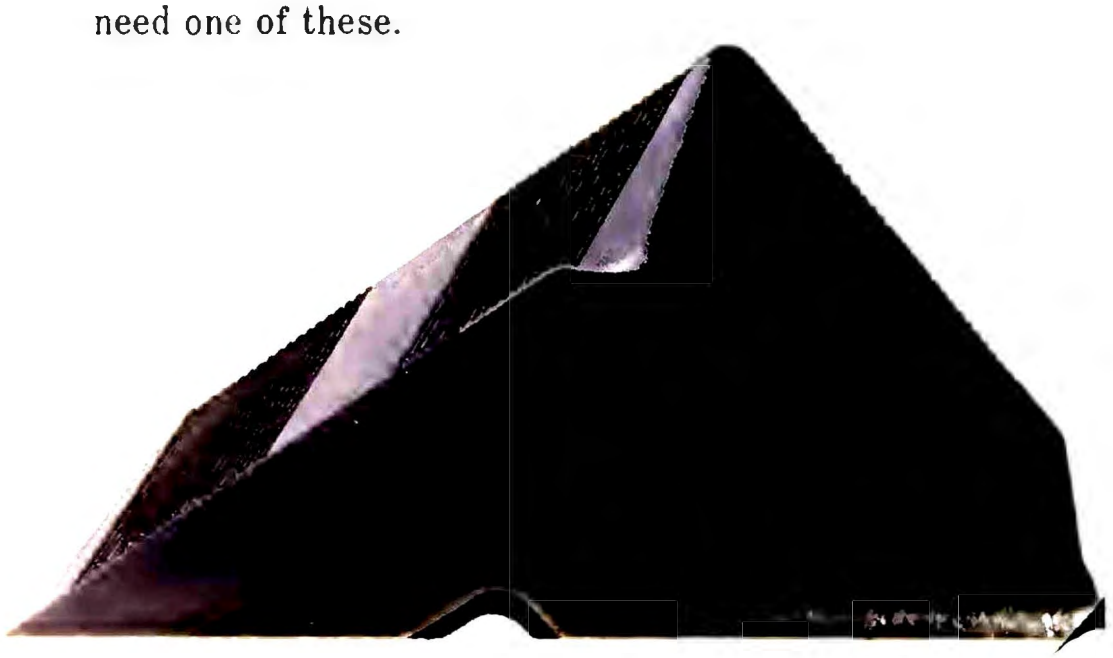

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Cover photograph by Fred Stimson

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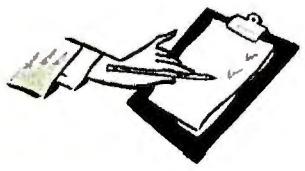

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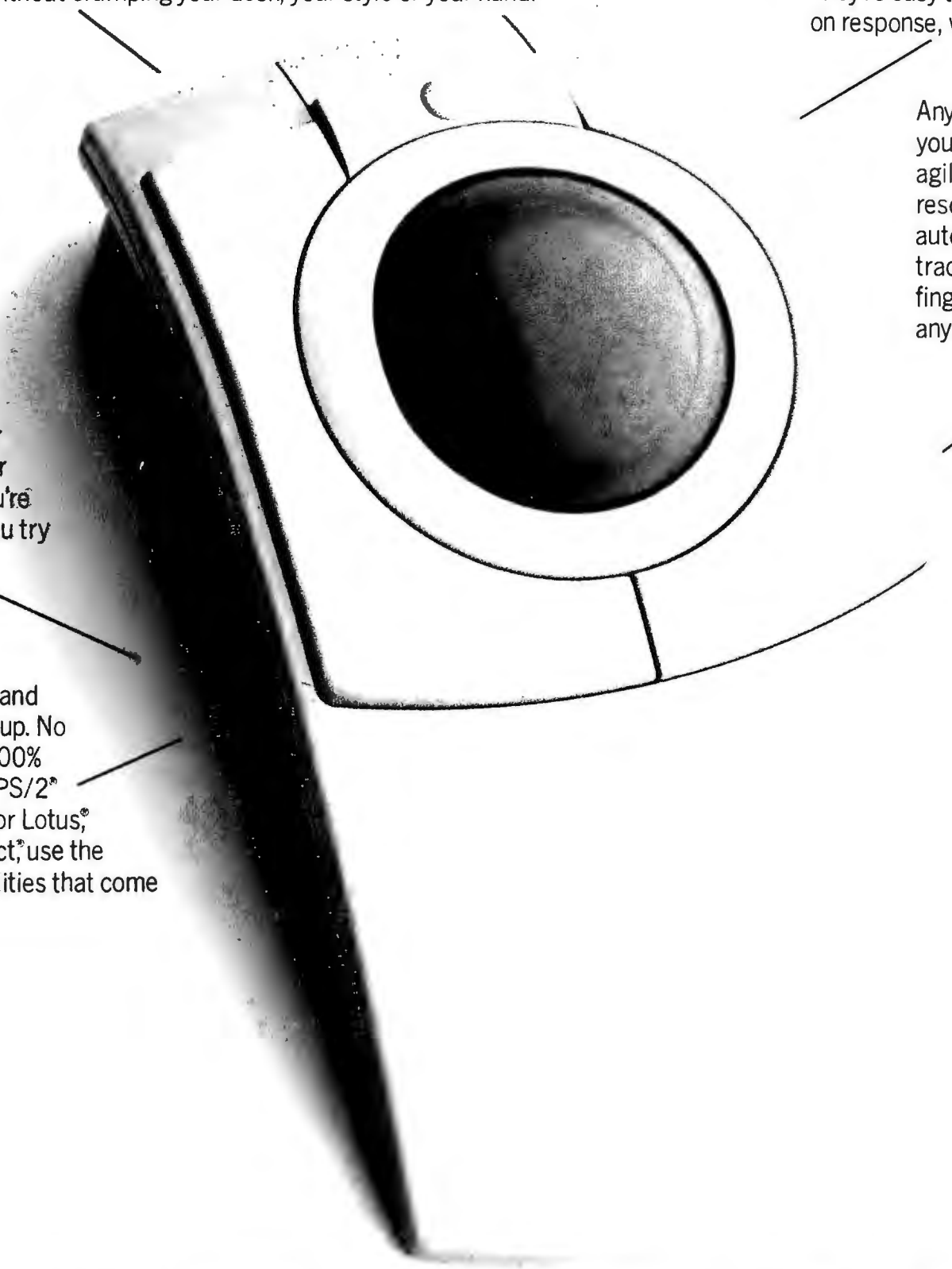

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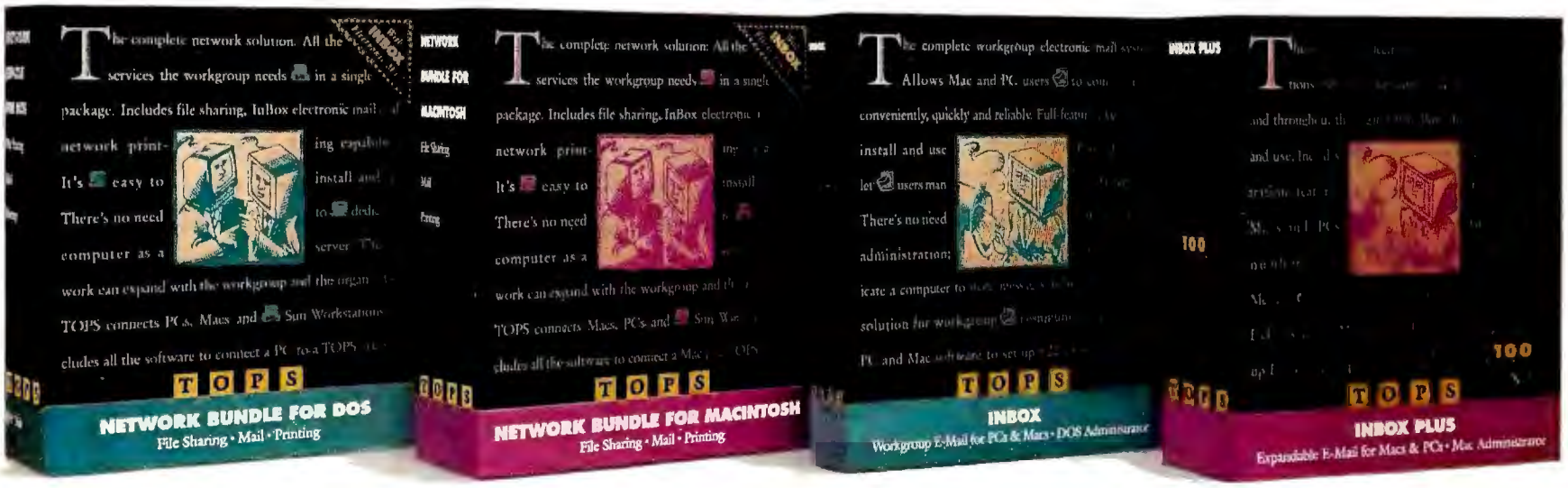

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Assistant Editor Susan Lusty and Editorial Assistant Cathy Smith, between phone calls.

ROBERT CARDIN

What's Wrong With This Picture?

Frankly, we're not used to seeing Assistant Editor Susan Lusty and Editorial Assistant Cathy Smith looking like this. Sure, the smiles are familiar. The energy and enthusiasm are no surprise. But where are the boxes? Where are the packing slips? And why aren't they asking *questions?*

By their own count, our two product specialists work the phones for a combined total of better than 48 hours every week. That's what it takes to keep up with *PC World*'s voracious appetite for new hardware and software. For a typical issue, Lusty and Smith make dozens of calls—researching a new product category; ordering review units and getting them safely into reviewers' hands; checking prices, specs, addresses, and phone numbers. Lusty also does the footwork for our *Consumer Watch* investigations.

"The hardest part of the job," says Lusty, "is just getting people on the phone—and voice mail makes it nearly impossible. You can trade messages eight or nine times without ever talking to a human. These days, people are shocked when they *don't* get my voice mail."

This month, we asked the pair to run up an extra-large long-distance bill, putting together our annual list of user groups from all over North America. And true to form, they turned up an impressive and eclectic collection, ranging from Alaska's Polar PC User Group to Florida's Hog Town Hackers. (The finished product appears in this month's expanded *Consumer Watch.*) You'll find the vital statistics for mega-groups like the Boston Computer Society side by side with those of Ohio's somewhat smaller Lake Ashtabula IBM PC Users Group. The odds are good there's a helpful organization right in your backyard.

Assembling and fact-checking the list was an unusual challenge, one that called for some long hours, Lusty reports. "Virtually all of these groups are volunteer organizations," she says. "We couldn't call the presidents at their day jobs, so we had to make most of our calls at night. Fortunately for us, most user group leaders are accustomed to getting after-hours calls."

Smith was most impressed by the boundless stores of energy common to user group leaders. "These people are *enthusiasts!* Practically every one had a story to tell, and they were all genuinely convinced their group was the best."

Would either staffer care to head up their own society? No, thanks, says Lusty. "The president of a PC user group has to deal with finances, field technical questions, arrange meetings, and coordinate guest speakers. That's just too much work for a volunteer."

Judging by this issue, no one can accuse our crack product team of being allergic to work. There's our largest-ever computer roundup ("14 SX Systems: Big Deals in Small Boxes") plus a full-sized Buyers' Guide to affordable tape backup drives. We look at four low-cost desktop publishing options. Our previews focus on two new and very different PCs: IBM's family-oriented PS/1 and Compaq's strictly business 20-MHz SX system. And as usual, *Product Outlook* turns the spotlight on nearly two dozen fresh hardware and software introductions.

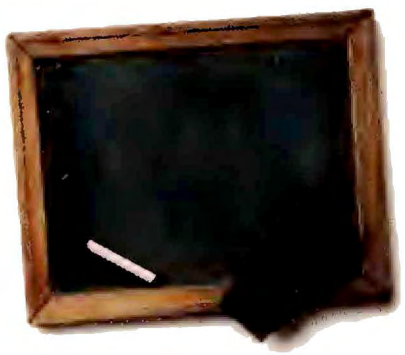
If you like the lineup, you could give us a call. But don't be surprised if the line's busy.

Ed Bott

Ed Bott
Managing Editor

Why Compaq will never build

The way we see it, the so-so, the pretty good and the just plain average are things for someone else. Not for us. And most certainly not for you.



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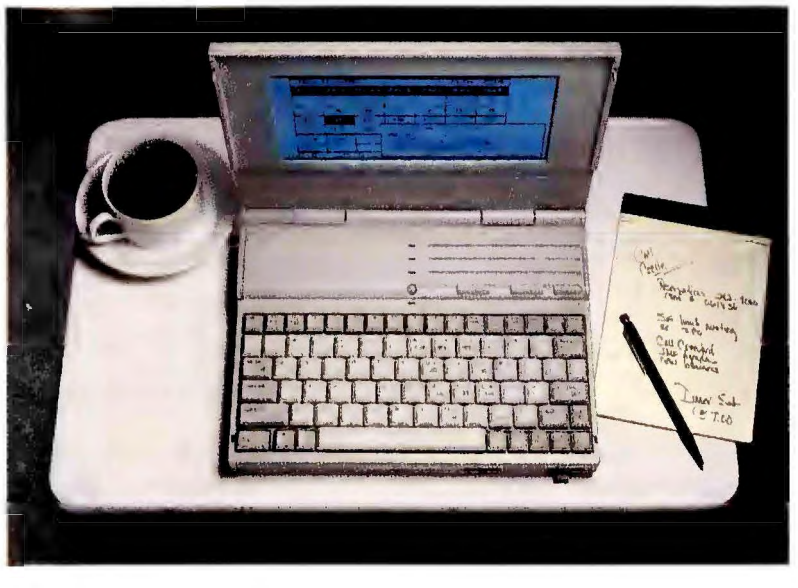

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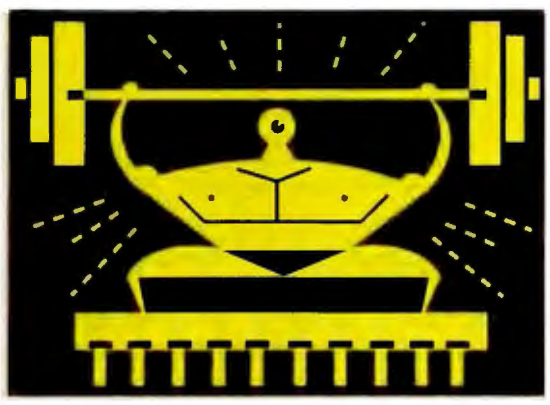
Circle 6 on reader service card

Mike Hogan

TOP OF THE NEWS

INTEL RAKES IN CACHE

Chip Will Cut System Costs but Not Performance



Intel Corporation has introduced a 16K cache subsystem for 386s, claimed to equal the performance of system vendors' proprietary 128K cache assemblies—but at one-third the size and 70 percent of the cost. The single-chip 82395 lowers costs mainly by incorporating fewer expensive static RAM (SRAM) chips. It will add $360 to $440 to the average system price of 25-MHz and 33-MHz 386 machines, compared with $500 to $600 for a proprietary 128K solution.

The successor to Intel's 82385 cache controller, the 82395 is derived from the 486 processor's cache architecture and is especially equipped to handle large programs and multitasking applications. It speeds reads from main memory by keeping four sets of the most commonly used data (even from multiple applications) and accelerates CPU writes to memory by exploiting four buffers. The controller has two separate buses, which enables an 82395-equipped system to read or write from cache memory to main memory (or vice versa) while the CPU simultaneously executes instructions held in the cache.

"The architecture is clearly superior to what is out there now," says Instat market researcher Mike Fiebus. "Call it the first of the second-generation cache controllers." Instat calculates that more than 60 percent of all 386 and 486 machines ship with an external cache and that that figure should grow to 95 percent by 1993. Intel's 82385 cache controller enjoys the lion's share of today's market—about 50 percent, compared with 5 percent for other third-party suppliers and 45 percent for system vendors who implement their own solutions.

Compaq and IBM already employ Intel's 82385, and Fiebus expects that many vendors like ALR that have been marketing proprietary caches will switch to third-party controllers. But Dataquest's Bart Ladd adds that the 82395 will pose a credibility problem for those vendors, which have advertised for years that a larger cache boosts performance. Systems equipped with the 82395 should debut this fall, says Intel marketing manager Sheila Cardno.

COMPAQ JUMPS TO 20-MHZ SX

Laptop Offers Desktop Speed and Storage

Other vendors were quicker off the mark with no-compromise 386SX-based portables, but Compaq aims to leapfrog them by offering a faster SX machine with the largest, fastest hard disk found in a battery-powered laptop.

The SLT 386s/20 has the same form factor, backlit VGA screen, 14-pound weight, and 3 hours of battery operation as Compaq's office-away-from-the-office, the SLT/286. But Compaq made the 386s/20 nearly twice as fast as the 12-MHz SLT/286 and up to half again as fast as competitors' 16-MHz SX laptops by including the 20-MHz 386SX CPU and innovative cached-memory architecture of its new Deskpro 386s/20. The 386s/20 can be configured with a 19ms 120MB hard drive for $7499.

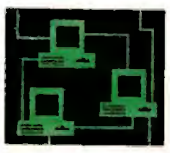
With the SLT 386s/20, Compaq retakes the technological lead (at least temporarily) in the small but fast-growing market for full-featured battery-powered SX laptops, now contested by Toshiba, NEC, and others. International Data Corporation (IDC) projects that shipments of these machines will almost quadruple from 20,000 in 1989 to 75,000 this year. But these numbers understate the potential, analysts say. This will become the middle of the portables market as prices fall and shoppers move up from 286-based equivalents.

Compaq's SLT/286 already dominates sales of battery-powered 286-based portables, which IDC says will enjoy a healthy 40 percent rise to 335,000 units this year. The SLT/286 accounted for 60 percent of such PCs sold through U.S. computer dealers during April, says JoeAnn Stahel, president of StoreBoard/Computer Intelligence in Dallas.

GORDON STUDER

NOVELL SHIPS NETWARE 386 3.1

Update Lacks Features Promised a Year Ago



NetWare 386 customers can look forward to faster network performance and server enhancements in version 3.1, due in July, but will have to wait for Novell or third parties to provide many crucial features promised when version 3.0 was introduced in May 1989.

Most noteworthy by its absence in 3.1 is support for mixing Macintosh and UNIX workstations on the DOS-based network. Novell laid the groundwork for itself or third parties to provide that support through NetWare Loadable Modules. But what was promised as standard in 3.1 will now cost users thousands of dollars extra. Also missing are the ability to "mirror" servers for fault tolerance and certain network management and message-handling services. "All NetWare 386 has been so far is an expensive file and print server," says Jamie Lewis, executive vice president and editor of the *Clarke Burton Report.*

On the upside, Novell says that disk access is 25 to 30 percent faster under 3.1 and server volume preparation three times quicker. Users can put still more storage and mirrored drives in a server under 3.1, and support extends to many more network adapters.

Although IDC research indicates NetWare 286 licenses still outsell those for NetWare 386 almost three to one, analyst Lee Doyle says NetWare 386 will steadily succeed 286-based versions.

POSTSCRIPT GETS A FACE-LIFT

A Speed Boost and New Features Answer Competitors

Hoping to bounce back from a stock market buffeting and decreasing revenues, Adobe Systems has announced PostScript Level 2, the first major upgrade to its page description language since it was introduced more than five years ago. Long in the works, Level 2's unveiling comes at a time when PostScript faces mounting competition from the Apple/Microsoft TrueImage alternative and from Hewlett-Packard's PCL5, which has many PostScript-like features at a considerably lower cost.

"Adobe is under a lot of pressure" because its infrequent enhancements have let others take aim at PostScript, says Dataquest analyst Bob Fennell. "With Level 2, though, it's a moving target."

Level 2 includes new features that respond to the most common criticism: slow performance. Adobe addresses the speed issue through a faster interpreter, more efficient memory use, and data compression schemes that accelerate transmissions between PC and printer. Adobe declines to quote numbers, but observers suggest that Level 2 could be 3 to 12 times faster, depending on the type of output.

Level 2 introduces device-independent color, so users can get exact color matches—even between different types of PostScript output devices. Adobe will help developers with their least-favorite task by writing faster PostScript drivers for *Windows 3.0*, OS/2, and the Macintosh as well as a "generic" DOS driver that can be enhanced by third parties.

The first Level 2 printers won't hit the streets until first quarter 1991, according to Adobe. The company claims applications written for today's printers will also work with Level 2 printers. In other product moves, Adobe will ship a long-awaited $495 PostScript Cartridge for HP's LaserJet Series II in August. The following month, the $99 *Adobe Type Manager for Windows* will provide *Windows 3.0* users with matching PostScript screen and printer fonts for on-the-fly font scaling from within applications.

LOTUS ACQUIRES NEW PARTNERS

Smaller Users Targeted After Failed Mega-Merger

Although its merger with network leader Novell fell apart at the altar, Lotus Development is going ahead with less dramatic business deals, several designed to reach out to individuals and small businesses rather than its usual corporate clients, says Lotus chairman Jim Manzi.

Lotus has bought Alpha Software's *AlphaWorks*, an entry-level integrated package with more than 300,000 copies installed. The only immediate change to the $149 program will be a new name, *LotusWorks*. But that should aid its struggle against *Microsoft Works* and Software Publishing's *First Choice*. Lotus's backing already has helped land bundling deals—notably one with home market leader Packard Bell. The package will provide individuals with a cheap entry point to the Lotus product line.

Lotus is arming *1-2-3 3.1* against Microsoft's *Excel* by building in PC Publishing's *Impress* spreadsheet publisher. It's also enhancing the small business appeal of *1-2-3 2.2* by collaborating with Great American Software on the $795 *Financial Manager*. The bundle includes Great American's *One Write Plus* accounting package, *1-2-3 2.2* (with several predefined worksheets), and a custom link between them. Finally, Lotus launched a venture with IBM and the Association of Small Business Development Centers to advise small-business owners on ways to exploit information technology.

Manzi's bold move to forge a software superpower rivaling Microsoft failed at the eleventh hour when Novell chairman Ray Noorda demanded equal representation on the new board rather than the Lotus majority he had accepted. Analysts say the demand grew out of Novell's dissatisfaction with its share of the $1.5 billion stock swap. The failed merger presents no financial problems for Lotus, says David Marshak of Patricia Seybold's Office Computing Group, but it does sideline Manzi's plans to counter Microsoft's growing dominance.

GORDON STUDER

DISPLAYWRITE TURNS XYWRITE

IBM Licenses XyQuest's Word Processor

Some 600,000 customers of IBM's *DisplayWrite* will be able to use their favorite word processor under *Windows* and OS/2 Presentation Manager sooner rather than later. But the upgrade path will lead them into *XyWrite*, not IBM, technology.

To accelerate its move into the nascent graphical word processor market, IBM has tapped tiny XyQuest to provide *Windows* and PM versions of *DisplayWrite*. The graphical products will be backwardly compatible with current *DisplayWrite* versions, says Fernand Sarrat, head of IBM's Desktop Software Group, who declined to give a delivery date.

Known for flexibility and speed, *XyWrite* has an installed base of over 60,000 and an equal number of installations under other labels. Sarrat won't say if *XyWrite* eventually will replace the character-based *DisplayWrite*. But IBM plans to up its R&D investment in the DOS version, first introduced in 1984 and frequently under fire for its backwardness.

In addition to the graphical interface and multitasking capabilities, the new releases of *DisplayWrite* will offer advanced page layout and formatting, features in which XyQuest has been an innovator.

Neither party will say whether this deal precludes XyQuest from introducing its own *Windows* and PM word processors. XyQuest says that it will continue to market its character-based *XyWrite 3+* through its 300 authorized resellers, with version 4.0 due in the fourth quarter. "This is a very big deal in terms of the overall health of the company," says Jeffrey Clark, senior marketing specialist. As Clark points out, despite good reviews, XyQuest has trouble matching its larger competitors' marketing dollars.

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PC MAGAZINE *Associate Editor*

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Richard Landry

Toward a Better Mousetrap

Watch out! Just when you thought it was safe to buy Windows and a 386SX, a new generation of PCs is changing the rules of the game.

If you've been following the PC platform wars for the last few years, then you may have started to believe we've finally achieved peace in our time. 386SX PCs with *Windows 3.0* are in, OS/2 is out, and 8088- and 286-based PCs are quickly fading into history. Other choices, like UNIX, haven't made it past the wishful-thinking phase. The PC world is settling in for a long stretch where *Windows*—the new DOS—will smoothly tap the power of the systems most people are buying today.

But not so fast! A whole new generation of PC hardware and software is springing up, filling the gaps *Windows* leaves in price, size, and ease of use. This wave of products, backed by some of the biggest guns in the industry, is proof that *Windows*-based 386s aren't likely to conquer either the home or the executive suite soon. And that's encouraging news for the innovators and PC powerhouses who are building better mousetraps to capture these important audiences.

FRED STIMSON

IBM: Worried About Ease of Use

When word first leaked that IBM was preparing to take another stab at the home market (seven years after the infamous PCjr debacle), Big Blue watchers thought the company would launch something akin to a clone of Commodore's Amiga: a 386SX machine running *Windows* and capable of handling multimedia software with the help of add-on hardware. Instead, everybody got a surprise in the form of the PS/1 (see the preview in this issue).

Rather than worry about creating a super educational and game environment to hook the Nintendo generation, IBM went straight to the heart of a different problem: how to make an inexpensive work-at-home PC that could double as an easy and fun information resource for the whole family. The PS/1 isn't a high-powered 386 but rather a simple, basic 286 with a built-in interface that sports large icons and list boxes like those found on an electronic marquee at a shopping mall. IBM thought *Windows* would be too hard for the average home-office user to master, so it borrowed the PS/1's interface from its *Prodigy* information service and built some special PS/1-only services into *Prodigy*. The result is a tight marriage of home-office computing with telecommunications and on-line information—a breakthrough in ease of use by any standard.

Tandy has quietly built a reputation for ease of use.

But rumbling beneath the PS/1's slick exterior is a confusing clash of interface styles among the other programs that makes the computer's ease of use more promise than reality. It also leaves the door wide open for IBM's nemesis in the home market: Tandy. Tandy has quietly built a reputation for ease of use that rests on its *DeskMate* interface and the programs that run in that environment. Tandy's not likely to surrender that reputation to IBM simply on the strength of the PS/1. Instead, we'll probably see new Tandy computers with *DeskMate* software that can hide even basic operations—like opening and saving files—from the user.

The Pen: Mightier Than the Mouse

Big Blue's going to battle with Tandy in another important arena where *Windows* doesn't seem to fit: notebook-sized PCs that accept handwritten input rather than keystrokes or mouse actions (see *Industry Outlook* in this issue). Here again Tandy leads the way into a new market by emphasizing ease of use rather than brute force. Tandy's Grid division sells the GridPad, a pen-based PC that's geared toward the millions of factory and service workers who spend a big chunk of each day filling out forms. GridPad software makes using a computer just about as easy as using a piece

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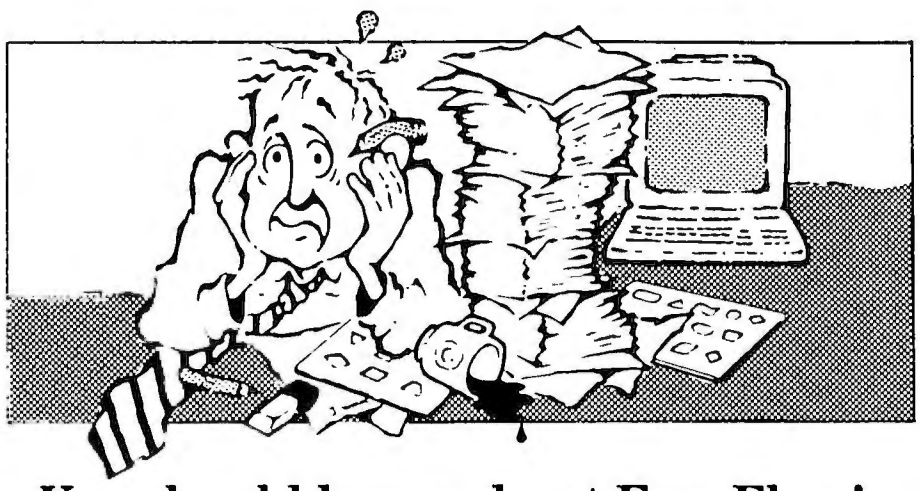

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of paper. But since information is captured electronically rather than on paper, it can get to managers more quickly, and companies can provide a higher level of customer service.

Working with the start-up Go Corporation, IBM is reportedly ready to stand this strategy on its head with a notebook PC designed for managers who need information at their fingertips but wouldn't be caught dead lugging a laptop into a meeting. Like most developments associated with IBM, it's wrapped in a heavy shroud of secrecy. But insiders who've seen the machine say its software easily beats *Windows* in ease of use. And it's reportedly a lightweight, compact device designed to be carried around all day, leaving little room for the large hard disk and gobs of memory that *Windows* currently requires.

You can tell a hot idea by the company it keeps. Software leaders who have jumped into the pen-based PC game include Vern Rayburn, veteran of Microsoft and Symantec; Dan Bricklin and Robert Frankston, codevelopers of *VisiCalc*, the first PC spreadsheet; Jerry Kaplan, codeveloper of Lotus's *Agenda;* and Robert Carr, father of Ashton-Tate's *Framework.*

Waiting for Windows

There's no doubt that 386 technology will soon find its way into home PCs and executive notebooks, and Microsoft promises that *Windows* will eventually fill the software gap in both markets. But that day will arrive only when *Windows* itself undergoes a transformation, becoming simpler in concept, better capable of hiding its DOS roots from the average user, and more suited to different kinds of input devices. There's room for improvement everywhere—especially in a brand-new standard.

As always, I'm interested in your opinions on these or any other subjects. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685.

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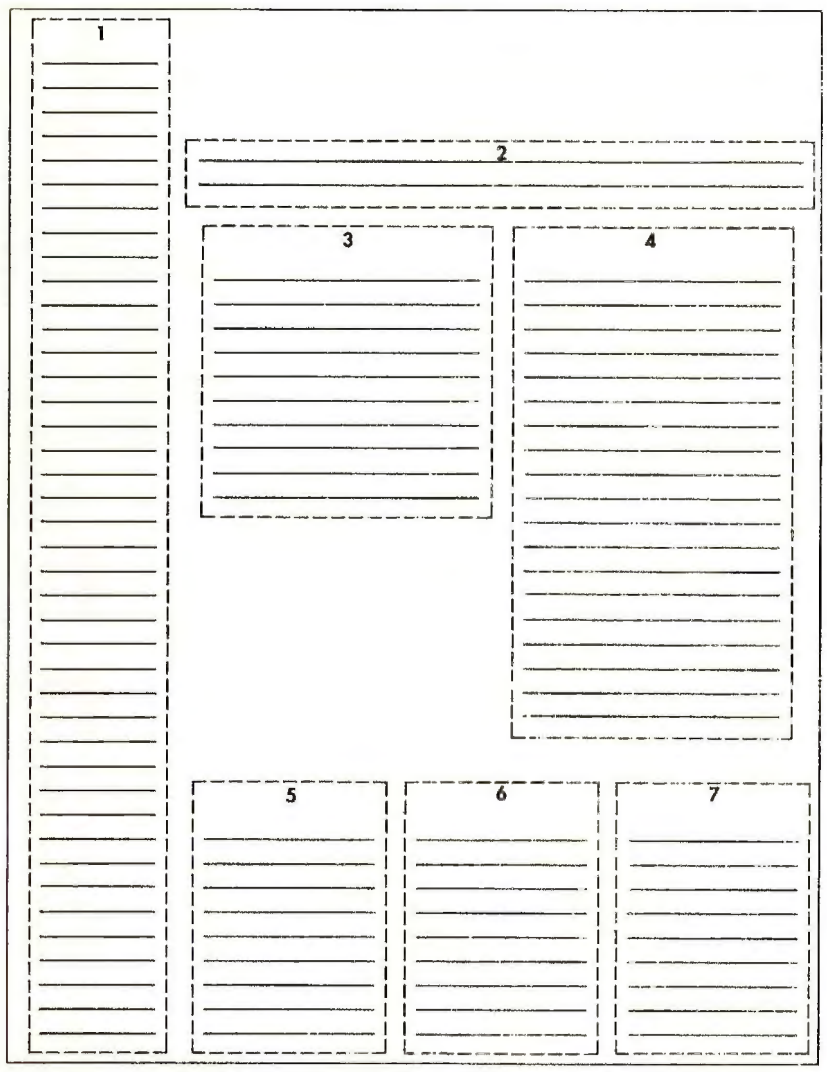

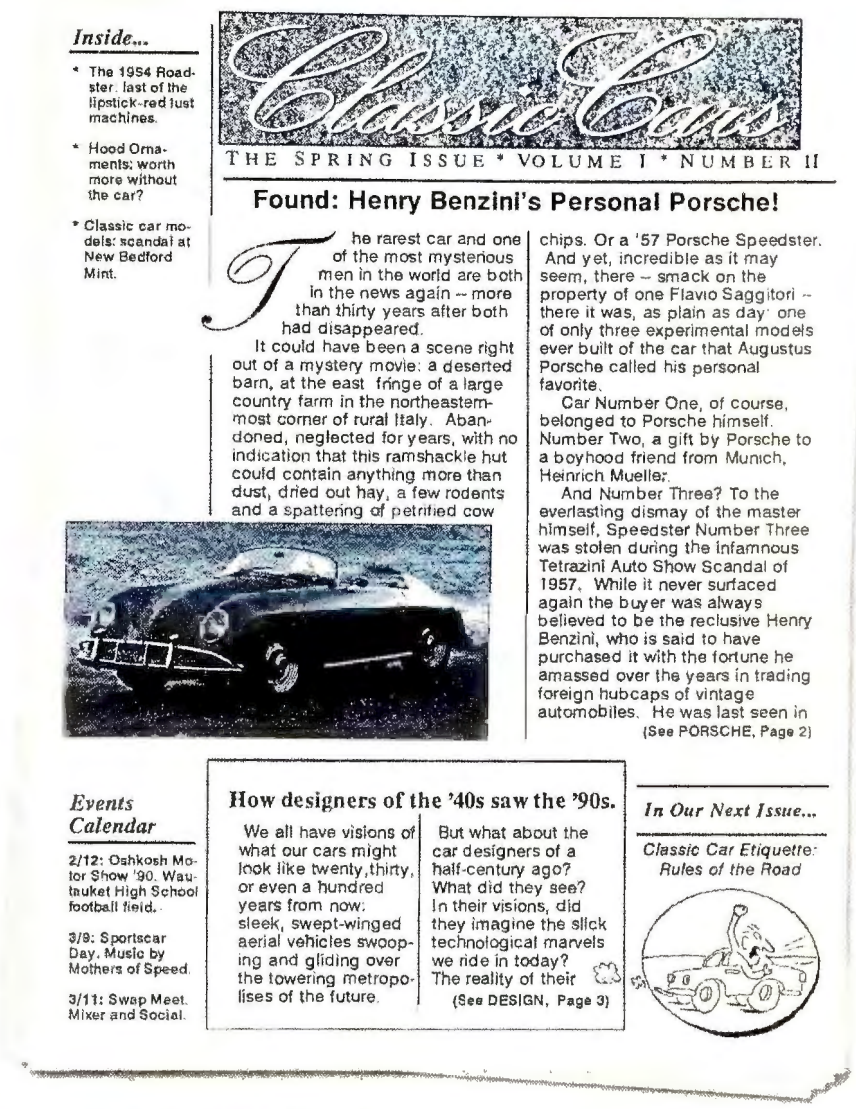

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PC MAGAZINE EDITOR'S CHOICE 11·29·88

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PC MAGAZINE EDITOR'S CHOICE 2·14·89

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July 1989
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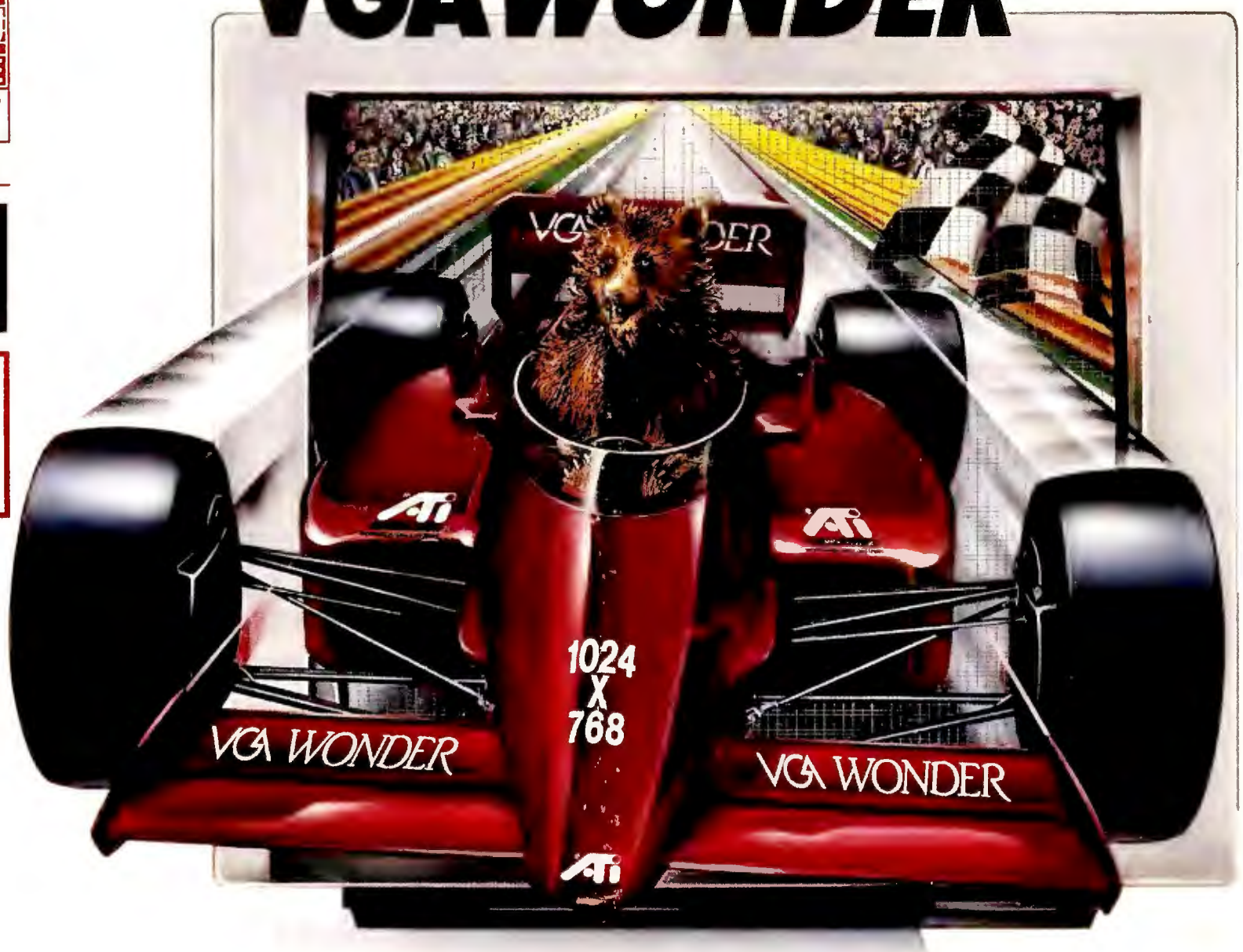

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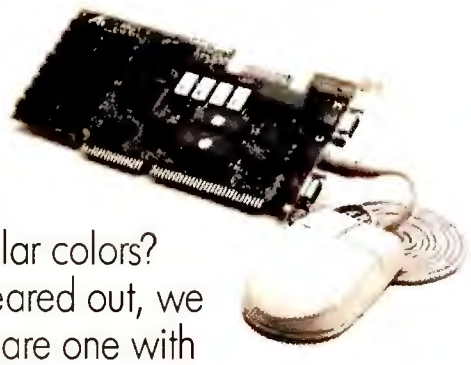

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Circle 302 on reader service card

LETTERS

Reactions and responses from the PC World community

TIM CARROLL

Don't Take It Home, Please!

My husband is an avid *PC World* reader, and he appreciates your *Taking It Home* column. But I see a downside to taking work home. I put in long hours at a high-stress job, but I insist that my time at home be devoted to family and self. In short, I leave my job where it belongs—at work. My husband, on the other hand, often comes home and rushes through dinner so he can flip on his computer and bury himself in work. And I wind up feeling like a computer widow. Home is for home life—work belongs at the office!

Lenore Van Tosh
San Francisco, California

ANTHONY RUSSO

Nix on UNIX

In response to Richard Shallberg's May letter and the same month's *Industry Outlook* piece "UNIX on the Desktop?" I would say that neither UNIX/Xenix nor OS/2 is the answer for multiusers or multitasking on the PC. UNIX is difficult, lacks DOS's advanced software, and requires 1MB or more of RAM just for itself. OS/2 is still more fantasy than fact and has a large RAM overhead. As a systems project manager, I administer a 19-user system. I chose CCI's Concurrent DOS 386 3.02. With this operating system, our users run NetWare, compiled *Clipper* applications, *Word 5.0, 1-2-3, dBASE III Plus, QuickBASIC 4.0,* and a host of other DOS applications. The operating system requires only 300K to 350K of RAM, permits each terminal to run up to four tasks, and provides every other benefit of UNIX without the difficult interface.

Jeff Jones
Cairo, Georgia

Computer Orphans

I read Mr. Juge's cry of foul in your April *Letters.* His company, Tandy, let many of us down with its 2000 system. I purchased mine in January 1985 and believe that Tandy had already made a covert decision to drop the unit. The Radio Shack Computer Store salesman didn't say a word while I wrote my check. I wrote another in November 1989 for a Kaypro KC-3. Then Kaypro filed for Chapter 11 bankruptcy. I wonder, did I jump from the frying pan into the fire?

Jay Selzer
Sebring, Florida

The orphaning of computer products continues to plague computer users. I purchased Ashton-Tate's *Byline 1.0* desktop publishing package, an excellent product. But in my opinion, Ashton-Tate never really promoted it. Although an update was announced, I now find that *Byline* is no longer available. If you are a registered user and are interested in the update, I suggest contacting the developer, Ken Skier of Skisoft Inc., 28 Fairlawn Ln., Lexington, MA 02173; 617/861-1190, 617/861-0086 (fax). Ashton-Tate retains the rights to the name *Byline,* but I am still hopeful that a publisher will decide to take on the marketing of this product.

Jack Coleman
Knoxville, Tennessee

Silent Running

Lawrence J. Magid's May *Taking It Home* column has some suggestions on how to reduce the noise level of PCs, including replacing the power supply and/or disk drive. The suggestions are valid but rather expensive and technical. The noise problem is usually caused by sitting just 1 or 2 feet from the system unit. This problem can often be solved by getting a vertical stand and extension cables and placing the system unit under the table. The tabletop acts as a sound barrier, and the carpet absorbs the noise. What formerly seemed like a noisy computer may now seem whisper quiet.

Donald L. Wahl
Dunkirk, Maryland

Still Out of Memory

I found your April review of seven spreadsheet programs very useful. The presentation is concise, in-depth, and easy to grasp. But I still have questions about DOS limitations. As a network

(continues)

administrator, I have users who work in *1-2-3* releases 2.01, 2.2, and 3 with worksheets as large as 800K. These users have 4MB of expanded RAM (allocated as extended RAM for release 3 when necessary). They also have Novell Ethernet drivers loaded into conventional memory. Because *1-2-3* reserves 4 bytes in conventional memory as a pointer to each cell in a worksheet, a large worksheet soon pushes memory to the max. What's the use of having expanded and/or extended RAM if the limits lie in conventional memory? And how can we best handle worksheets that are up to 1MB or more?

Carleen D. Mejza
New York, New York

There should be no problem in using 1MB and greater worksheets with 1-2-3 3 *if you have* extended *memory. However, when* 1-2-3 2.1 *or* 2.2 *puts cell data in* expanded *memory, it stores a pointer to that data in conventional memory. The general rule is that the more room you have in conventional memory, the more access you have to expanded RAM. Your best bet for working with really large worksheets if all you have is conventional and expanded RAM is to break up your worksheets and use* 1-2-3 2.2*'s and* 3*'s cell-linking capabilities or* 2.01*'s File Combine (/FC) command to pull in totals. —Karl Koessel, technical editor*

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Undo Undone

I was glad to see your How To column on spreadsheets in May, but I have to say that using *Allways* is not without its frustrations. When I attach *Allways* to a spreadsheet, I have to be sure that I am finished entering and manipulating data in *1-2-3*. If I switch from *Allways* back to *1-2-3* and move something, and then find that the change is wrong, I cannot use Undo; I get an error message: 'Undo is blocked by add-in'. For this reason, I also have to be careful to detach *Allways* when I retrieve a worksheet or create a new one. It's too bad Lotus couldn't do something about this.

Catherine Roy
Reston, Virginia

The Wrong IDEa

In May's *Help Screen,* you say that if an IDE drive is cabled directly into a computer's expansion bus, a slot is wasted, and that IDE drives are used only in PS/2s and other systems providing an IDE connector on the motherboard. Actually, since the components required for the IDE interface take up so little space, it is possible to put the IDE interface, floppy controller, serial port and optional second serial port, printer port, game port, and bus mouse port all on one half-length AT card. Depending on the casing and the motherboard, this *(continues)*

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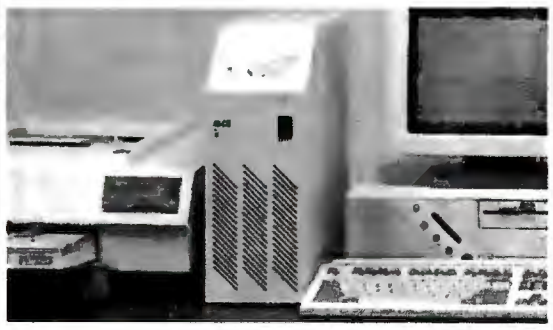

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leaves four to six open slots in the typical computer we sell. In short, the one slot you mention has little meaning if it isn't associated with the total number available on the motherboard.

Larry F. Byard
President
Dux Computer Works
Sanford, Maine

Emulation Clarification

Phoenix Technologies' PhoenixPage PostScript interpreter is found in Pacific Data Products' PacificPage cartridge for the LaserJet Series II—one of the PostScript "clones" you reviewed in your May article "PostScript the Hard Way." We felt the image shown on page 118 of the article cast the cartridge in an unjust light. I've enclosed a listing of a file that produces a similar, PostScript-generated image, along with output from both the Apple LaserWriter IINTX and the PacificPage cartridge. The output shows just how compatible with the Adobe standard the PacificPage cartridge is.

Tom Spillane
Marketing Programs Manager
Phoenix Technologies Ltd.
Cambridge, Massachusetts

We retested the PacificPage using our original test file and found that the cartridge printed the curve without the flaws shown in May. We apologize for the error. The test page, however, still contained minor imperfections not present in the LaserWriter-generated page, and the cartridge still had difficulty producing smooth curves in tests with common graphics applications. The PacificPage—like virtually every software emulator or PostScript interpreter, Adobe licensed or not—is unable to correctly interpret all PostScript code. —Ed.

Corrections and Clarifications

Our May *Industry Outlook* item "Ink Jets Take Over—Quietly" misstated the mean-time-between-failure rate of the Hewlett-Packard DeskJet Plus as 20,000 pages. Actually, the rating is 20,000 hours.

In April, an *Update* item in *Product Outlook* stated that *Hot Line 2.2* can load a note with up to 500K of information. In fact, *Hot Line 2.2* can load notes containing no more than 500 bytes.

To send correspondence, please see How to Contact PC World, page 4.

POWER TIP NO. 114

Flip-Flop WordStar Menus

WordStar 5.0's pulldown menus provide a convenient way to learn the program, but the classic *WordStar* menus are faster once you master them. Although switching from classic to pulldown menus is an easily remembered 4-keystroke process—**<Ctrl>-JJ4**—switching in the opposite direction is an awkward 6-keystroke affair. Here's a macro that automates the change from pulldown to classic menus.

Press **<Esc>?** to display the Shorthand menu. Assign the macro to the H key by pressing **H**, and type a brief description of the macro at the prompt. Press **<Enter>** to begin recording the macro keystrokes. Press **<Ctrl>-P <Alt>-O** to pull down the Other menu. Next, press **<Ctrl>-P<Ctrl>-X** three times to move the cursor down to the help level prompt, press **<Ctrl>-P <Ctrl>-M**, and hit **3**. Finally, press **<Enter><Ctrl>-U** to exit the Shorthand menu, and press **Y** to save the macro. Now, whenever you want to switch from classic to pulldown menus, just press **<Esc>H**.

George Beinhorn
Nevada City, California

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MODEL D3/25
MODEL D/LT386SX
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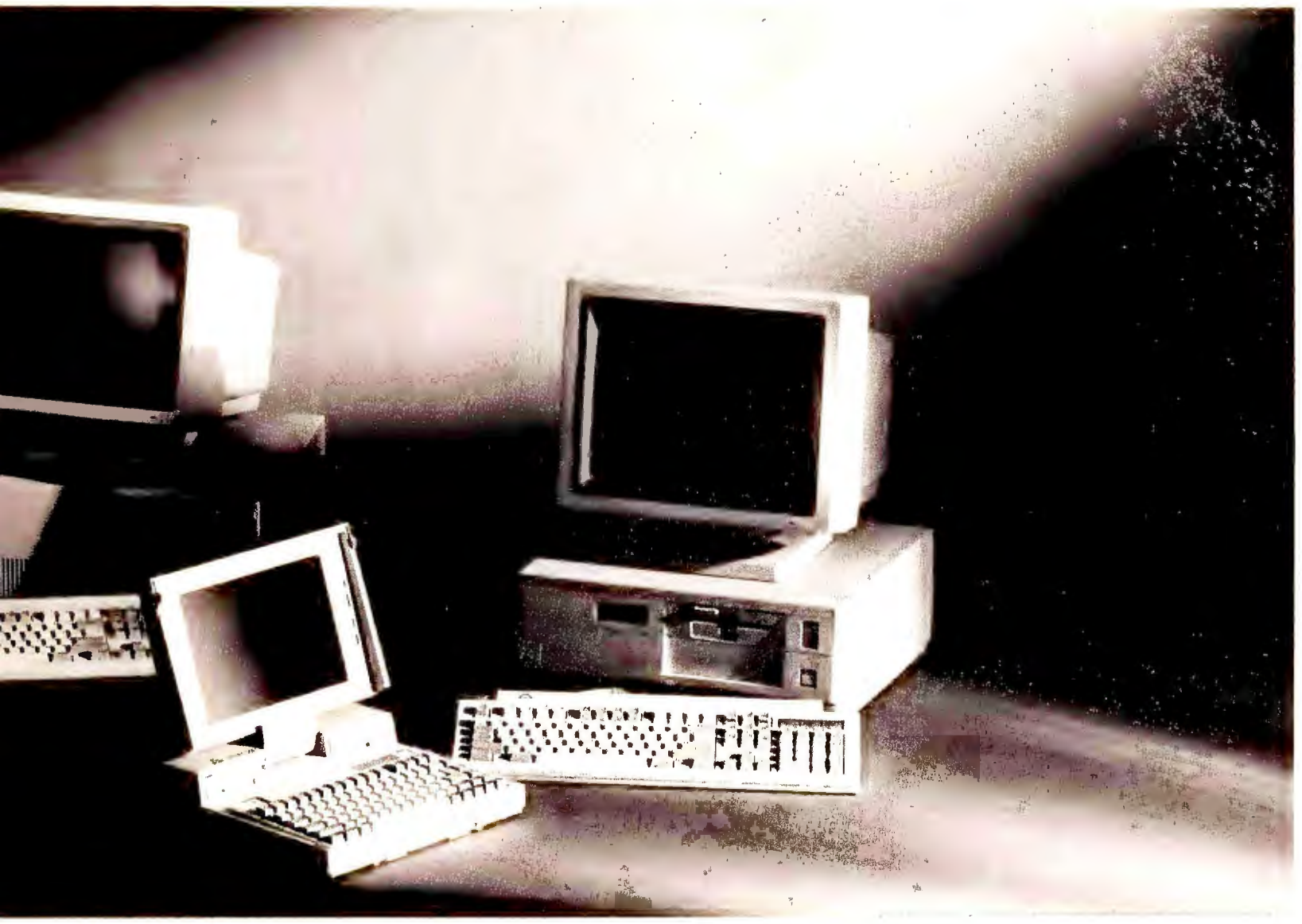

brand that created the IBM-compatible market in the 1980's, amassing an 800,000 user base in the process.

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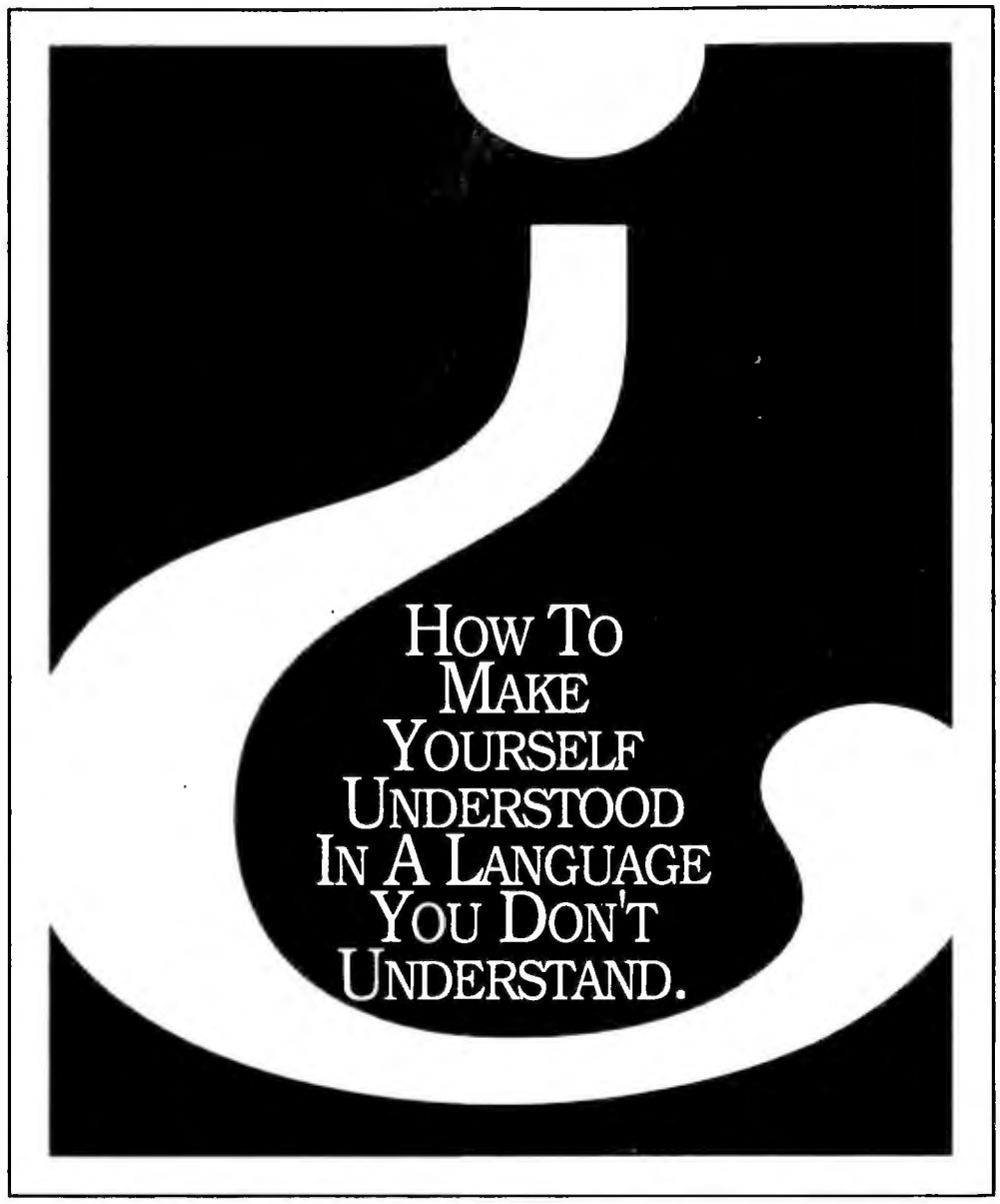
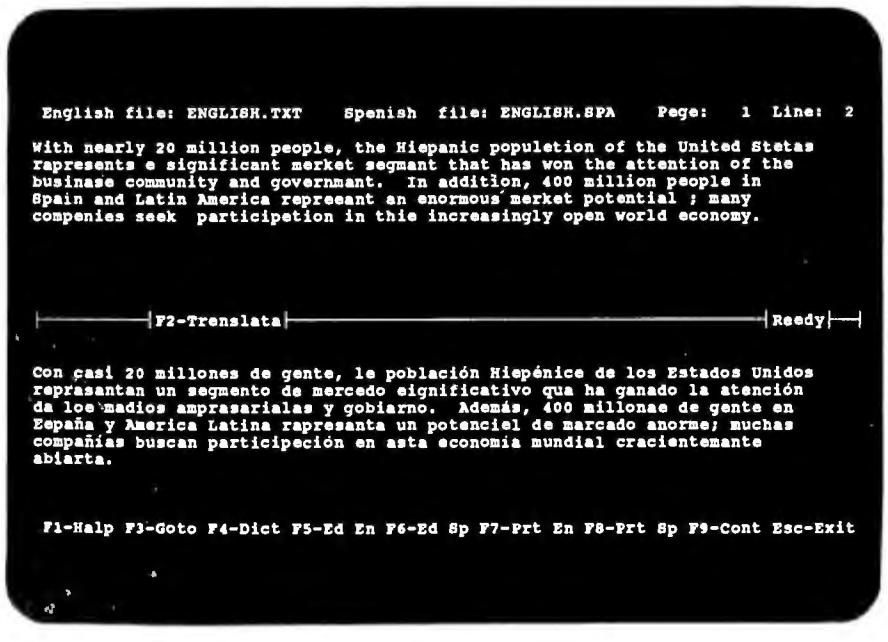
With this revolutionary software program, all you do is input text written in English. Virtually instantaneously, you'll have the Spanish equivalent. With a straightforward English text, you get a precise, unadorned Spanish translation. Nuances of language and stylistic preferences obviously require some familiarity with Spanish and these can be easily implemented through the dictionary update function.



We're Not The Only Ones Who Think It's A Valuable Tool.

PCM Magazine noted that "The advantages of Translate are many. It can bring an increase in productivity due to less time spent on translations — not to mention the usual high fees associated with having a letter or document translated. This program handles translation of complete phrases — unlike other programs that function word by word.... Besides being easy to use and fast to learn, it works!"

Translate utilizes an 85,000 term English-to-Spanish dictionary. You can make your dictionary even more functional by adding as many words or phrases as you like. Corporate jargon and specific terminology may all be incorporated into the system via its dictionary update function. Finalsoft's User Support Service will assist you in customizing the dictionary.



Translate isn't the only program of its kind available on the market. But the others cost thousands of dollars; our special introductory price is only $399.00 thru August 31, 1990 (thereafter, $495.00). That's a terrific value in any language.

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Translate

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System requirements: IBM® XT® /AT®, PS/2® or compatible (8 Mhz. or higher recommended), DOS 3.0 or higher, hard disk, and 512K RAM.

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Circle 84 on reader service card

THE HELP SCREEN

PC World offers answers and advice at every level

Teach <Print Screen> to use a LaserJet, find a screen blanker and more for other Windows shareware programs, discover a disparity between PC-DOS and MS-DOS versions 3.3, and boot up with Num Lock off.

Karl Koessel

From Screen to LaserJet

Q. *How can I use the <Print Screen> key to send graphics screens to my Hewlett-Packard LaserJet Series II? With my old Epson-compatible dot matrix printer, I could just issue the DOS command GRAPHICS at the DOS prompt, but that doesn't work with my laser printer.*

Prokopis A. Christou
Irvington, New Jersey

A. By default, <Print Screen> supports 80-column, 25-line text-mode screens only. Pressing it causes code stored in your system's ROM BIOS to send *character* codes to the printer. Running GRAPHICS.COM supplants that BIOS routine with one that generates Epson-compatible *graphics* codes.

LaserJets are not compatible with either the BIOS or GRAPHICS.COM routine. What you need is a replacement for GRAPHICS.COM that speaks LaserJet. Using its default character set, the LaserJet prints letters, numbers, punctuation, and other standard characters of text-mode screens just fine; but it produces foreign and italic characters instead of the PC's line-draw and other special symbols. And because the LaserJet does not understand Epson com-

(continues)

TABLE 1

<Print Screen> Gets Some Needed Help

DOS's routines are inadequate for printing today's multicolored text or high-resolution graphics screens. The programs listed here support hundreds of printers and enable you to scale, position, and rotate a printed image. Some make screen dumps of colored or multigray text legible by letting you reassign the black-and-white pattern that will be printed for a given color or gray.

Operating environment	Grafplus	InSet	HiJaak	HotShot Graphics	Pizazz	Pizazz Plus	Tiffany Plus
DOS	•	•	•	•	•	•	
Windows	•	•	•	•		•	•
OS/2 PM				•			
Display adapters							
CGA, EGA, Hercules	•	•	•	•	•	•	•
MCGA/VGA	•	•	•	•		•	•
8514/A						•	•
AT&T 6300	•	•	•			•	•
Image-capture boards						•	•
File formats							
EPS			•	•		•	
TIFF			•	•		•	•
MSP			•	•			•
PCX	•		•	•		•	•
GIF			•	•			
WPG			•	•		•	
Other features							
Batch printing	•			•	•	•	
Vary gray scaling	•	•	•		•	•	•
Crop images	•	•			•	•	•

ANTHONY RUSSO

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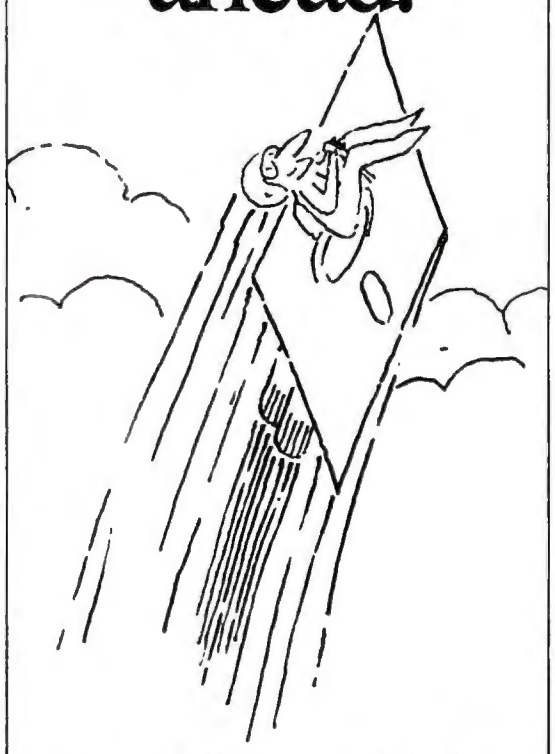

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PC Magazine 2/14/89

PC WORLD BEST BUY

"Not only is Super PC-Kwik the fastest utility we tested, but its compatibility, installation, tuning options, and documentation are also tops, making this Best Buy well worth the price."

PC World 2/90

"This collection of utilities has boosted my system's performance more than I ever dreamed possible...Soon after Power Pak's installation the wonders began...The acceleration this produces must be experienced to be believed."

Tom Swan, "Developer's Toolbox," PC World 9/89

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mands, GRAPHICS.COM can't tell it how to print a graphics screen. Besides, the high-resolution images of VGA and full-page monitors beg for sophisticated screen printing capabilities not available from GRAPHICS.COM. Furthermore, the abundant colors in today's screens demand that you be able to assign different black-and-white print patterns to various screen colors so you can, for example, read a printout of "red" text on a "yellow" background.

All the products listed in **TABLE 1** except for the *Windows*-only *Tiffany Plus* will dump DOS text and graphics screens to the LaserJet or to any of more than a hundred other printers. All but *Pizazz* will print *Windows* screens (though some are less capable than others). Only *HotShot* handles OS/2 Presentation Manager screens. *HotShot* is also the only package here that includes a data base for tracking images.

All the programs let you rotate, resize, and position the image on the page. Most enable you to modify the gray scaling, crop the image, and print from DOS (enabling batch print jobs). *Pizazz* and *Pizazz Plus* even smooth the rough edges of enlarged printouts. As the table shows, many can save screen images in various file formats for use with graphics and desktop publishing software. Most of these packages support CGA through VGA (including Hercules) and some AT&T 6300 graphics adapters.

For more information about all products in this item, circle reader service no. 906.

WHERE TO BUY

Grafplus 5.13
Jewell Technologies
4740 44th Ave. SW #203
Seattle, WA 98116
800/628-2828 ext. 527, 206/937-1507 (fax)
LIST PRICE: $49.95
Reader service no. 680

HiJaak
InSet
Inset Systems, Inc.
71 Commerce Dr.
Brookfield, CT 06804
800/828-8088, 203/775-5634 (fax)
LIST PRICE: $149 each, $199 for both
Reader service no. 681

HotShot Graphics 1.7
Symsoft
924 Incline Way
Call Box 5
Incline Village, NV 89450
702/832-4300, 702/832-4310 (fax)
LIST PRICE: $249, upgrade $75
Reader service no. 682

Pizazz
Pizazz Plus
Application Techniques
10 Lomar Park Dr.
Pepperell, MA 01463
800/433-5201, 508/433-5201, 508/433-8466 (fax)
LIST PRICE: $99 and $149
Reader service no. 683

Tiffany Plus
Anderson Consulting & Software
P.O. Box 40
North Bonneville, WA 98639-0040
800/733-9633
LIST PRICE: $89
Reader service no. 684

(continues)

POWER TIP NO. 115

Speedy Norton Menus

Batch-file menus made with *Norton Utilities'* Batch Enhancer (BE) can be very slow if there are many BE commands, because BE.EXE must be read from disk for each one. To speed up the process by loading BE.EXE only once per screen, place the Window, Rowcol, and other BE commands for a given screen—without the *be* before each one—together in a separate file. Then, in your batch file, use the command **be** *filename* to launch the screen.

Peter J. Sherman
Brooklyn, New York

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PC MAGAZINE EDITORS' CHOICE
September 26, 1989
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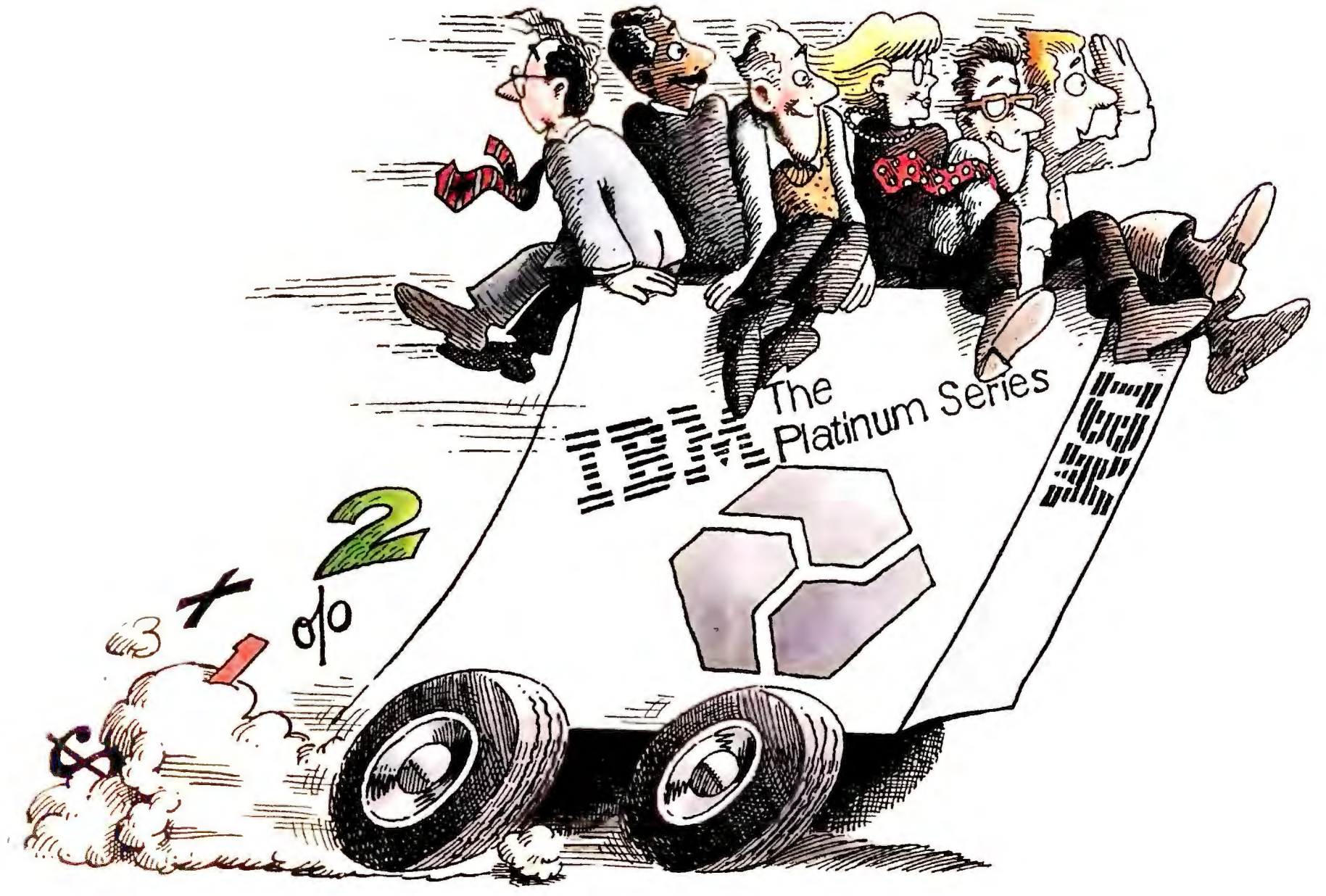

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Thanks to Lotus® and IBM,® you now have an opportunity, as well as a reason, to move to OS/2.®

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But for those of you who might not be ready to make the leap to OS/2, may we offer you some more reasons why you should?

Save a couple of grand when you buy them all together.

First of all, if you're a 1-2-3® user, 1-2-3/G will feel familiar, with menu commands and keystrokes you already know. But look a little closer. You'll begin to notice a lot that's new. Like full mouse support. Pull down menus. And dialog boxes. There's even a WYSIWYG display. And that's just the beginning.

We've also added features like previews and palettes in dialog boxes, dramatic new graphing capabilities and the capacity to directly move objects on the screen, making 1-2-3/G extremely responsive to the way you work.

The more you get to know 1-2-3/G, the more you'll like it. The advanced functionality helps you do better business analysis, with bonuses like file linking, network support, true 3D worksheets, and the new advanced goal-seeking technology of Solver.

Solver helps you solve complex "what if" problems by showing you "how to" achieve desired results. Rather than going through a lengthy trial-and-error process, just ask Solver to present you with alternatives, given whatever variables or constraints you define in your spreadsheet. It will not only give you a choice of solutions but will also point out the optimal one.

If you're a current 1-2-3 user, you'll be happy to know that all data and macros created in existing versions of 1-2-3 can be retrieved directly into 1-2-3/G. So a move to OS/2 will only serve to enhance any investment you may have already made in 1-2-3.

IBM

But how does OS/2 make 1-2-3 better? Well, besides introducing 1-2-3 to a graphical environment, OS/2 works harder and faster, so 1-2-3 can work harder and faster for you

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With OS/2, 1-2-3/G can give you Dynamic Data Exchange. DDE provides live links to other Presentation Manager™ applications for true application integration.

For example, you can include a graph from 1-2-3 in a word processor document. And when the data in your graph changes, the word processor document will automatically be updated as well.

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OS/2 1.2 is better than ever. And before long, no one will be without it. It's more than just a graphical environment for the PC. Or an operating system for a handful of power users. It's a high performance, easy to use operating system that provides increased memory addressability and true multitasking.

Multitasking in OS/2 lets you get your job done more efficiently by allowing you to work with several applications at once, or even perform several functions at once. Instead of having to end one program before retrieving another, you can open as many OS/2 windows as you need, in any size. And not only view them concurrently, but also transfer data among them. You can also do things like print a spreadsheet and run Solver at the same time.

Plus, with a capacity of up to 16Mb of real memory, you can run larger, complex programs concurrently. And reliably. That means your computer is more efficient for you, not just more fun.

If you're worried that a move to OS/2 will mean sacrificing the investment you've made in DOS-based applications, this should put your mind at rest: The DOS compatibility mode in OS/2 allows you to run most of the existing DOS-based programs you already own. Which means the transition to OS/2 involves great gain, with no pain.

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Hurry to your local participating IBM authorized dealer. This offer won't last long.

The Lotus 1-2-3/G Bonus Pack

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Window Shades

Q. *I now use* Microsoft Windows *throughout the workday. Before* Windows *became de rigueur, I used a small memory-resident program that would blank my screen after a couple of minutes of no keyboard activity to prevent the monitor from "burning" the image into the screen. Striking any key restored the image. I tried using my screen blanker with* Windows, *but because* Windows *prevents the blanker from noticing keystrokes, the screen blanks right away. Even worse, I have a hard time getting the screen to come back on.*

Is there a screen blanker that works with Windows?

Terry Gilbert
Capitola, California

A. There's a great screen blanker for *Windows* called *Fireworks,* which was written by Kim Levitt of Synergistic Enterprises. FIREWORK.EXE and its accompanying dynamic link library file, FIRELIB.EXE, comprise a *Windows* program that, after a specified interval of time, displays a fireworks simulation. (The current version, 4.3, seems to work fine under *Windows 3.0* but produces two error messages warning that you may encounter compatibility problems and should upgrade to a *3.0*-aware version.)

Fireworks is a shareware program, and registration is only $5. It can be found on The Business BBS, an electronic bulletin board service in Los Angeles that believes it has the largest library of *Windows* programs in the world. Set your (300-bps to 2400-bps) modem to N,8,1, and call 213/477-0408. Synergistic Enterprises also operates a 24-hour BBS from which you can download *Fireworks* and the company's other *Windows* shareware programs. The Synergistic BBS supports 300-bps to 2400-bps modems (N,8,1) and can be reached at 213/653-6398.

WHERE TO BUY

Fireworks
Synergistic Enterprises
8033 Sunset Blvd. #975
Los Angeles, CA 90046
213/852-1688
LIST PRICE: $15
Reader service no. 685

MS-DOS Versus PC-DOS

Robert H. Reilly of Miami, Florida, writes in response to the May column's "Straight and Narrow Upgrade Path." He reports that while PC-DOS 3.3 uses a function call that allows multiple-track reads with a single call to ROM BIOS, this function does not work with the ROM BIOS provided by some non-

(continues)

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FIND FILES	✓		✓	✓
COPY/MOVE FILE CONTENTS	✓		✓	
VIEW FILES	✓	✓	✓	✓
OPEN/ASSOCIATE APPLICATION	✓	✓	✓	✓
SPLIT WINDOWS	✓	✓		✓
PRUNE/GRAFT	✓		✓	✓
GLOBAL FILE VIEWS	✓			
COLLAPSE DIRECTORIES	✓			
HIDE/UNHIDE DIRECTORIES	✓			✓
FORMAT DISKS	✓			
TOGGLE/MERGE TAGGED FILES	✓			
REVERSE FILE SPECS	✓		✓	
COPY ORIGINAL DIRECTORY STRUCTURE	✓			
DATE/TIME STAMP FILES	✓			
PRINT DIRECTORY TREE	✓			✓
CHANGE FILE ATTRIBUTES	✓	✓		✓
RENAME A VOLUME	✓			
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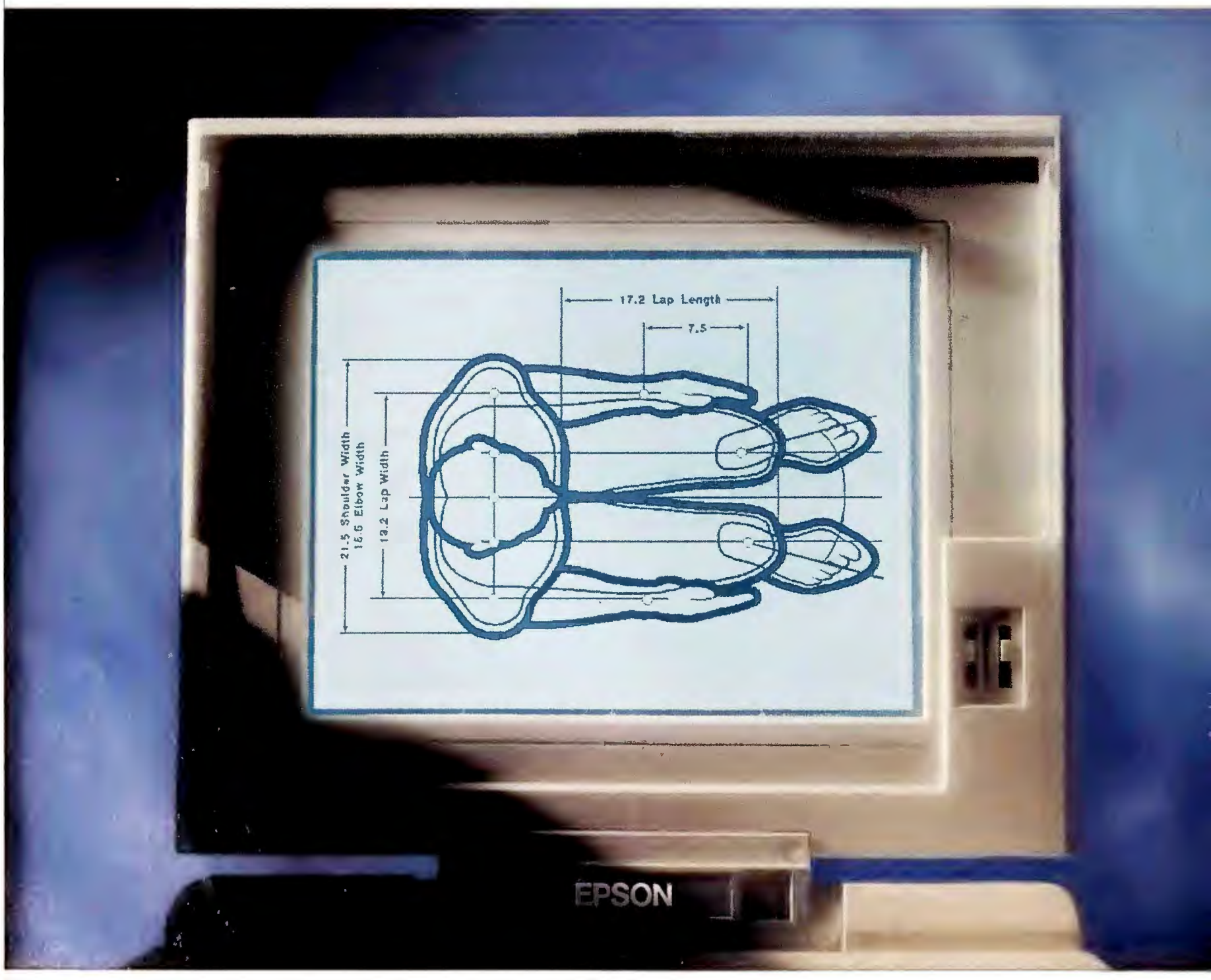

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with the knowledge needs may expand, etty much the same.

Introducing the Equity LT 386SX Laptop

Adding power, speed and peripherals to a personal computer is a constant test of design innovation.

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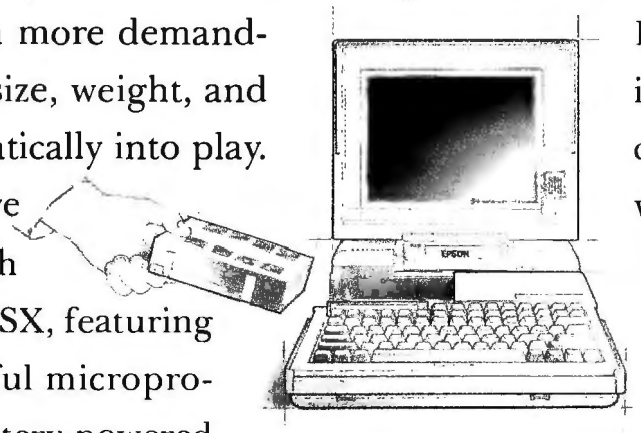

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The Epson laptop indicates its own vital signs—battery life, speed, and disk drive in use—on a unique LCD status bar, and even has the good sense to turn off its own screen and hard drive when not in use.

The LT 386SX offers a degree of speed, power and flexibility once limited to desktop computers. In fact, there is one feature of this remarkably engineered bit of technology that a desktop can only envy. Its size.

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PC WORLD

IBM vendors and causes problems for some disk caching programs. Furthermore, applications that do not use DOS function 67H cannot open more than 20 files per process. Hence, Mr. Reilly strongly recommends that users upgrade to MS-DOS rather than to PC-DOS.

However, users can purchase legal upgrades to MS-DOS only from their system vendors. And in the volatile PC industry, being tied to a vendor means that someday you may find yourself without a place to buy an MS-DOS upgrade. Microsoft is aware of this problem; perhaps one day there will be a solution.

Nixing Num Lock

Q. *I've been using IBM and compatible PCs for years. Unlike the PC and the XT, the AT turns Num Lock on when it boots. I prefer to have it off and so would press <Num Lock> every time I started the AT. Nowadays I'm using an IBM PS/2 Model 50 and a 386 clone, both of which come up with Num Lock on. Do you know how I can get them to leave Num Lock off?*

Robert Schultz
Phoenix, Arizona

A. Turning Num Lock on—that is, activating the numeric keypad—at start-up was intended to be a positive feature, since the AT's new 101-key keyboard provided a separate set of cursor keys. However, many users accustomed to the old keyboard found it easier to turn Num Lock back off than to adjust to a new cursor-key layout.

Some systems let you set Num Lock's default status with a setup disk. For those that don't, here's a program, LOCKKEY2.COM, that will turn Num Lock off. If you put LOCKKEY2 in your AUTOEXEC.BAT file, you may never notice that Num Lock is on when your system boots.

LOCKKEY2 also controls the status

(continues)

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PC MAGAZINE EDITORS' CHOICE June 23 1987 EasyLAN

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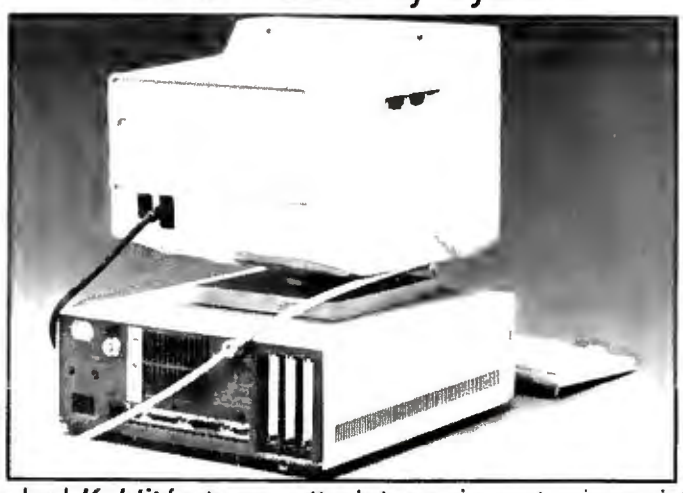

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of Caps Lock and Scroll Lock. Thus, LOCKKEY2 has six valid parameters: Num Lock : on, Num Lock : off, Caps Lock : on, Caps Lock : off, Scroll Lock : on, and Scroll Lock : off. The command is not case sensitive, and spaces are optional. As a matter of fact, parameters consisting of just the first letter of the Lock key followed by :on or :off (n:off, for example) are acceptable. You can use any combination of parameters, and the status of a key that is not specified is not changed.

You can use DEBUG.COM (from your original DOS disks) to create LOCKKEY2.COM. Because it's so easy to mistype, use an ASCII editor or the text mode of a word processor to record the necessary keystrokes, instead of directly inputting DEBUG commands. When the file is complete and correct, you'll "feed" it to DEBUG.

Type in the seven lines shown in **FIGURE 1A**, pressing **<Enter>** at the end of each line and to create the fourth (blank) line. Be careful not to confuse *l*'s with 1's, or to add or omit any characters or spaces in the last three lines. *(continues)*

POWER TIP NO. 116

Repeating Text in WordPerfect 5.0

If you want to repeat a block of text several times throughout a *WordPerfect* document, highlight the desired text by using **<Alt>-<F4>**; then hit **<F10>** to save the block and press **<Enter>** instead of typing a block name. When you want to retrieve the block, press **<Shift>-<F10>** (Retrieve), then just hit **<Enter>**. The block remains in memory until you exit *WordPerfect*.

Michael Linford
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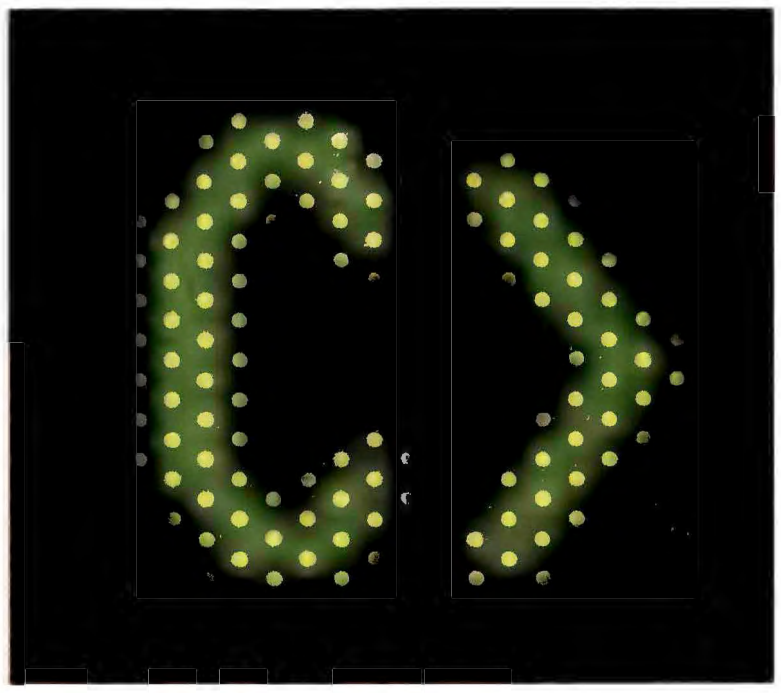

Introducing new Windows 3.0.

The graphical user interface (GUI) environment on an MS-DOS® PC, and subsequent demise of the "C" prompt, is a reality today. Sure, you say.

Microsoft realizes you may have heard this one before. And we agree that you have every reason to be skeptical.

Well, all of this was before new Microsoft® Windows™ version 3.0. A GUI environment that will forever transform the way you use your PC.

Now, before you wonder what to do with all of your existing DOS applications (to say nothing about your existing DOS experience), the Windows environment works within your MS-DOS system. This is not a traumatic thing.

As a matter of fact, once you see the environment created by Windows 3.0, you'll think quite the contrary.

The first time you see it, you won't believe it. Archaic characters, mundane instructions, and even entire command sequences, have been replaced by a program manager full of clear, friendly icons. You're immediately comfortable.

When you work on more than one thing at a time, you'll quickly reap the benefits. Because the program manager welcomes on-screen multitasking of large Windows applications. Of course, without ever visiting the "C" prompt.

Through something with the complicated name of Dynamic Data Ex-

change (DDE), you can simplify your life. For example, with DDE, you can change information in a Microsoft Excel spreadsheet, and have those changes automatically show up in a "linked" table in a word processing document. Or vice versa.

You can also easily access a network from within Windows. So, no matter how big the rivalry between research and accounting is on the softball field, everybody's on speaking terms in the office.

Even the setup program is graphical, only needing a few easy steps.

At this point, you probably think your machine will slow to a crawl the first time you try any of this.

We thought about that, too. So new Windows 3.0 breaks the 640K memory barrier that saddles other DOS programs. Giving you access to all the memory and power your 286 or 386 PC can muster.

It all sounds incredible. Which it is. And, it's taking place in an intuitive, consistent graphical environment.

For more information or to learn about upgrading your current Windows version, call (800) 323-3577, Dept. L84.

Graphics-based software is how people will run their PCs in the 1990s.

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Microsoft Windows 3.0 is optimized for 1-2MB 286 and 386 personal computers. 640K RAM required. Customers inside the 50 United States, call (800) 323-3577, Dept. L84. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661.
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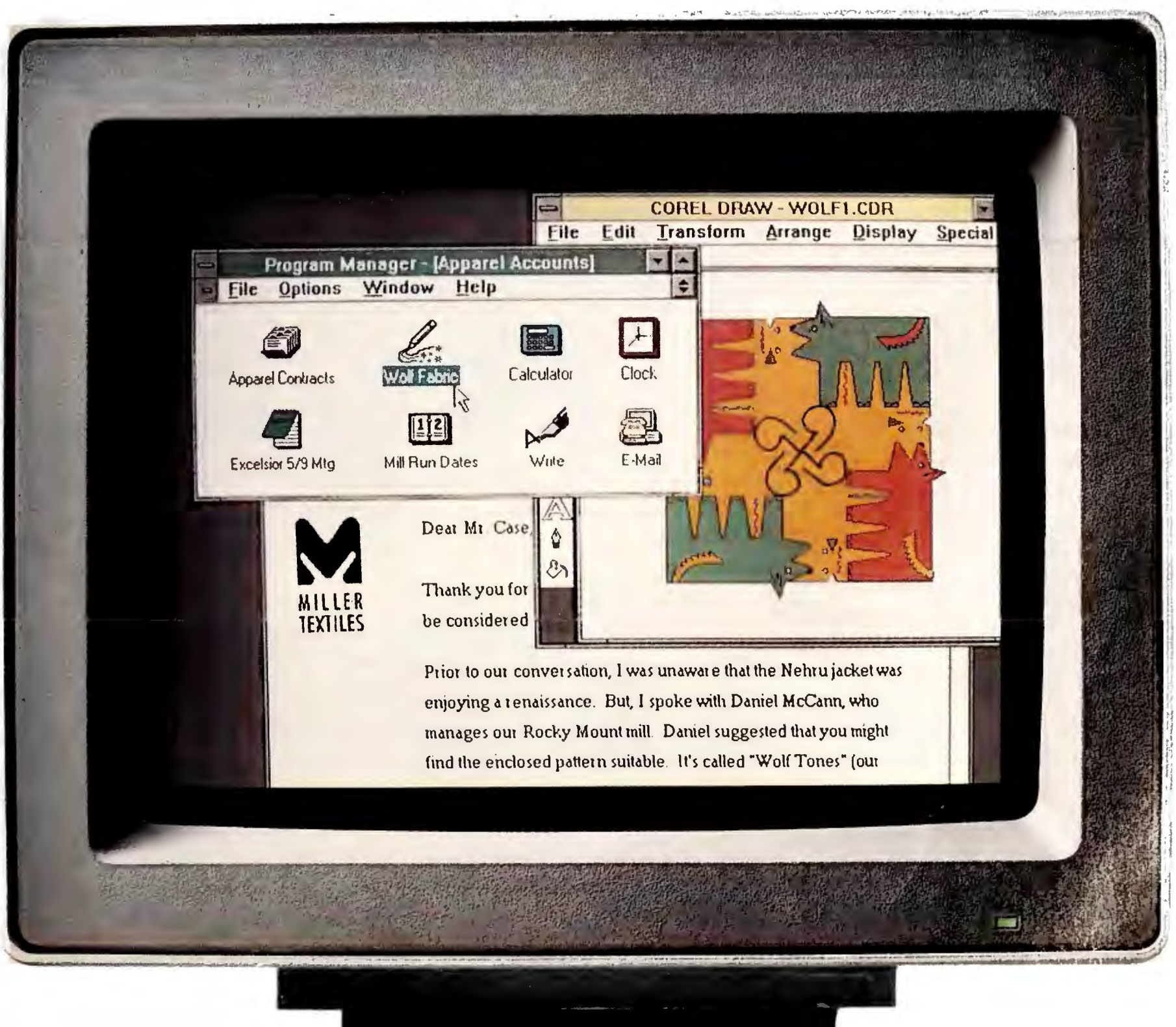

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PC WORLD

```
a100
jmp     017f
nop

e103 d,a,"Bad or missing parameter; use one or more of these:"
e138 d,a,a,9,"Caps:on    Num:on    Scroll:on"
e15a d,a,a,9,"Caps:off   Num:off   Scroll:off",d,a
```

FIGURE 1A: These DEBUG commands and those shown in FIGURE 1B create LOCKKEY2.COM, a program that can turn the state of Num Lock, Caps Lock, and Scroll Lock individually on or off. This portion is the error message.

```
a17f
mov     si,80
lodsb
mov     cl,al
mov     bx,40
mov     es,bx
mov     di,17
mov     bh,ff
call    1de
jb      1c1
cmp     al,0
jz      18f
mov     bl,bf
cmp     al,43
jz      1aa
ror     bl,1
cmp     al,4e
jz      1aa
ror     bl,1
cmp     al,53
jnz     1cb
call    1eb
jb      1cb
xor     bh,bh
cmp     al,0
jnz     1ba
es:
and     [di],bl
jmp     18f
not     bl
es:
or      [di],bl
jmp     18f
cmp     bh,0
jnz     1cb
xor     al,al
jmp     1da
nop
mov     bx,1
mov     cx,7c
mov     dx,103
mov     ah,40
int     21
mov     al,1
mov     ah,4c
int     21
cmp     cl,0
jz      1e9
lodsb
and     al,df
dec     cl
ret
stc
ret
call    1de
jb      21d
cmp     al,1a
jnz     1eb
call    1de
jb      21d
cmp     al,0
jz      1f4
cmp     al,4f
jnz     21d
call    1de
jb      21d
cmp     al,4e
jz      21a
cmp     al,46
jnz     21d
call    1de
jb      21d
cmp     al,46
jnz     21d
xor     al,al
ret
or      al,ff
ret
stc
ret

nlockkey2.com
rcx
11f
w
q
```

FIGURE 1B: This portion is the main body of code plus the DEBUG commands to name and save LOCKKEY2.COM.

Now enter the lines shown in **FIGURE 1B**, which includes one blank line just before the line 'nlockkey2.com'. For these lines, you can add tabs or extra spaces to make them easier to read. Save the file as **lockkey2.dbg**, double-check your work, and exit your editor. Make sure DEBUG.COM is in a directory listed in your system's PATH command. Then, at the DOS prompt, type **debug <lockkey2.dbg** and press **<Enter>** to create LOCKKEY2.COM.

To test the utility, type the command **lockkey2 c:on n:off** and press **<Enter>**. The Caps Lock light should come on, the Num Lock light should go out, and the Scroll Lock light should remain unchanged.

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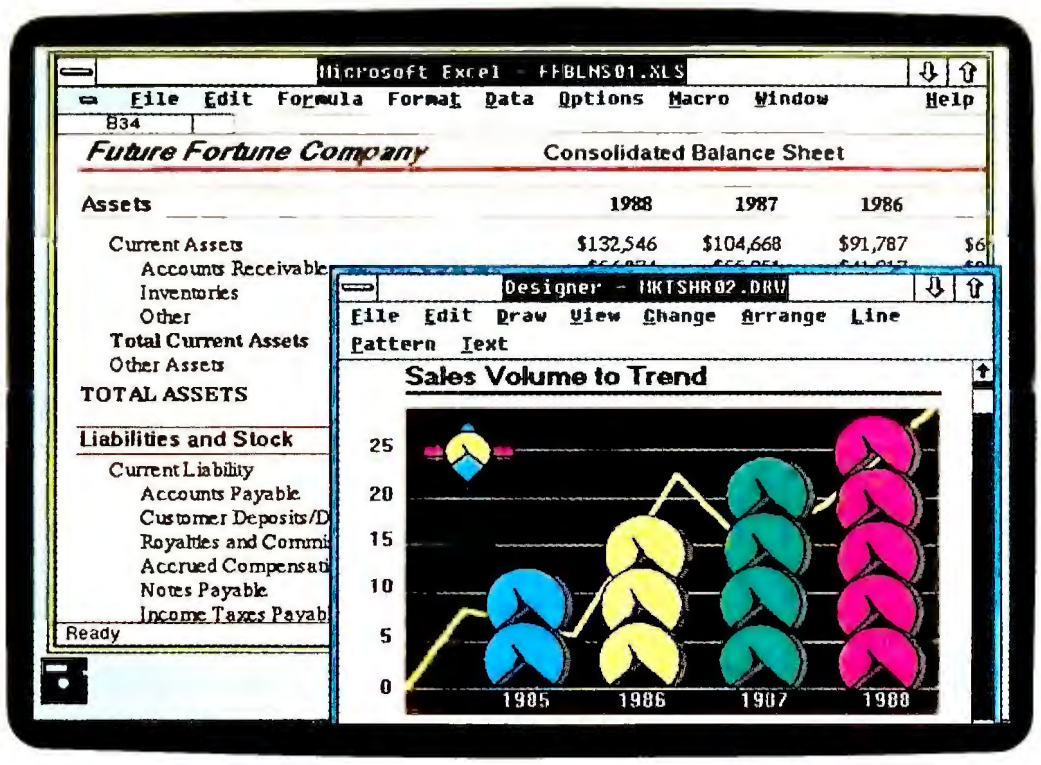

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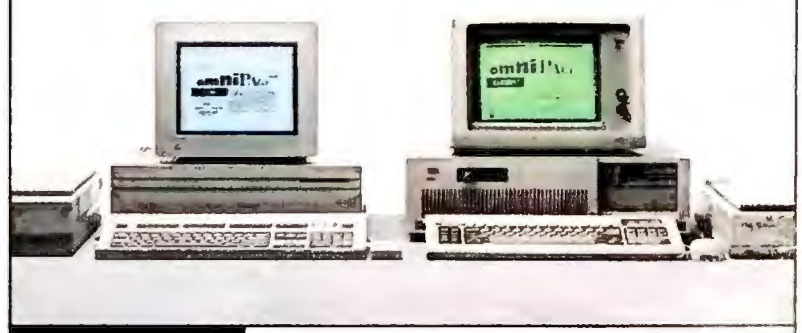

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CONSUMER WATCH

Advice and information for the computer consumer

Nationwide Guide to User Groups

Roberta Furger

Whether you've just bought your first computer or you're a PC wizard setting up a network for an entire department, your local PC user group can be a valuable resource. Hundreds of groups throughout the United States and Canada offer technical assistance, special interest groups for popular business applications, forums for software developers, bulletin board services, and more.

As part of our continued effort to foster user group activities, we've updated our annual listing of organizations throughout the United States. If your city isn't included in our listing, a few calls to local computer dealers should yield information about the user group nearest you.

ABBREVIATIONS KEY

NL: newsletter
SIG: special interest group
TS: technical support
TE: training and education
BBS: bulletin board service
SL: software library

(User groups are listed alphabetically by state and city, not by user group name.)

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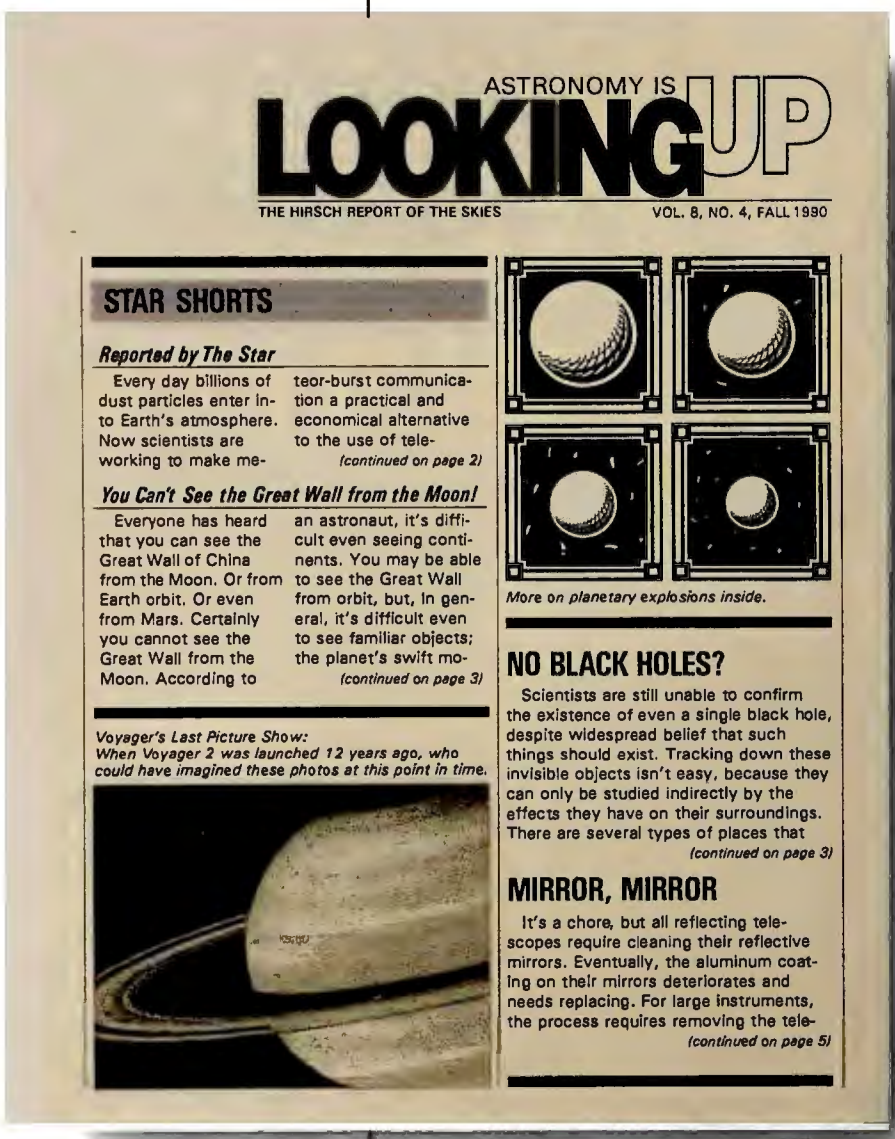
Other laser printers play with one standard dot size.

HP makes it a



ASTRONOMY IS
LOOKING UP
THE HIRSCH REPORT OF THE SKIES — VOL. 8, NO. 4, FALL 1990

STAR SHORTS

Reported by The Star

Every day billions of dust particles enter into Earth's atmosphere. Now scientists are working to make meteor-burst communication a practical and economical alternative to the use of tele-

(continued on page 2)

You Can't See the Great Wall from the Moon!

Everyone has heard that you can see the Great Wall of China from the Moon. Or from Earth orbit. Or even from Mars. Certainly you cannot see the Great Wall from the Moon. According to an astronaut, it's difficult even seeing continents. You may be able to see the Great Wall from orbit, but, in general, it's difficult even to see familiar objects; the planet's swift mo-

(continued on page 3)

Voyager's Last Picture Show:
When Voyager 2 was launched 12 years ago, who could have imagined these photos at this point in time.

More on planetary explosions inside.

NO BLACK HOLES?

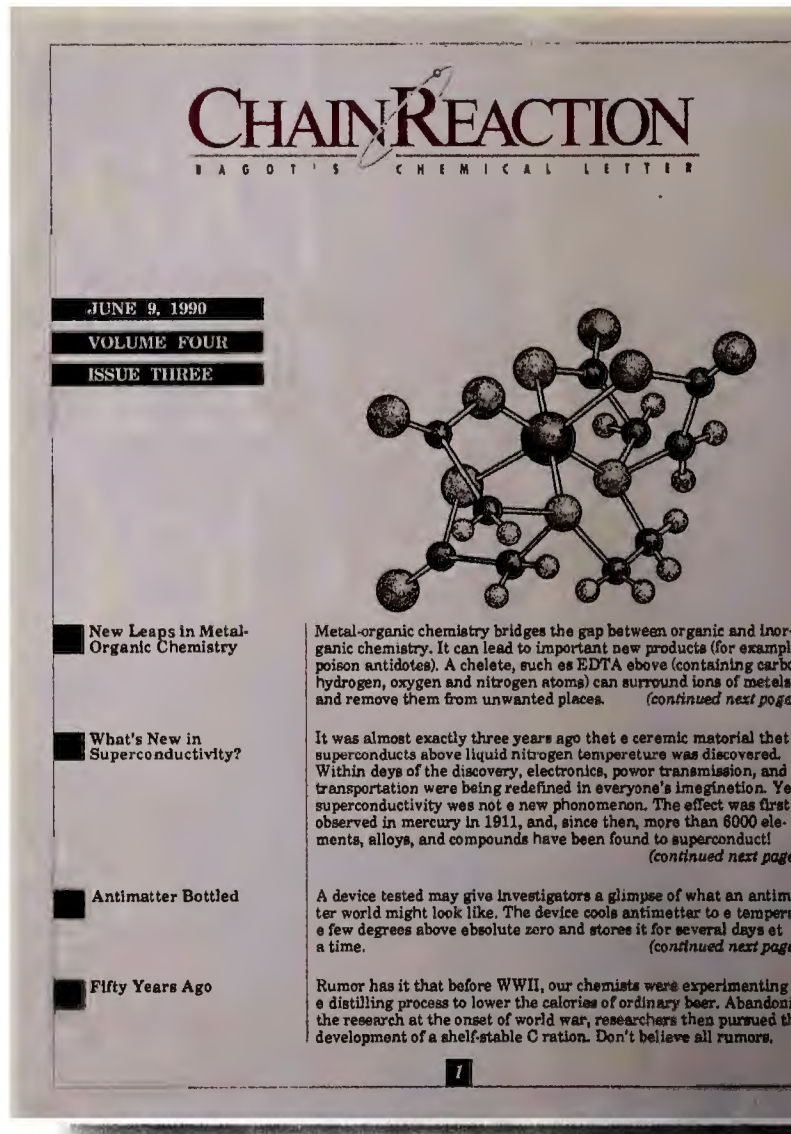
Scientists are still unable to confirm the existence of even a single black hole, despite widespread belief that such things should exist. Tracking down these invisible objects isn't easy, because they can only be studied indirectly by the effects they have on their surroundings. There are several types of places that

(continued on page 3)

MIRROR, MIRROR

It's a chore, but all reflecting telescopes require cleaning their reflective mirrors. Eventually, the aluminum coating on their mirrors deteriorates and needs replacing. For large instruments, the process requires removing the tele-

(continued on page 5)



CHAIN REACTION
BAGOT'S CHEMICAL LETTER

JUNE 9, 1990
VOLUME FOUR
ISSUE THREE

New Leaps in Metal-Organic Chemistry

Metal-organic chemistry bridges the gap between organic and inorganic chemistry. It can lead to important new products (for example, poison antidotes). A chelete, such es EDTA ebove (containing carbon, hydrogen, oxygen and nitrogen atoms) can surround ions of metels and remove them from unwanted places. *(continued next poge)*

What's New in Superconductivity?

It was almost exactly three years ago thet e ceremic matorial thet superconducts above liquid nitrogen tempereture was discovered. Within deys of the discovery, electronics, powor transmission, and transportation were being redefined in everyone's imeginetion. Yet superconductivity wes not e new phonomenon. The effect was first observed in mercury in 1911, and, since then, more than 6000 elements, alloys, and compounds have been found to superconduct!
(continued next page)

Antimatter Bottled

A device tested may give investigators a glimpse of what an antimatter world might look like. The device cools antimetter to e temperature e few degrees above ebsolute zero and stores it for several days et a time. *(continued next page)*

Fifty Years Ago

Rumor has it that before WWII, our chemists were experimenting with e distilling process to lower the calories of ordinary beer. Abandoning the research at the onset of world war, researchers then pursued the development of a shelf-stable C ration. Don't believe all rumors.

1

Introducing the new HP LaserJet III printer with Resolution Enhancement technology.

The rules have changed. Now the name of the game is Resolution Enhancement technology. You'll call it the best thing to happen to laser printing since the very first HP LaserJet printer. It gives you clearer resolution. Curves that really curve. And edges that are never jagged.

Instead of a "one-size-fits-all" dot, HP's built-in intelligence varies dot sizes. So they can fill areas where they could never go before. For clearer, more professional-looking documents.

Resolution Enhancement technology shrinks dots to fit in curves and diagonals where they've never gone before.

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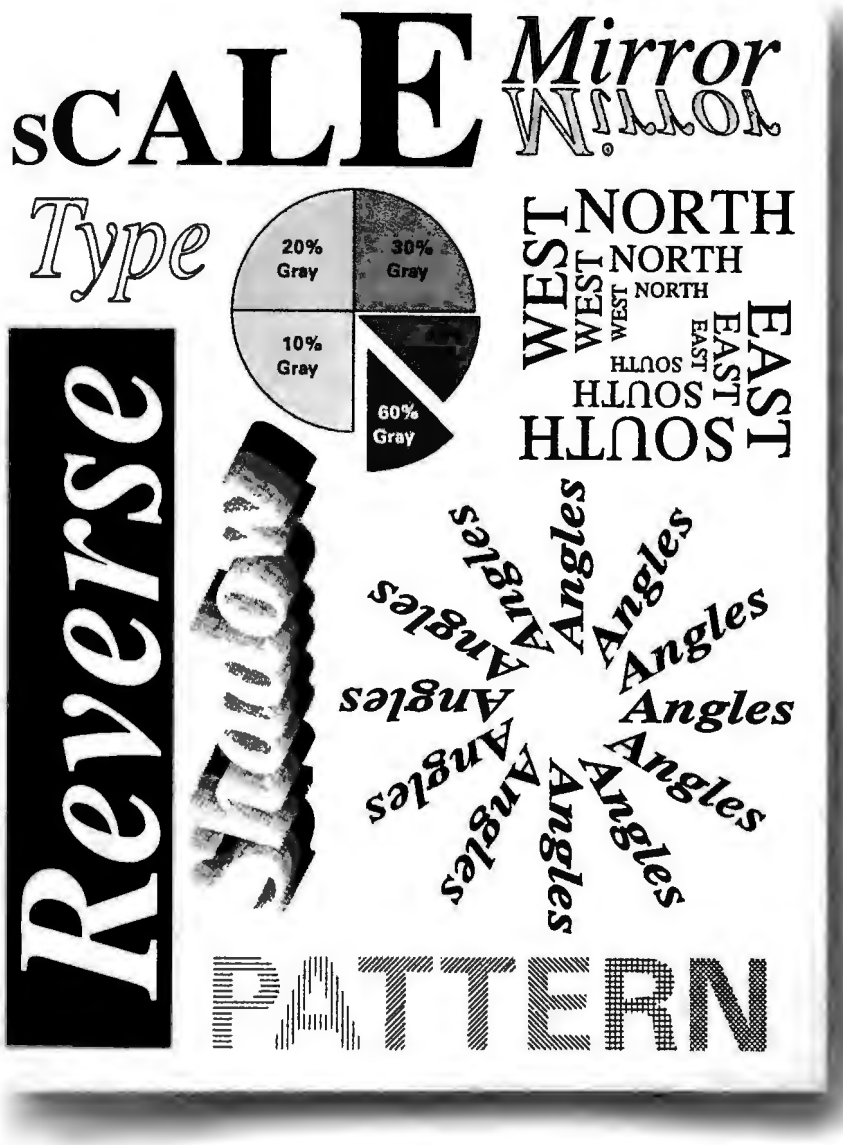
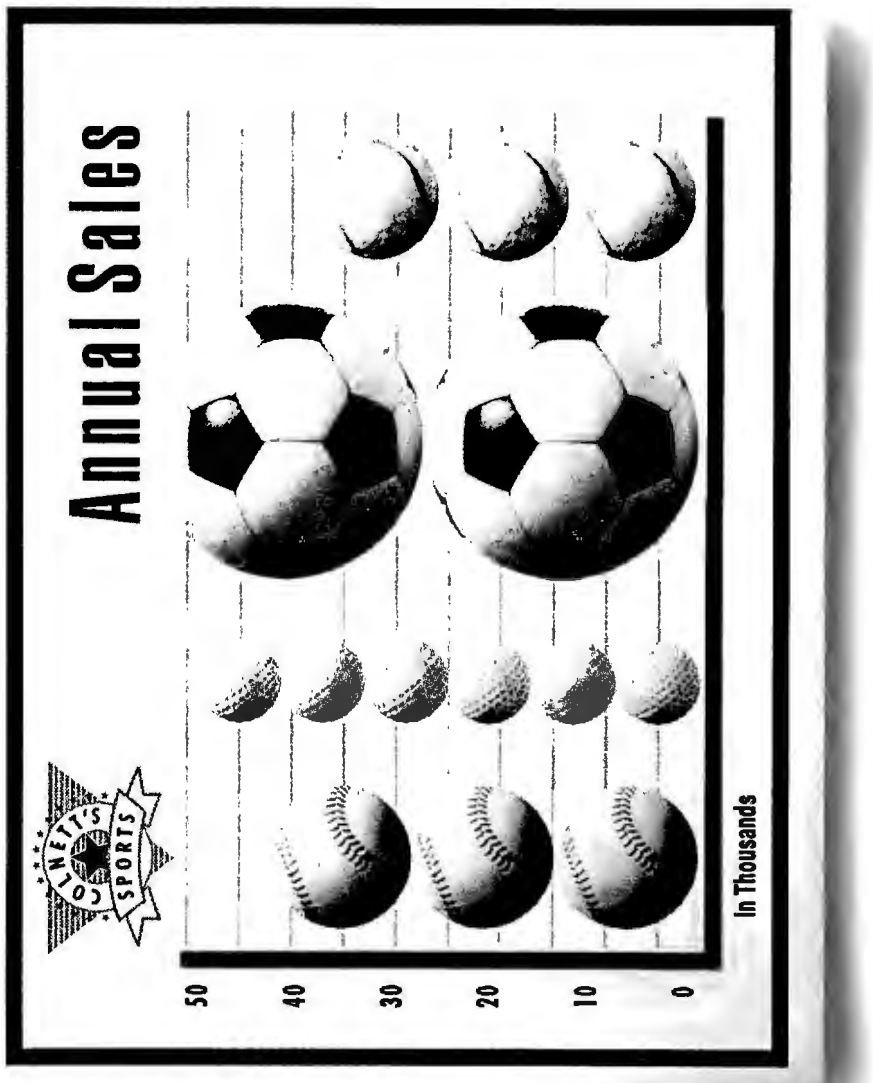
whole new ball game.





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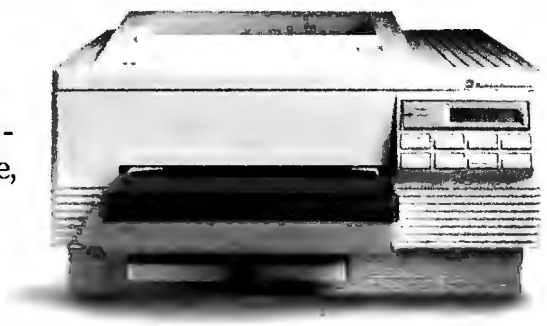

Series II printer it replaces. With the same hardware compatibility, wide range of applications, 8 ppm print speed, and software compatibility, including WordPerfect 5.1 and WordStar® 6.0. And the same reliability as the rest of the HP printer family.

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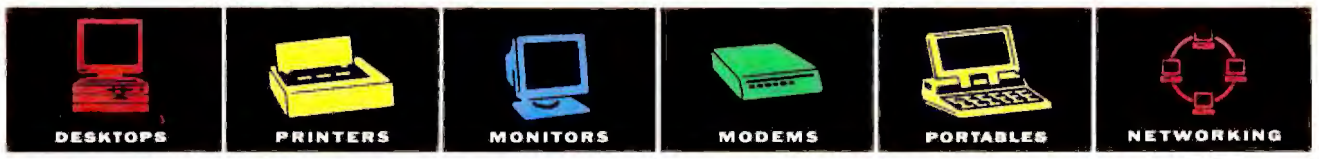

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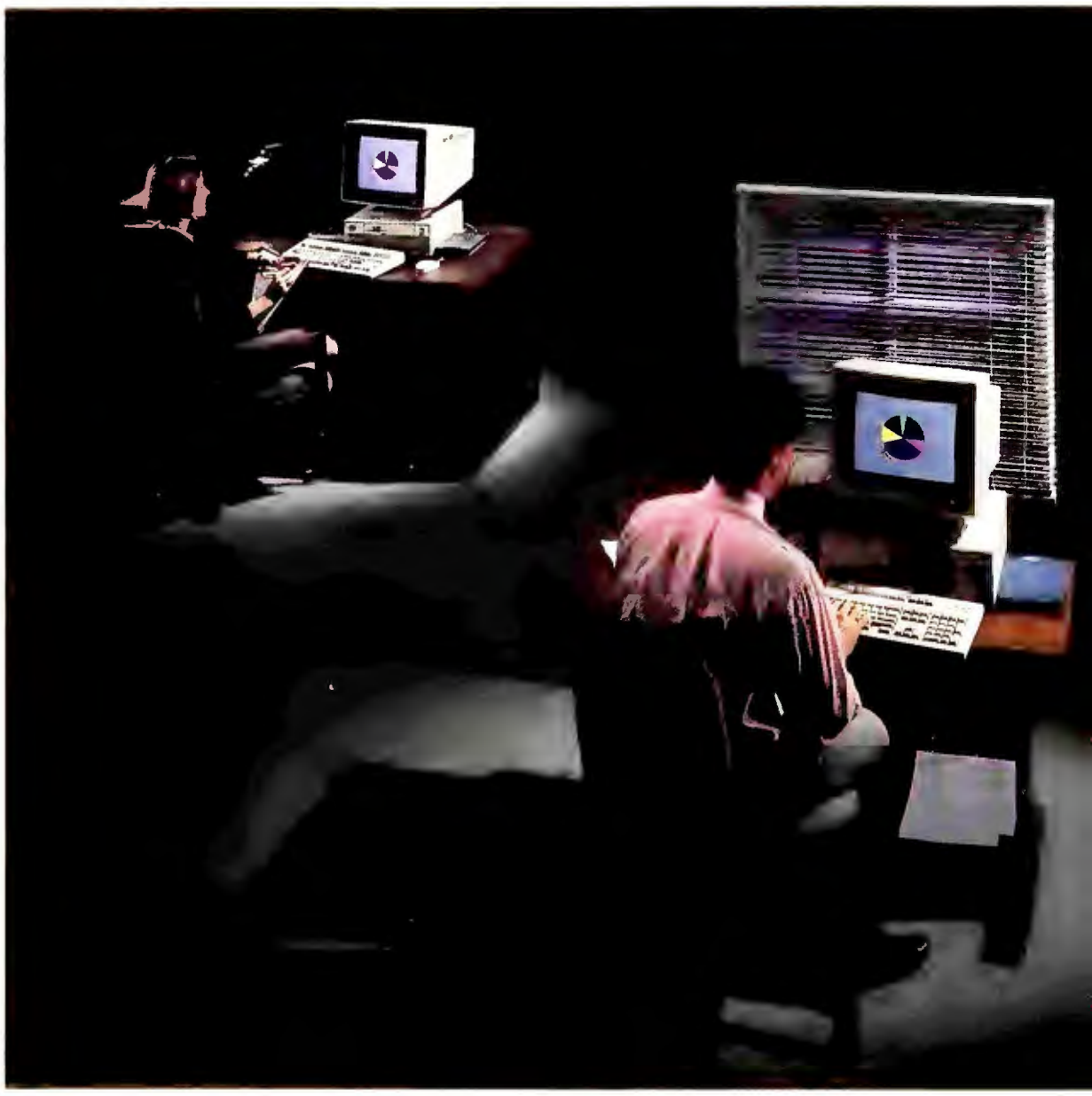

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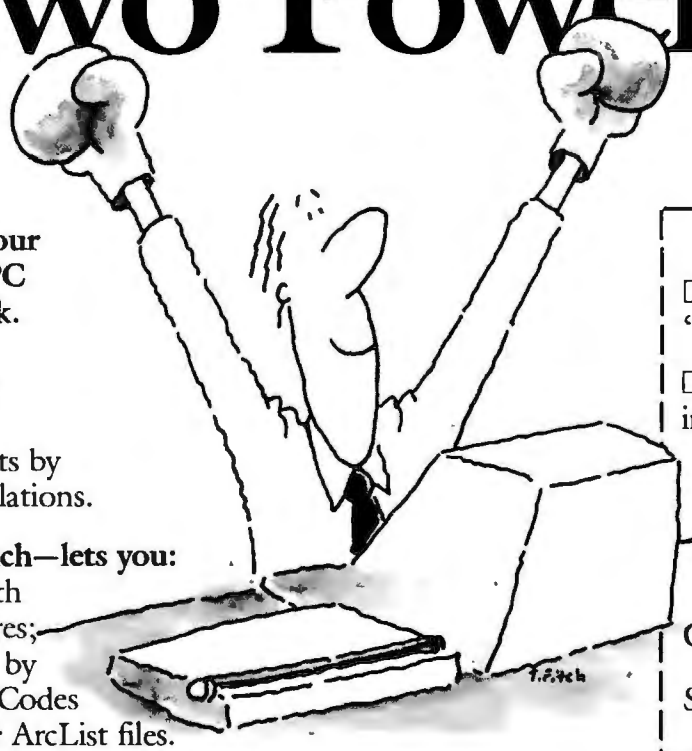

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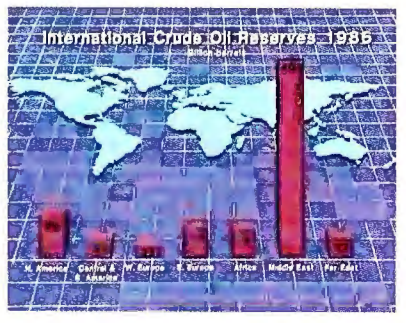

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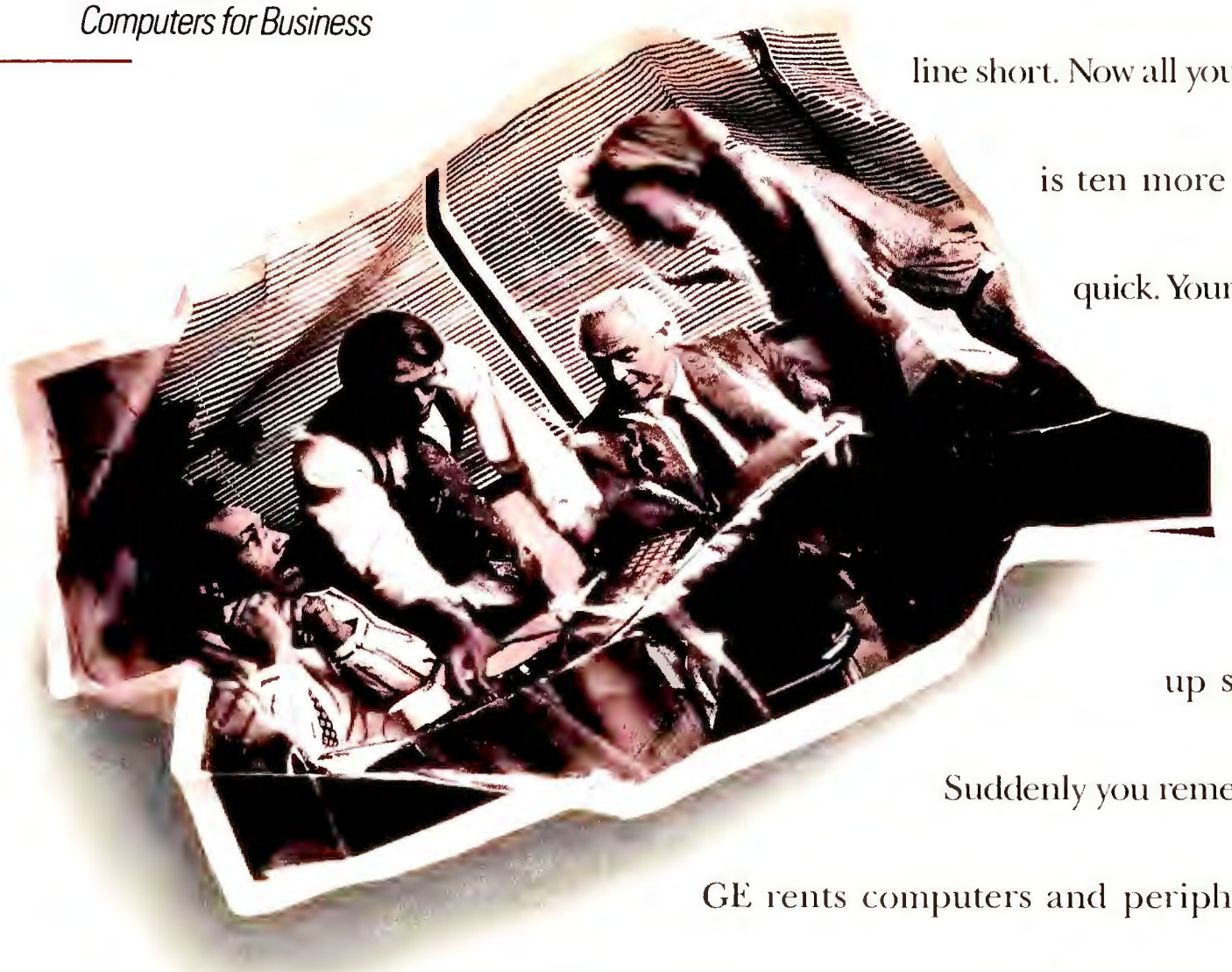

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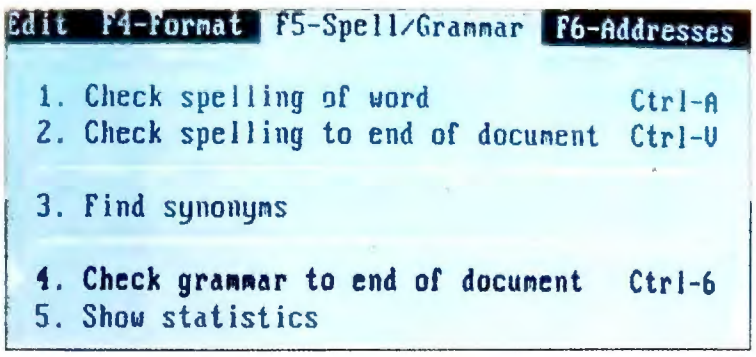

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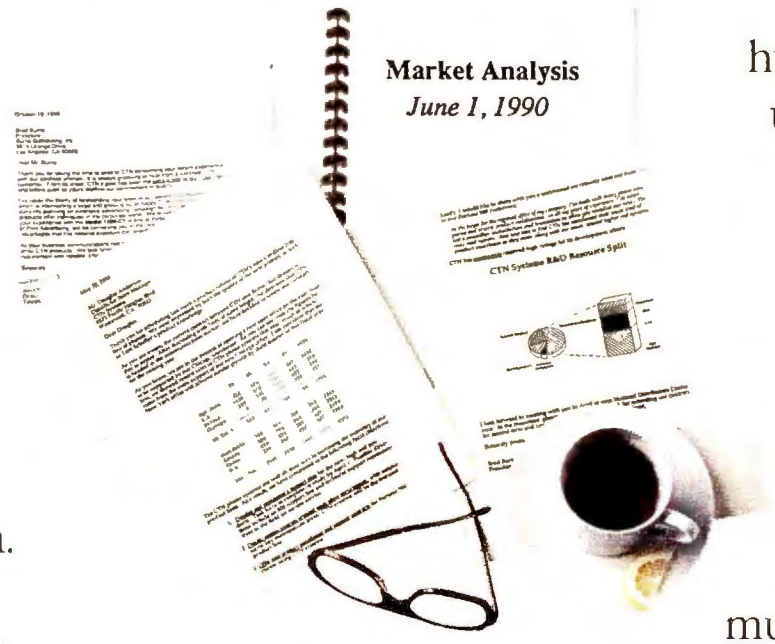

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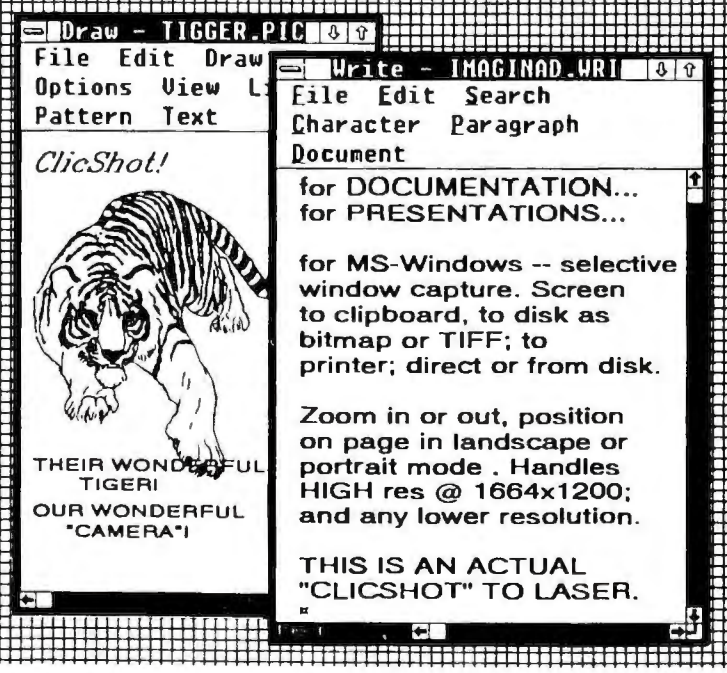

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Edited by ERIC BENDER

Notebooks: How Small Is Too Small?

Portables Reach the Limit

Tiny PCs Still Have to Be Usable

Analysts say Toshiba's notebook (left) has an acceptable keyboard but the Poqet PC (right) doesn't.

MICHAEL JAY

Way back before the lambada, there was the limbo—another rum-and-cola dance whose enthusiasts asked that musical question, How low can you go?

As notebook PC makers gird themselves for yet another round of products, enthusiasts ask: How low can you go in size? Don't look for "subnotebooks," major suppliers respond.

Since the Osborne 1 first popularized computer schlepping, vendors have been trying to stuff a full-function computer into an ever-smaller box—without an AC umbilical cord. For most of the 1980s, the effort was constrained by screen, storage, and battery technology, observes Jim Bartlett, director of strategic marketing for NEC Technologies in Wood Dale, Illinois. Now manufacturers have broken through most of those barriers; portability is being driven by what Bartlett calls "ergonomic minimums."

The minimum footprint is one that can accommodate a full-sized keyboard and an adequate-looking screen—about 8½ by 11 inches. The upper limit is roughly 10 by 12 by 2 inches, about half the size of an average briefcase.

NEC defined that footprint in fall 1988 with the 4.4-pound 8086-based backlit UltraLite, but its restriction to RAM card storage was an unacceptable compromise. So was the 2-inch floppy in Zenith's MinisPort, which debuted in June 1989. Four months later, the Compaq LTE and LTE/286 attained the first minimum acceptable functionality, with standard 3½-inch floppy and 20MB hard drives.

Sales figures indicate that users agree with Compaq's logic. The 80C86-based LTE and the 286-based LTE/286 have vastly outsold the UltraLite and MinisPort since their introduction, reports JoeAnn Stahel, president of StoreBoard/Computer Intelligence in Dallas.

Notebook shipments will soar 149 percent to 566,000 during 1991, projects InfoCorp analyst Peter Teige. This category should realize a combined annual growth rate of 61 percent through 1995, he says.

Technology Shifts

Compaq's competitors take comfort in the quick turnover of technology. While Compaq promotes the LTEs as a no-compromise solution, Toshiba feels that the CGA screen and the keyboard are compromises. It has been conducting a hard-hitting advertising campaign that highlights its machines' 25 percent larger, double-scan CGA display and more desktoplike keyboard.

Notebook leaders are about to launch a new generation of products that will make VGA screens and 20MB hard drives de rigueur. Just over the horizon are 386SX notebooks. Altima Systems in Concord, California, touts its Altima NSX as the first "notebook computer combining 80386SX technology, VGA display, and a 20MB hard disk drive." But with a footprint of 11 by 14 by 2 inches, the NSX takes up a bit too much room.

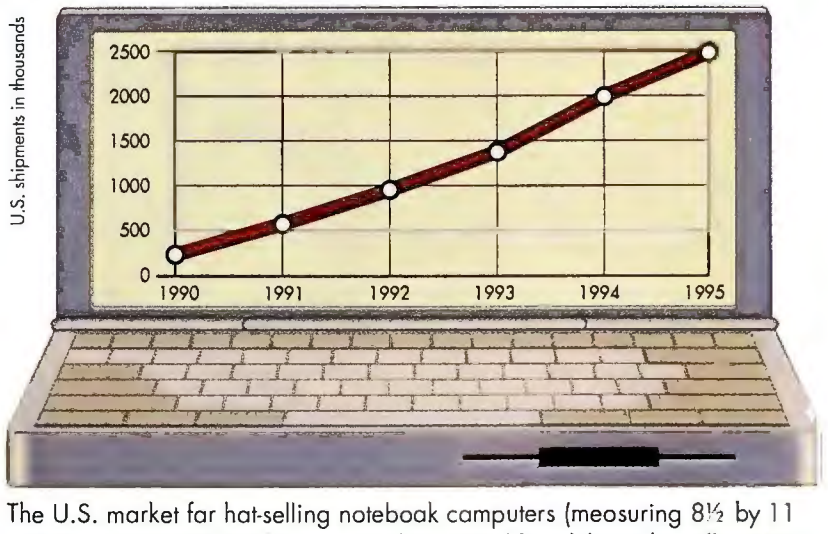
Hitting the Limits

Advanced battery technologies like nickel-hydride eventually will open the notebook to 486 processors and color LCDs, predicts Tom Sherrard, director of PC marketing at Toshiba Information Systems in Irvine, California. For now, power management is the most important delimiter of performance.

Here Poqet Computer's Poqet PC excels: With 16 power management patents pending, it can be driven for *100* hours on two penlight batteries. Unfortunately, the Houston firm tailored its unit to fit into a suit coat's inside pocket. That requirement dictated the unlit 3-by-7-inch display and a keyboard that is too cramped for even hunt-and-peck typing. "If human beings were about half the size they are, that keyboard might be something they could use," allows InfoCorp's Teige.

But through such experimentation, vendors have found the sweet spot in portability and full functionality—somewhere between the human fingertip and the briefcase. *—Mike Hogan*

Notebooks Are Red-Hot



The U.S. market far hat-selling notebaak camputers (meosuring 8½ by 11 inches or less) is still wide apen. Technological breakthraughs will cantinue to drive sales, says InfaCarp, producing a mare-than-healthy campaund annual growth rate af 61 percent in shipments through 1995.

Will a Pen Replace the Keyboard in Your Next PC?

Start-Ups Have High Expectations

Newcomers and longtime PC players alike are rushing to build next-generation devices that put the power of a PC in your hand—power accessible via a pen or stylus.

Grid Systems of Fremont, California, was first on the scene last September with its 4½-pound GridPad. Relying on a pen alone, unassisted by mouse or keyboard, the $3000 portable is targeted at mobile workers such as delivery people for whom the clipboard already is the primary means of gathering information.

But work under way at two Silicon Valley start-ups—Go Corporation of Foster City and Momenta of Mountain View—promises to be even more tantalizing. While both companies refuse to discuss their plans, they're expected to provide PC capabilities not just in stylus-based notebooks but across a broad spectrum of electronic devices.

The 4½-pound GridPad is the first pen-driven PC.

Meeting Specific User Needs

For the time being, Momenta and Go executives will say only that they want to reach far beyond the PC users that the GridPad targets. "Grid's vertical market approach is a tremendous opportunity but potentially too limiting," says John Rizzo, Momenta's marketing vice president. Momenta's systems, he explains, focus on "alternative input strategies," and its efforts aren't necessarily limited to pen-based PCs. "We're not building our product around handwriting recognition," says Rizzo. "That's one element of many."

Of course, neither are Momenta and Go overlooking the so-called clipboard market, which is the most immediate opportunity and the easiest to identify and serve. The advantages of computerizing this market are straightforward: When field personnel enter data directly into a computer, companies eliminate the extra data entry step and the errors associated with it.

Beyond mere data entry, Go and Momenta want to reach an estimated 65 percent of the work force that either can't or won't use a computer just because of its keyboard, as well as executives looking for an electronic datebook and note keeper. The pen's familiar interface makes computer technology that much more accessible for keyboardphobes and executives alike. It also enables them to work in situations where standard laptops aren't appropriate, such as business meetings.

"The challenge for the industry is to pick the right computer for the right task," says Vern Raburn, chairman of Slate Corporation in Scottsdale, Arizona, which is writing software for pen-based systems.

Hardware and Software

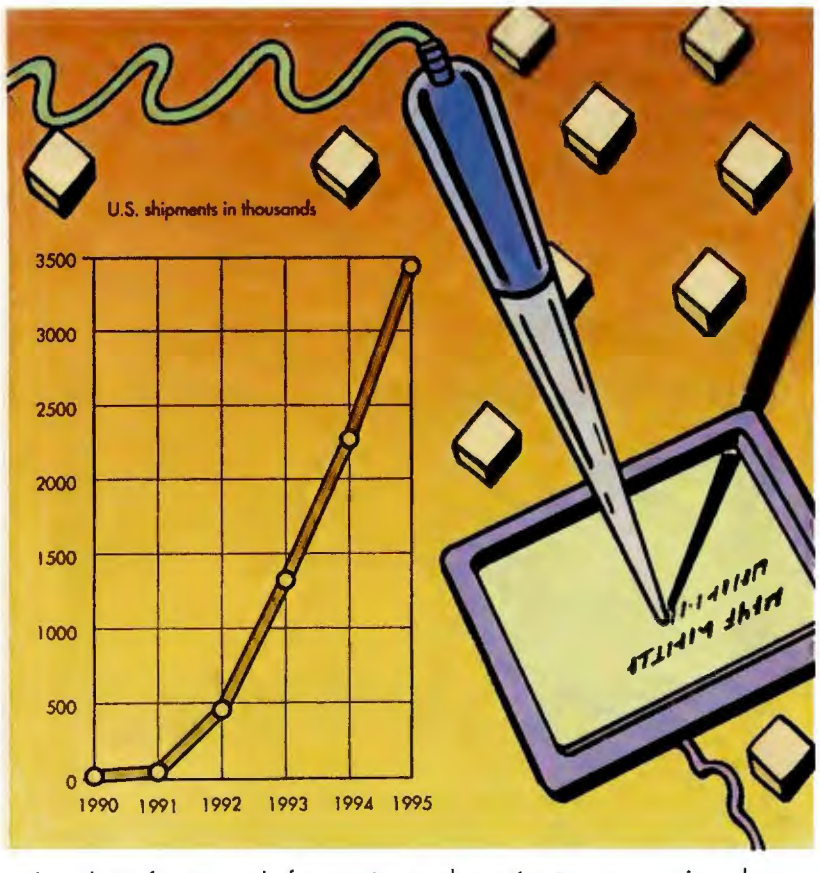
Go and Momenta are keeping their planned systems under wraps, but the GridPad offers a glimpse of how the technology will shape up. The sleek system looks like a high-tech Etch A Sketch tablet. To stay small and light, it employs battery-backed RAM cards for storage.

While the GridPad is a DOS machine, Microsoft plans to create an environment for such systems around ROM-based versions of DOS and *Windows*. Other players envision more ambitious graphical environments that not only make these systems easier to use but reduce memory demands through a tighter coupling with applications. "Our view is broader than hardware," says Dan'l Lewin, Go vice president of sales and marketing. "The value is in the software in the long run."

A Recognition Problem

One of the biggest challenges continues to be handwriting recognition, which Lewin calls "a very slippery slope." Rizzo agrees, noting that Momenta avoids the term *handwriting* *(see Pen-Based, p. 76)*

Mightier Than the Keyboard



Although it's far too early for precise market estimates, pen-equipped computers are expected to catch on fast. InfoCorp projects that U.S. shipments of computer pens and pen-equipped computers will grow 132 percent between this year and next and will pass 3.4 million in 1995.

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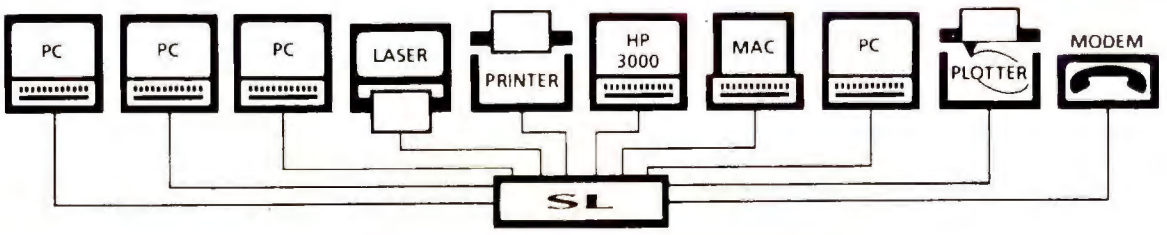

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Better-Writing Software Hits the Best-Seller Lists

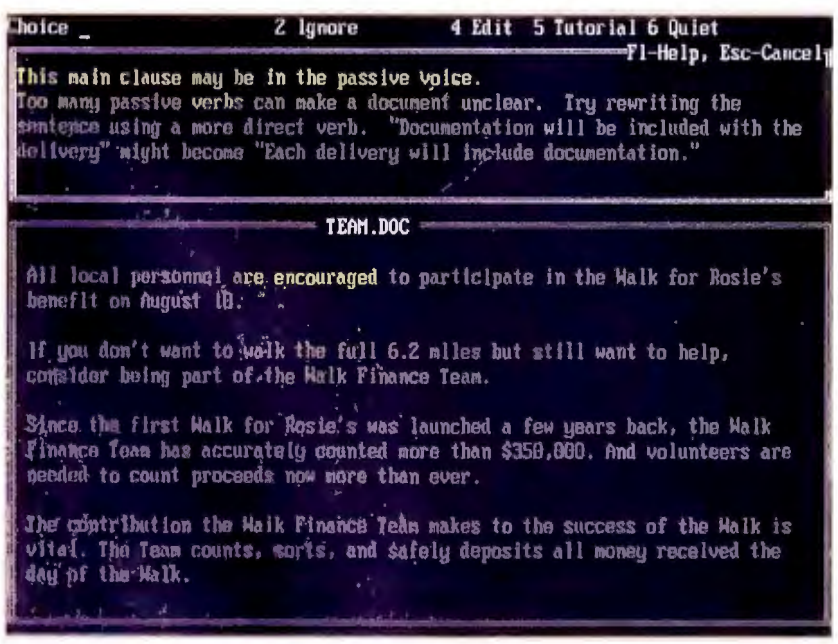
Thanks to the PC, the business world today is awash in memos and letters with elegant fonts and stylish layouts. Beneath the medium's glossy overcoat, however, often lurk messages every bit as sloppy as in the era of the typewriter.

That's why PC users are turning in droves to so-called grammar-checking programs to improve or repair their writing. The leading products—Reference Software's *Grammatik IV*, RightSoft's *RightWriter*, and Lifetree Software's *Correct Grammar*—list for just under $100 each. They serve as reproachful schoolteachers by flagging long sentences, passive-voice construction, clichés, and jargon. They also gently rap your knuckles for straightforward errors of grammar, such as sentence fragments and lack of subject-verb agreement.

Despite almost unanimous scorn from the professional writers who review software, these products sell extremely well. Reference Software in San Francisco claims more than 300,000 users of its grammar-checking products. *Grammatik IV* has been one of the top ten PC packages for both Softsel/Microamerica and Egghead. Reference's sales have doubled every year for the past three and should hit $10 million this year.

Robert Collins, who spends half his time writing, says that Grammatik proved extremely helpful.

RightSoft claims 300,000 users for *RightWriter*. Sales for the Sarasota, Florida, firm have grown from $1.5 million in 1987 to $4.1 million last year. Lifetree of San Francisco declines to give out any figures for *Correct Grammar*, which was introduced only last year.



Correct Grammar and its peers offer friendly, solid advice that can help even experienced writers.

Giving the Write Advice

The growing popularity of grammar checkers stems partly from their improved quality and flexibility. Early versions were stern, uncompromising, and wrong often enough to make them more nuisance than help. The newer releases are smarter. They recognize parts of speech within a sentence and thus know when to employ *there* instead of *their* or *they're*. And users can modify program rules; with legal documents, a lawyer can tell the program to allow lengthy sentences.

As PCs penetrate the managerial ranks, professionals are producing documents on their own—without the once-common editing services of a literate secretary. Users see the software as one more way to make themselves look good in their organization. "My manager is a very scholarly individual, a real stickler for grammar," explains *Correct Grammar* user Robert Spain, a production supervisor at CAD vendor Evans & Sutherland in Salt Lake City.

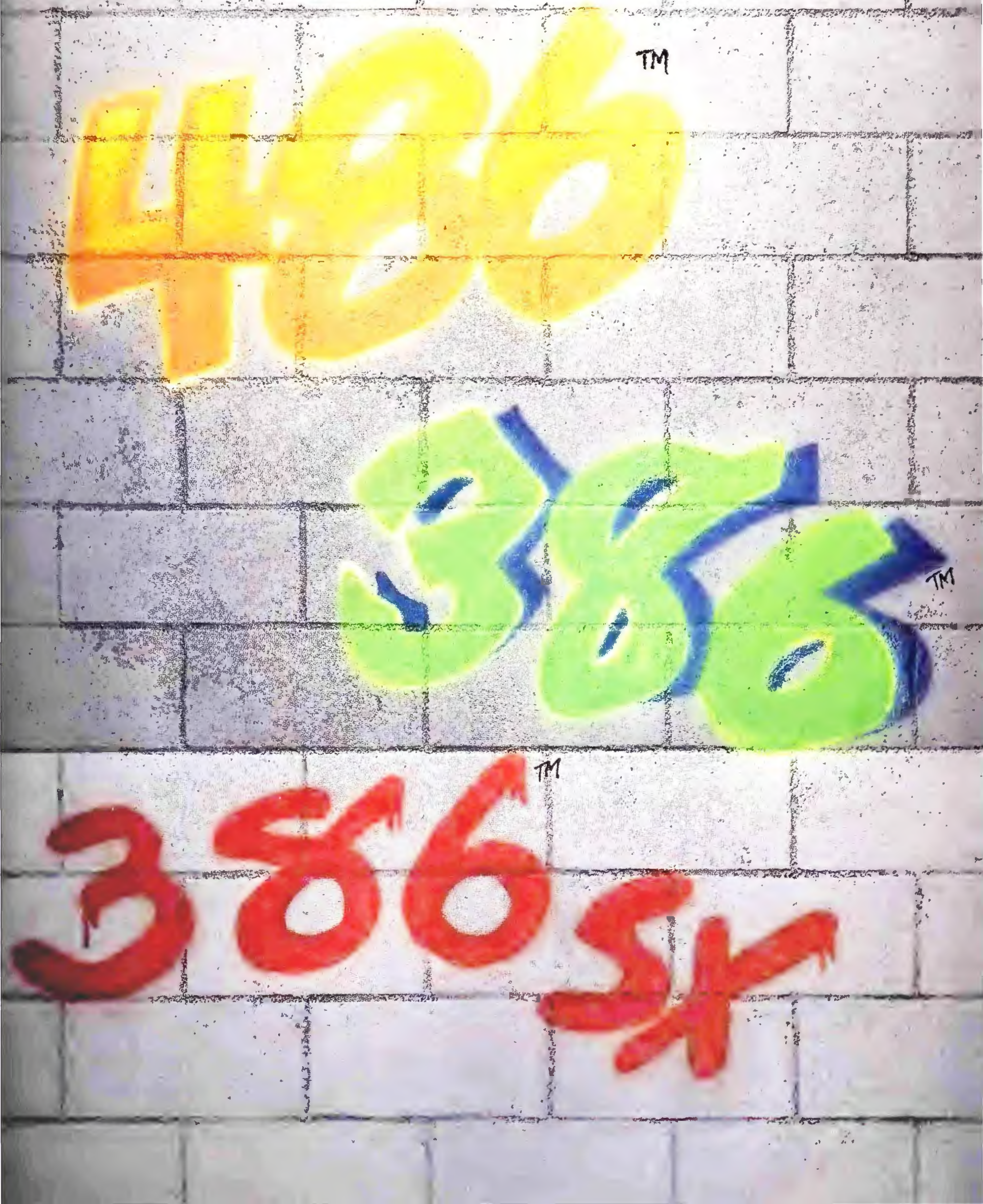
Grammar-checking products help users avoid embarrassment. "I had lost the ability to write simply and concisely," admits Robert Collins, chief compliance officer at UNUM Sales in Portland, Maine. Collins must make sure that his firm obeys the complex web of laws regulating the securities business. He estimates that he spends half his time writing, and once won a tongue-in-cheek company award for his prolific output. *Grammatik* proved a chastening experience: "The first document I put through came out with something like 171 errors."

Many users appreciate the value of strong writing and don't know how to achieve it. "I've been out of school awhile and have lost touch with all those rules," says *RightWriter* aficionado Jim Klosinski, development secretary at St. Mary's Hospital in Blue Springs, Missouri. Klosinski writes direct-mail pieces to raise funds. "I used to ramble a lot," he says. "*RightWriter* makes my writing more concise."

Like spelling checkers and thesauri, grammar checkers will inevitably become part of word processing programs. Ashton-Tate is the first major vendor to take this step; users of *MultiMate 4.0* can invoke *Grammatik* without leaving a document. Software Publishing seconded the motion this spring, including *Grammatik* in *Professional Write 2.2*.

—Herb Brody

The numbers outside.



ALR Takes the Fast Track

Public Offering Spurs Sales Growth

When a tiny engineering outfit called Advanced Logic Research entered the PC market in 1986, it didn't sneak in with the usual "me-too" clone. It launched itself with a bang by shipping the first desktop built around Intel's 80386 chip.

This brassy, aggressive supplier is still on the leading edge, but it's also garnering laurels for technical prowess—*PC World* applauded the recently released PowerCache 4 as the "first true 486" PC. And now ALR systems can be found in about 1200 U.S. resellers, a number that the supplier hopes to boost to 3000 by year-end. ALR "has done surprisingly well, even shockingly well," says Richard Shaffer, an industry analyst and editor of *Technologic Computer Letter* in New York City.

David Kirkey: ALR's rise was no accident.

In April, ALR moved from adolescence to adulthood by going public. Cash reserves had been about $2 million, but the oversubscribed offering raised a respectable $38 million. At the same time, ALR has steadily gained shelf space in computer stores. Ingram Micro D and Softsel/Microamerica, the two giant distributors, now carry ALR products. In April, Intelligent Electronics—the largest computer reseller in North America, with 850 stores—signed on as well. This is no fluke, says ALR sales vice president David Kirkey: "We've risen in an industry that's hard, and we haven't lost any money in the process."

In the quarter that ended March 30, ALR reported record revenues of $44.8 million and a $3.2 million profit. Staff has risen to roughly 400 employees worldwide. About 40 work at a sales and service subsidiary in Singapore—the home of Wearns Brothers, the holding company that has been ALR's main financial backer.

Innovative Engineering

How did ALR get on this fast track? Primarily by building extremely fast PCs, taking a creative approach to matching very-high-speed cached memory architectures with speedy disks. "Our machines will always be unique," says ALR president and cofounder Eugene Lu. "We don't just make copies, we do first-class engineering.

"We're not IBM or Compaq, but we want to offer a better price," Lu adds. In general, say industry experts, ALR's 386 machines run a wink faster than similar IBM or Compaq models but cost 10 to 13 percent less. "You can't find any other computer that can compete with what ALR can do for its price," declares Bob Rezaian, manager of Socrates Computer Systems in Rockville, Maryland.

ALR's market share remains tiny. The firm sold about 60,000 machines overall in 1989, while Big Blue and Compaq sold 477,000 and 277,000 386 machines respectively, says analyst Bill Lempesis of Dataquest in San Jose. "It's still the IBM and Compaq show in the 386 market," he says. "ALR is certainly vulnerable to any pricing moves by IBM and Compaq. And its status in the marketplace can always be challenged by Korean manufacturers."

Eugene Lu: Tight product focus remains key.

Some dealers believe that ALR's sales could improve if its memory cards weren't so costly. A 1MB card from ALR costs $300 to $400, compared with about $100 per megabyte of memory for other brands, like AST. "It sometimes loses the advantage of being a reasonably priced computer," says Michael Erfani, manager of PC Concepts in Arlington, Virginia.

In earlier years, *PC World* and others blasted ALR for cutting corners in manufacturing. Complaints still crop up about its technical support. Less seriously, ALR raises eyebrows by often announcing products long before they ship in volume. "I wouldn't be surprised if these guys announced [an Intel] 586 machine tomorrow," jokes one observer.

Still, its big bankroll leaves ALR strongly positioned for further growth. Foreign sales accounted for 30 percent of its business last year, and a major expansion plan is under way. The company recently signed up distributors in Australia, the United Kingdom, and Canada. But Lu plans to continue to choose niches very carefully—ALR won't necessarily jump into laptops, for instance. "It's important for us to stay focused," he says. —*Patrick Cole*

Herb Brody writes on technology in Boston; Patrick Cole is a freelance business writer in Los Angeles.

ALR's Dizzying Climb

GORDON STUDER

Since launching products for the 386 market, ALR's sales have soared. The company received a $38 million infusion from its initial public offering this spring. Figures are for the fiscal year ending September 30.

The computer inside.

Since buying a computer today is such a numbers game, here's a simple rule of thumb. Look for 386™SX, 386™or 486™on the outside to be certain that you have Intel technology on the inside. From the company that invented the microprocessor. The company that has shipped over 10 million 32-bit processors. The same company that's investing over $1 billion this year to make sure the computer inside your computer has the technology, power and compatibility to take you into the future.

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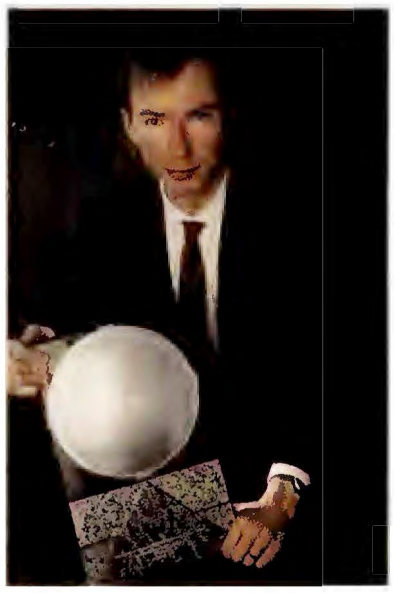
Circle 109 on reader service card

NextStep Wins Andrew Fluegelman Award



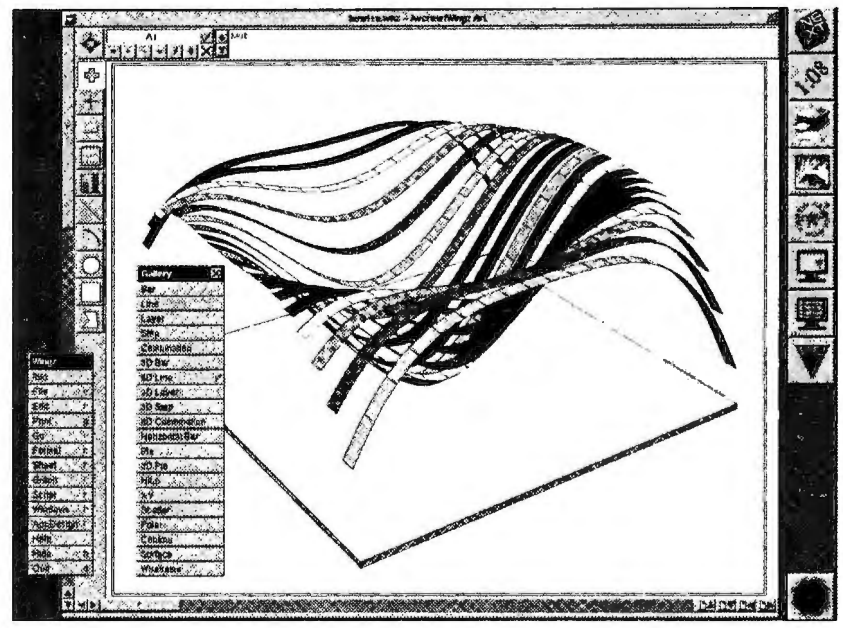
Bud Tribble accepted the prize for his team.

Hindered by a lack of application software, the Next Computer is struggling hard for commercial acceptance. But Steve Jobs's brilliant NextStep environment continues to rate very high in the software community, and it edged out some impressive competition to win this year's Andrew Fluegelman award.

In the future, all desktop systems will include a unified imaging model (which gives true what-you-see-is-what-you-get integration between display and printouts). They'll also feature an object-oriented development system, a well-designed user interface with enhancements like 3-D buttons, aids for end user programming, support for voice annotation, and other advances. "NextStep is the first complete, commercial system with all of this," notes developer Dan Bricklin, a Fluegelman judge. "It's a milestone."

"NextStep shows what the interface of the future should look like," adds the Association of PC User Groups' Jerry Schneider, another judge. "It's a dream for developers. A lot of people are talking about what we need to be doing. Rather than talking about it, NextStep is implementing it."

Bud Tribble and the Next software team received the $5000 prize for the Fluegelman award, which recognizes programmers for excellence in personal computer software design. It commemorates Andrew Fluegelman, founding editor of *PC World* and *Macworld*, author of the first PC communications package, and a leader in the creation of shareware software distribution. —*E. B.*



Informix's Wingz will be joined this year by a few NextStep packages from other major players.

Pen-Based

(continued from p. 70)

recognition. "It conjures up an image in the consumer's mind that we are going to be hard-pressed to meet," says Rizzo.

What users want is recognition of cursive writing, which vendors agree is years down the road. GridPad accepts only block characters. Grid claims a 95 percent accuracy rate, which climbs as users adjust their writing style, says Anne Marie McGee, marketing manager for the GridPad. Other products, such as the Portable Reference System, a laptop from Scenario of Boston, feature "trainable" software, in which the machine rather than the user is forced to adapt. Based on neural network technology, the Scenario software becomes more adept over time at recognizing a user's handwriting style.

Standard Versus Custom

One of the most hotly debated industry topics concerns the trade-offs between creating an operating system for pen-based PCs and employing standard DOS. Go is expected to develop proprietary system software that will be licensed to other players.

By contrast, the GridPad is a DOS-based system. "We'll be able to get the applications out there more quickly," explains Ken Dulaney, Grid's director of advanced systems marketing. "It's one less hurdle to overcome when we go to software developers."

Microsoft is expected to push DOS and *Windows* hard. Russ Werner, group manager for DOS and *Windows*, promises that his company "will be a big player in the next couple of years."

Momenta's Rizzo argues that the operating system doesn't have to be an all-or-nothing proposition. "Our feeling is that users would prefer a little of both," he says. In any case, a pen-based PC must be able to exchange data with standard PCs (both ways) in order to succeed in corporate America.

Gentle Takeoff?

Plenty of money and distribution power are about to be thrown into this market as some of the biggest names in computing jockey for position. Sony and Canon have introduced such systems in Japan. IBM has invested in Go, and Apple and other major vendors are busily researching the technology.

Although the GridPad is currently the lone player, the market should heat up in the fall if the Go system enters as rumored. Momenta says only that it intends to join the battle by 1992.

InfoCorp projects exceptional growth: The combined market for portable and desktop units will jump from 22,000 units sold in 1990 to nearly 3.5 million systems sold in 1995.

In the meantime, suppliers are busy lining up software companies to write applications. Grid, the most public, claims that over 150 software companies have attended its training classes.

High expectations could both help and hurt response to pen-based systems. Go's Lewin cautions that it will take time for the technology to evolve to a level that will match early expectations and for applications to come to market. —*Roberta Furger*

TWO-FISTED MANAGEMENT

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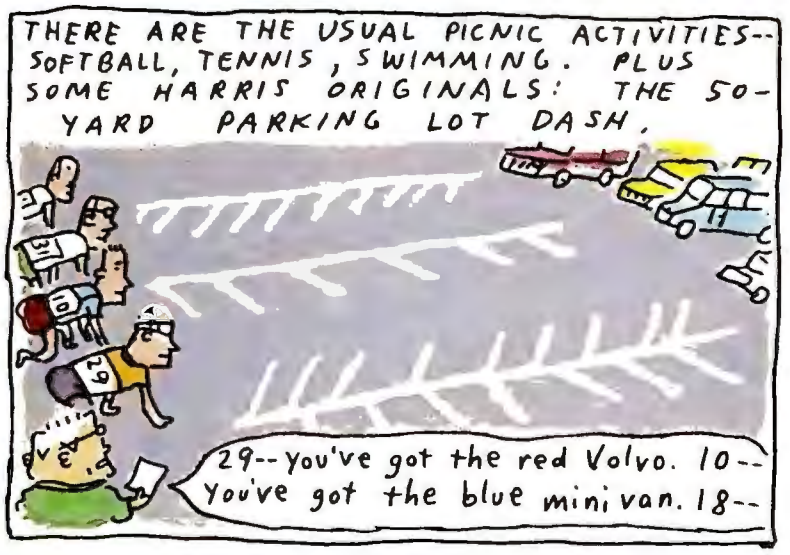

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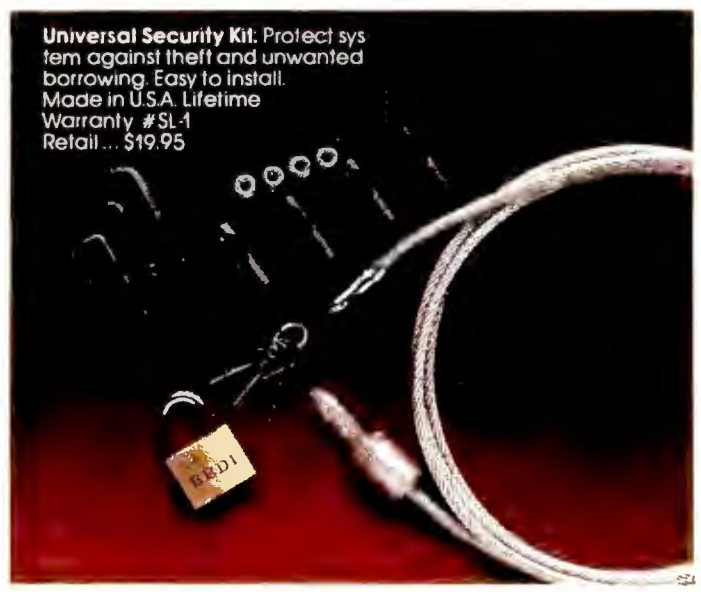

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IBM's Half-Step Toward Home

Is it a work-at-home PC or a new-wave consumer information appliance? The Personal System/1 tries to strike a balance.

An unambitious combination of basic AT hardware with built-in modem and simple software tools, the PS/1 is meant to lure families into buying their first PC.

FRED STIMSON

Eric Bender

Someday, friends who know little and care less about PCs will come to you for advice on buying a home computer. You'll suggest one that they can simply take home and plug in. "It's just like a VCR or a microwave oven," you'll say.

The Personal System/1 is not that machine. But it does show that IBM is deadly serious about smoothing the path between consumers and their first PC. IBM hopes the PS/1 will become a true family appliance, handling everything from job-related tasks to homework to games. IBM brought little innovative technology to that quest; the PS/1 is based on conventional AT-style components. Instead, IBM reserved its most innovative efforts for novel customer service-and-support policies.

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.

Plug-and-Play Platform

The PS/1's technology is plain vanilla. It's basically a revamped Model 30 286 with a VGA display, a 2400-bps Hayes-compatible modem, a mouse, a 3½-inch 1.44MB floppy drive, a parallel port, and bundled software—but no standard expansion slots. Like the Model 30 286, it's a one-wait-state, 10-MHz 286-based system whose performance lags a little behind most AT compatibles (see "12-MHz ATs: Home-Office Alternatives," December 1989). The footprint is a relatively small 10¾ inches wide, 17 inches deep, and 14¼ inches high with display. The keyboard is equipped with the standard PS/2 keys and the standard spacing between keys but measures a compact 17¾ by 6¼ inches.

Four configurations are differentiated by monitor and storage options, starting with a $999 single-floppy model that includes a monochrome VGA monitor and climbing to a $1999 system with color VGA and a 28ms, 30MB hard disk. Floppy drive models come with 512K of memory and hard drive versions with 1MB.

SNAPSHOT

Personal System/1

IBM tokes onother shot at the home market with on idiosyncrotic smoll-footprint AT to be offered in department stores.

KEY FEATURES

- **Intended to let novice home users install add-ons and swap out parts for repair**
- **Includes DOS 4.01, Microsoft Works, and access to Prodigy-based on-line service**
- **10-MHz 286 CPU**
- **Color or monochrome VGA monitor**
- **Single-floppy model comes with 512K of memory, 30MB model with 1MB of memory**
- **No expansion slots**

AVAILABILITY

September, nationwide

PRICING

$999–$1999

IBM U.S. Marketing and Services
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White Plains, NY 10604
800/426-2468

Reader service no. 692

IBM Lowballs Its 286 Rivals

List prices for selected 286-based machines with 1MB of memory, VGA color monitor, and DOS. All these machines typically are discounted heavily on the street. The least expandable, the PS/1, features a built-in 2400-bps modem and a mouse (items that would add $250 to $300 to the other systems' street prices).

Model	CPU speed	Slots	Hard disk	Bundled software	Price
Epson Apex 200	12 MHz	6	40MB	PFS:First Choice	$2500
IBM PS/1	10 MHz	0	30MB	Microsoft Works, on-line services	$1999
IBM PS/2 Model 30 286	10 MHz	3	30MB	none	$3368
Packard Bell 1m	12 MHz	3	40MB	Lotus Works	$2854
Tandy 2500 XL	10 MHz	3	40MB	DeskMate, DeskMate applications	$2777

The PS/1's monitor is a 12-inch, .37mm-dot-pitch VGA display, which puts a headphone jack and controls (including the on/off switch) up front. It has two tilt angles—full vertical or slight recline—and houses a 2-inch speaker. It also contains a power supply that provides 90 to 105 watts to the system unit as well, making it a requirement. The power is in the monitor, so you can open up the system box without exposure to AC current.

Configuration is quick enough, although mistakes are possible (like plugging the mouse into the keyboard port). But as with setting up any PC, the big challenge comes when you add software or more esoteric options.

A Bundle of Support

IBM gives you a hand by storing the DOS 4.01 kernel and a custom DOS shell in ROM, so you can start computing as soon as you turn on the machine. Also bundled are *Microsoft Works* and two on-line offerings: a kit for becoming a PS/1 "users club" member on Prodigy, and a kit for other services (including software libraries and on-line PS/1 classes) offered by Quantum Computer Services.

Turn on your PS/1, and you're greeted by a screen divided into a four-part image menu. You can click on one or another of the images to access system information and on-line services; *Microsoft Works;* a simple file manager that uses an office-folder metaphor; or DOS. But click your way through all these offerings, and you have to contend with six distinct user interfaces. Why didn't IBM create a well-integrated environment based on *Windows 3.0* instead? The company maintains that *Windows* is still too complex and that it lacks applications.

The Prodigy-based users club offers a data base containing answers to common support questions plus bulletin boards that let users exchange messages with IBM technical personnel or each other. The club is free for 90 days; then you must pay Prodigy's $9.95 monthly fee. IBM hopes users will try the bulletin boards before calling the 800 number, although the same IBM personnel will handle both.

Hands on the Hardware

While conventional service options will be available, generally the user is responsible for making repairs or upgrades, with help from IBM. IBM prefers that resellers never open up the PS/1 box, even to make repairs or add options. The theory is that if the hardware fails, you call the 800 number and an IBM representative helps you isolate the problem and then swap out the bad component. You return it to IBM in a custom overnight envelope and receive a working part within 48 hours.

This is a bold experiment—possibly too bold for some novice users. At first blush, the PS/1's design seems sensible. For example, you can remove the hard drive without tools: Just slip off the cover, remove the front panel, disconnect the drive's cable, and pluck out the drive. But you're right in the guts of the system—scary territory for the PS/1's intended customers.

The customer is expected to install all PS/1 hardware options—an upgrade to a total of 1MB of memory for floppy drive models, an expansion box, an external 5¼-inch floppy drive, and an audio card. The PS/1's unique $199 512K memory card is a breeze to install, but other upgrades aren't. To get add-on slots, you must fork out $169 for an expansion box that holds three 8/16-bit slots and replaces the PS/1's lid. To hook up a 5¼-inch drive, you must buy a $299 box that slips in underneath and draws power from the modem. (IBM's portable PS/2 Model P70 offers a classier way to hook up a floppy: a dedicated port.)

The PS/1's upgrade path doesn't take you far. The system doesn't accept drives larger than 30MB, a math coprocessor, or more than 1MB of CPU-speed memory—although IBM might well craft a 2MB version of its card later, and you can add up to 16MB of memory on the bus. Similar expansion difficulties helped to doom IBM's first home entry, the PCjr.

Beyond the Basics?

In this age of Nintendo, speech-quality sound is a must if you want to attract children to a computer. Unfortunately, IBM didn't build such capabilities into the PS/1. Instead, optional audio cards hook up to a dedicated slot in the system unit. The $129 base card includes standard 8-bit audio circuitry, a joystick connector, a microphone jack, a MIDI music port, and a game. A $249 card adds a joystick, MIDI cable, and two more games. Current PC packages that support audio must be rewritten for the PS/1.

Unlike Tandy, IBM doesn't offer the option of a built-in CD ROM player, although one could easily be attached underneath as with the external floppy drive. Nor has IBM announced an accompanying printer, which would be a logical development.

The PS/1 will compete with conventional compatibles, many of which now bundle *Windows 3.0.* It also will slug it out with first-generation home information appliances like Tandy's entrant, upcoming notebook computers that fit into a home electronics suite, and other products. Born more from customer surveys than from a vision of home computing, the PS/1 doesn't aim as high as some of its rivals. But it does formally kick off the race for home in the 1990s.

Eric Bender is PC World's *East Coast editor.*

WHY IBM WANTS TO GO HOME: IT'S STILL A STRATEGIC OPPORTUNITY

IBM is a $63 billion supplier whose traditional business markets are growing rather slowly. The giant has long coveted opportunities in the home, where more than a quarter of personal computers end up.

IBM first attempted to sell a computer designed specifically for homes (and schools) in 1983. Big Blue had high hopes for its new system, but the PCjr had nonstandard features and was hard to expand. IBM straightened out most of the snags and sold a few hundred thousand. But by then, the jr had earned a reputation as an intentionally crippled machine. IBM was forced to pull the plug little over a year after the jr shipped in volume.

In the fall of 1988 IBM executives reexamined the market and were encouraged by what they found. Studies indicated that 54 percent of those planning to buy a home computer expected to buy from IBM—although once they got to the store, they typically picked up something else. LINK Resources of New York City estimates that only 15 percent of all home computers in the United States carry the IBM logo.

The latest surveys show consumers spending an average of $1598 on their home systems, sans software, "which indicates that they're not buying the cheapest model," notes Thomas Miller, LINK vice president. "Working at home and job-related activities remain the largest reasons for purchasing," he adds. IBM is well positioned for the home market in terms of both pricing and intended use. And the potential in that market is healthy: LINK estimates that 4.5 million personal computers will be bought for U.S. homes this year.

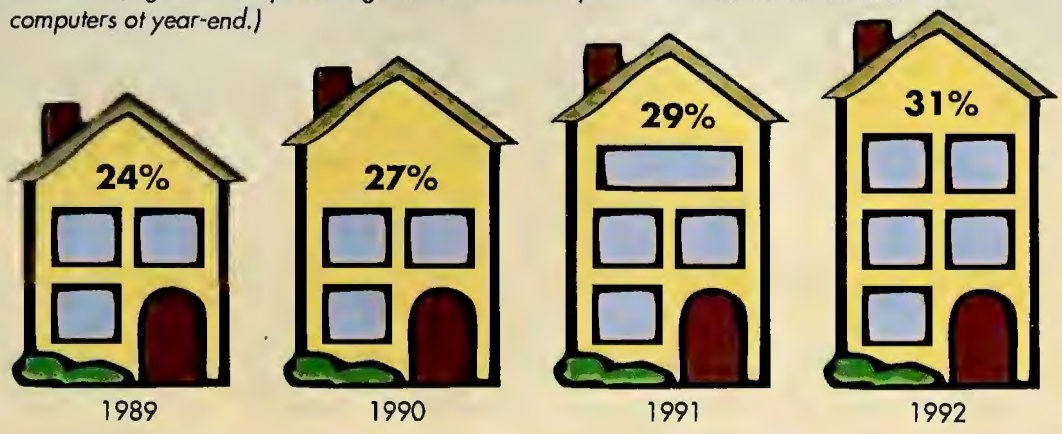
The PS/1's target market is well-heeled families who are only slightly acquainted with PCs and have school-aged children. "Our goal is to attract people who are sitting on the sidelines," says Skip Gladfelter, marketing head for IBM Entry Systems Division's new-business development group in Lexington, Kentucky.

IBM will make its biggest push through nondiscount department stores like Sears that already peddle PCs and other expensive consumer goods for the home. These retailers have the right customers, support policies, and hours. As Gladfelter points out, "You can't buy most brand-name PCs after 5 p.m. or on weekends, which is when most people shop."

IBM will introduce the PS/1 through 900 outlets in the Chicago, Dallas, and Minneapolis metropolitan areas this summer and will offer this system nationally in September. —*E. B.*

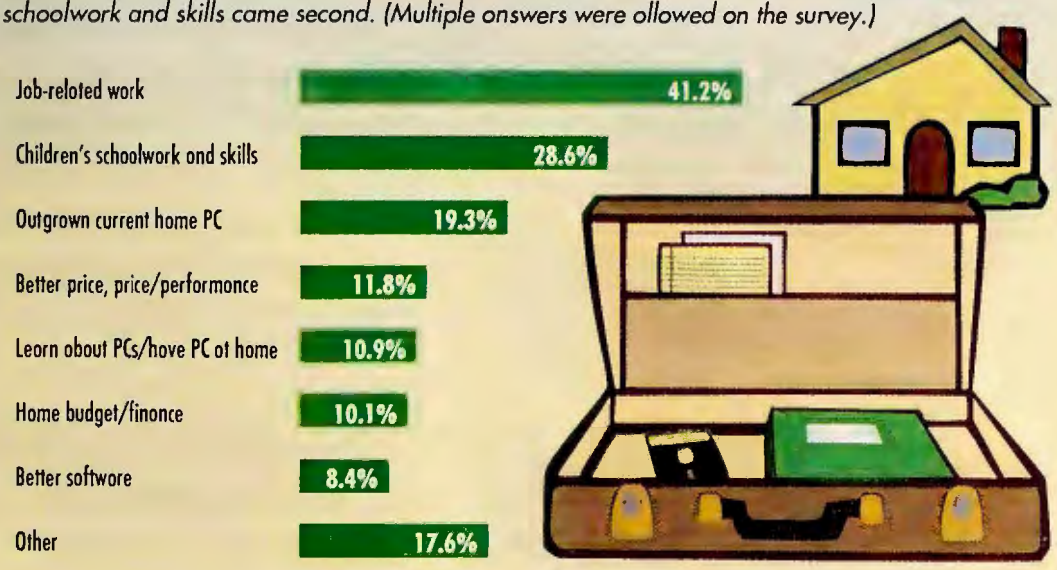
Is There a PC in the House?

Personal computers are steadily entering more and more homes, according to LINK Resources estimates. (Figures show percentage of the 92 million–plus U.S. consumer households with computers at year-end.)



Why Buy a Home PC?

Among consumers intending to buy a personal computer for the home during the next year, job-related work represents the leading reason for the purchase, says LINK Resources. Children's schoolwork and skills came second. (Multiple answers were allowed on the survey.)



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PIERRE-YVES GOAVEC

Eric Knorr

These days, the conservative buy isn't IBM, it's Compaq. You pay top dollar for Compaq systems, but their design, quality control, and dealer support are among the best in the business—and you don't have to worry that Micro Channel slots will make your AT or XT boards obsolete.

For Compaq fans, the Deskpro 386s/20 is a big event. Built around Intel's new 20-MHz 386SX chip, this latest entry costs only $500 more than Compaq's 16-MHz SX, the Deskpro 386s, and should offer approximately 25 percent better performance. The $3299 base price of a Deskpro 386s/20 without a monitor is fairly high, but this 20-MHz unit remains an attractive midperformance purchase for those willing to pay for top quality.

Besides the Model 1 base system, the 386s/20 comes in two hard disk flavors: the $4499 Model 60 (with a 60MB hard disk) and the $5299 Model 120 (with a 120MB unit). All the models have 2MB of RAM and will be shipping by the time you read this.

Same Box, New Design

The Deskpro 386s/20 has the familiar small-footprint chassis most Compaq systems use. From the outside you can access one half-height and two third-height devices—say, a tape backup and two floppy drives.

The 386s/20 sports a new motherboard that uses ASIC (application-specific integrated circuit) chips to reduce the component count and increase reliability. Compaq has nixed the usual proprietary slot for memory, which means you won't need a special board to add RAM.

Instead, four sockets on the motherboard hold either 1MB, 2MB, or 4MB SIMMs (single in-line memory modules). This setup lets you install up to 16MB of RAM, all accessible at CPU speed. You can even mix and match SIMMs, enabling you to upgrade in 1MB increments all the way to system maximum. Unfortunately, Compaq's RAM is expensive—between $650 and $700 a megabyte, depending on which SIMMs you use.

Compaq also engineered a new cache memory architecture for the Deskpro 386s/20. As with all such schemes, the CPU accesses frequently used data in a small cache of high-speed RAM, avoiding the wait states that can be incurred by accessing slower main memory directly. The cache is a mere 4K, but Compaq claims that for most applications, it should deliver speeds approaching those of systems with caches eight times the size.

Integration Plus Expansion

Most users will be happy with the Deskpro 386s/20's built-in features. VGA and serial, parallel, and mouse ports all reside on the motherboard, as do the floppy controller and hard disk interface. That leaves four standard 8/16-bit slots free, plus an internal connector to the VGA that lets you add a high-resolution graphics board without sacrificing built-in VGA capability.

You can load the small box with a whopping five drives, and install two floppy and two hard drives without adding a controller card. A socket for a 20-MHz 80387SX math coprocessor is also provided.

Other systems offer better performance for less. But it's hard to imagine a competitor with equivalent memory, board, and drive capacity in a package as compact and well designed.

Eric Knorr is executive editor for PC World.

SNAPSHOT

Compaq Deskpro 386s/20

A special memory caching architecture, an ASIC-rich motherboard, and large memory, board, and drive capacity distinguish Compaq's first 20-MHz 386SX system.

KEY FEATURES

- **Built-in VGA, floppy controller, and hard disk interface**
- **Up to 16MB of CPU-speed RAM**
- **4K memory cache**

AVAILABILITY

Immediate

PRICING

$3799 to $5799

Compaq Computer Corp.
20555 State Hwy. 249
Houston, TX 77070
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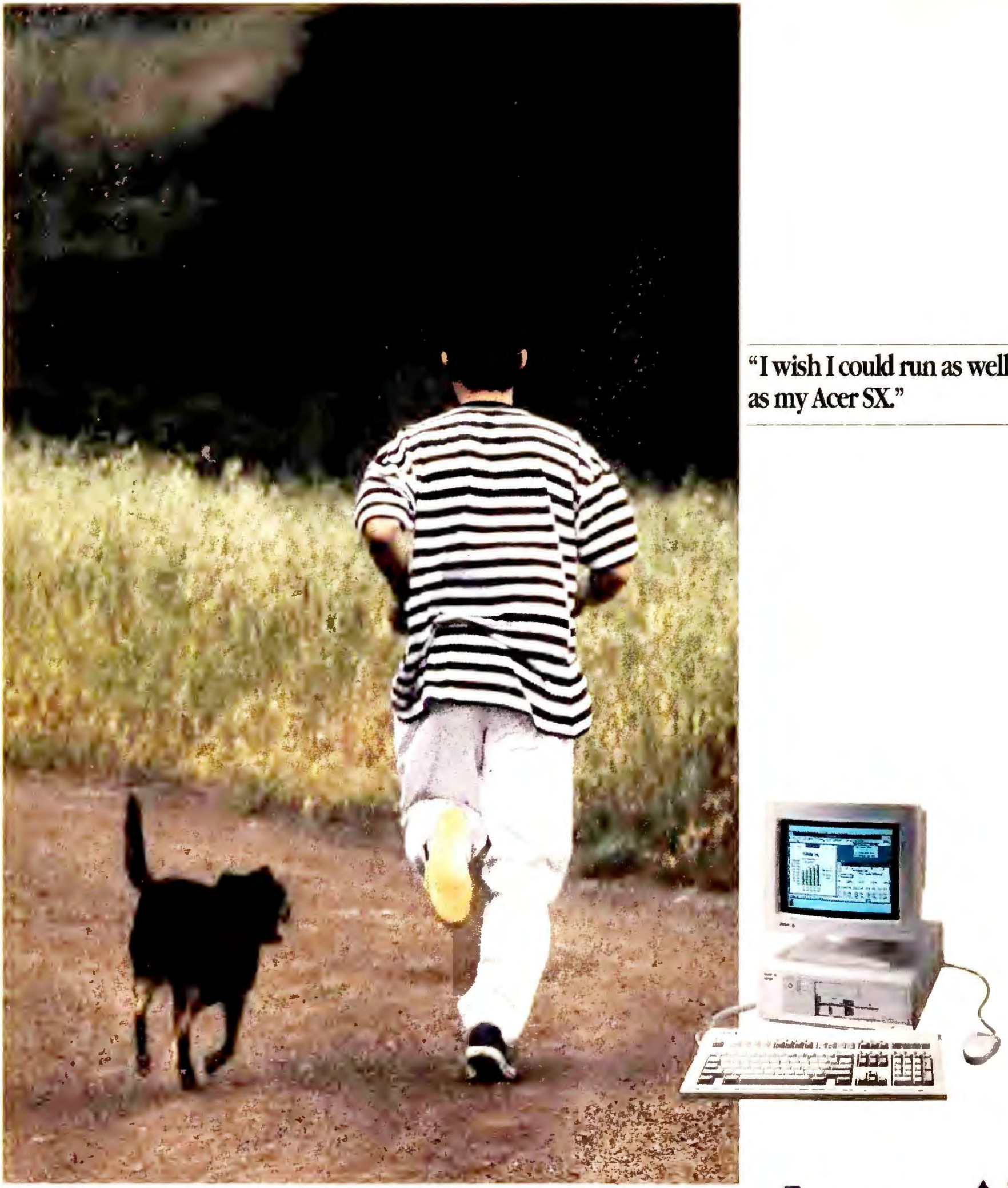
713/370-0670

Reader service no. 691



"I wish I could run as well as my Acer SX."

A smooth move up to the 386 world, the Acer 1100/SX is ideally suited as a desktop system, workstation or entry-level file server.

Loaded with the Intel i386SX 16MHz processor, it has 1MB of system RAM expandable up to 8MB. 1.2 MB Floppy Disk, enhanced VGA video, 4 ISA expansion slots, 101-key enhanced keyboard, 2 serial ports, 1 parallel port, 1 mouse port, and FDD IDE disk interfaces. Bundled with MS-DOS, MS-Windows/386, GW BASIC, and PS/2 style mouse, and backed by our unique 4/8/12 warranty and on-site service, the Acer 1100/SX offers unsurpassed value.

You'll love the potential of the Acer 1100/SX.

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Circle 3 on reader service card

PRODUCT OUTLOOK

Edited by MIKE HOGAN

INSIDE PRODUCT OUTLOOK

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94 **PercentEdge** Interest rate calculations don't have to be torture.

94 **ProSpeed 386SX** No need to do without 386 muscle when this 15-pound laptop rides shotgun.

94 **32-Bit Dual-Speed Token Ring Controller** Crank up the performance of your network by adding high-performance Compaq EISA servers.

UPDATE

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96 **DisplayWrite 5** IBM brings its popular word processor up to speed for the nineties.

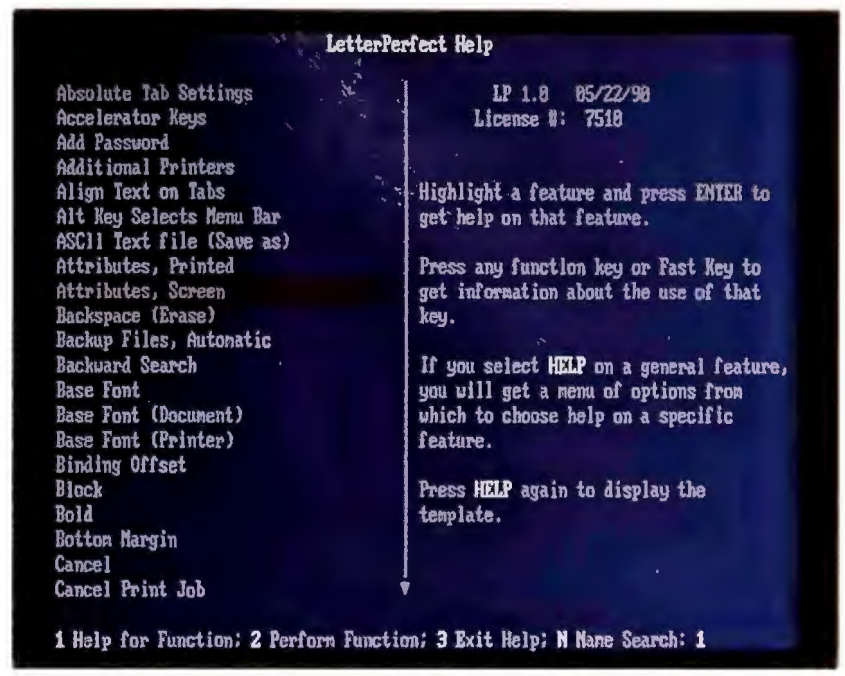
98 **Ami Professional 1.2** Samna jumps on the *Windows 3.0* bandwagon with enhancements to its top graphical word processor.

98 **ELS NetWare Level 1 V.2.12** An upgrade for Novell's entry-level product focuses on speed and simplicity.

98 **Direct Access** Version 5.0's new features make menu building a breeze.

LetterPerfect

A Perfectly Portable Word Processor



LetterPerfect retains most of WordPerfect 5.1's core features.

While *WordPerfect 5.1* has a mother lode of features, you need a hard disk to run it—which rules it out for many laptop owners. *LetterPerfect*, a half-price ($229) version of the best-selling word processor, fits on a 720K floppy yet retains the essential features.

LetterPerfect's friendlier interface improves on *WordPerfect 5.1*'s pulldown menus, but *WordPerfect* aces can switch to the familiar "clean screen." *LetterPerfect* also offers better on-line help via the <F1> key. You can cursor or search through help titles and even execute a command from the help screen.

While many of *WordPerfect 5.1*'s advanced features are simplified or missing, most core features are duplicated. The line formats, speller, thesaurus, font support, and print preview are identical, as are file format and support for 700-plus printers.

LetterPerfect simplifies merge, graphics, and page formatting and exports only text files. It forgoes footnotes, mailing labels, styles, soft keyboards, sorts, equations, line numbering, text boxes, and the ability to edit two documents at once—although you can cut and paste blocks and retrieve documents.

Nor can you create, view, or print columns or tables, although you can edit those you import from *WordPerfect*. *LetterPerfect* lacks *WordPerfect*'s built-in macro recorder and editor, so you can't use *WordPerfect* macros. But you can write macros by starting *LetterPerfect* from its DOS shell, which has a sophisticated macro facility.

LetterPerfect requires DOS 2.0 or later, 384K RAM, and two 360K drives or one 720K floppy drive. WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 800/321-4566 (U.S.), 801/225-5000, 801/222-4477 (fax).

—Robert Lauriston

Reader service no. 635

Takeover

Scripts Add to Remote Possibilities

If you've ever been computing at home or on the road and needed files from your office system, you're a candidate for remote communications software. Programs like SoftKlone's *Takeover* let you dial your office PC to swap files and run applications on it. But *Takeover* goes other remote packages one better with a powerful script language that lets you automate complete remote sessions and log-ons.

Takeover includes both *Host* and *Guest* modules. *Host* uses a mere 55K to 70K on your office PC and features security measures that include password protection, automatic dial-back, and the ability to lock callers out of subdirectories. It also works as a TSR. *Guest* runs as an add-on to the bundled *Mirror III* communications program and takes a 480K bite out of the calling PC's RAM—about twice the RAM competitors require.

But then, you need only dial from a *Guest* PC to run hefty applications like *Framework* on the *Host* PC. You can transfer files, perform DOS commands, take screen shots, print files remotely or locally, and record keystrokes. File transfers use SoftKlone's proprietary error-checking protocol, which has built-in data compression.

While you lose memory running *Takeover-Guest* under *Mirror III*, you gain the PRISM script language, which is more powerful than those found in competitors. PRISM lets you automate not only log-ons but a series of commands to an application running on the *Host* PC and the capture of data from its screens. *Takeover*'s most obvious limitation is that a PC running *Host* cannot accept calls from a PC using communications software other than *Mirror III*.

Takeover, which supports full color graphics including EGA and VGA, requires DOS 2.0 or later and a modem. *Host* is $150; *Guest* (with *Mirror III*) is $195; and *Host* and *Guest* together are $295. SoftKlone, 327 Office Plaza Dr. #100, Tallahassee, FL 32301; 800/634-8670, 904/877-9763 (fax). —*Judy Getts*

Reader service no. 690

Takeover lets you write scripts to automate remote sessions and dial your office PC to swap files and run applications.

Memory Commander

A Flexible Memory Manager—For 386s Only

Memory Commander, a relatively new player among 386 memory managers from V Communications, can unlock a hidden treasure trove of memory between 640K and 1MB in DOS-based 386 machines—in some circumstances, giving your applications access to as much as 920K of conventional memory.

DOS was written to reserve memory addresses between 640K and 1MB for system use, but many of them go unused. *Memory Commander* lets you tuck device drivers and RAM-resident programs into the unused portions of 386 system memory. The program can even make high memory available to today's gigantic applications that demand conventional rather than expanded memory.

In EGA and VGA systems, you can free up 96K to 124K of above-640K memory when not in graphics mode. If you also avoid loading TSRs in a separate block, you can make up to 920K of conventional RAM available to your applications.

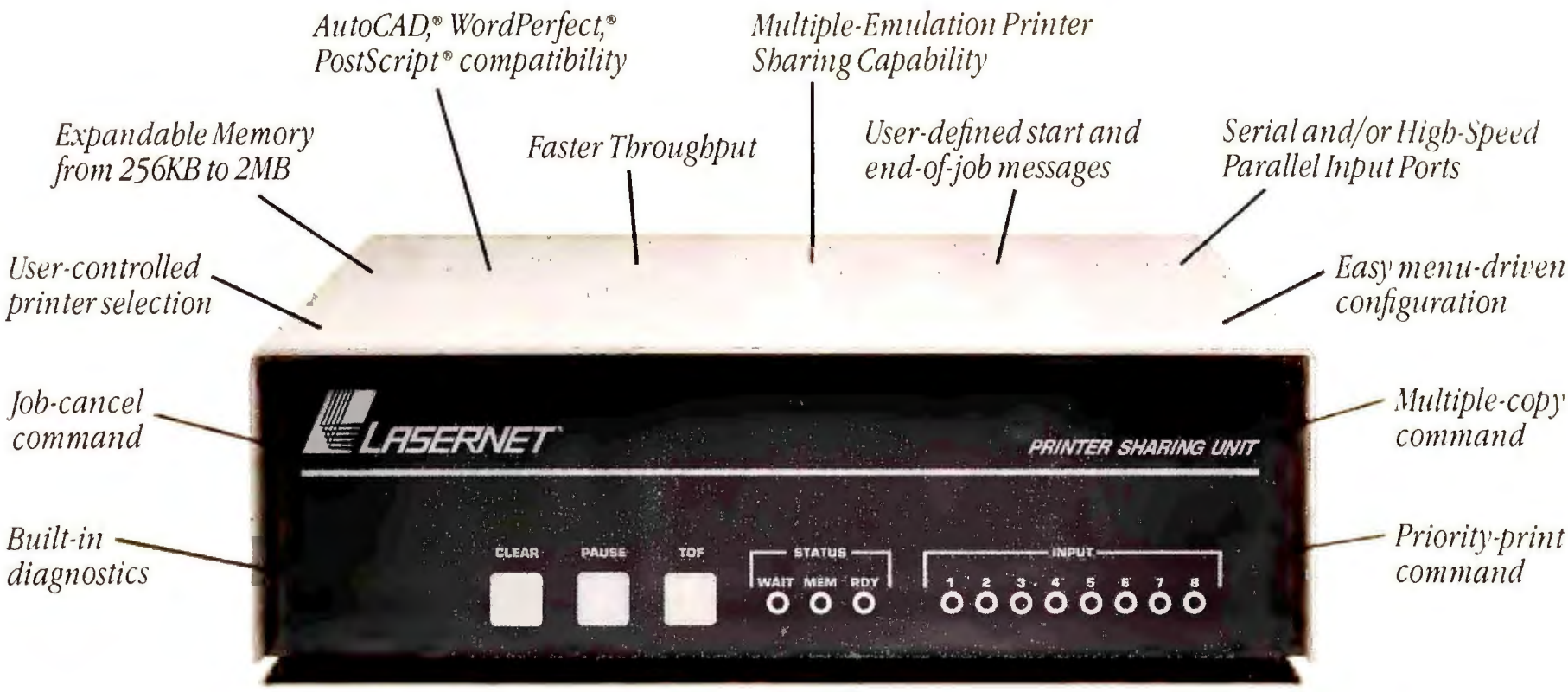
What's more, you can easily turn graphics back on again. One of *Memory Commander*'s best features is its flexibility—you can change memory configurations on the fly, resetting memory addresses for your expanded memory page, video and hard drive adapter ROMs (to the extent allowed), and TSRs. In fact, you can preset configurations for different programs so that these changes happen automatically when you load them.

The program's other tricks include locking out a memory block for diagnostic purposes, transferring BIOS ROM code into high-speed RAM, and turning extended memory into the more widely supported EMS 4.0 expanded memory. *Memory Commander*, which lists for $129.95, requires a 386-based computer, DOS 3.0 or later, and 1.5MB of RAM. V Communications, 4320 Stevens Creek Blvd. #275, San Jose, CA 95129; 800/662-8266, 408/296-4441 (fax). —*Lincoln Spector*

Reader service no. 649

Memory Commander enables your applications to access as much as 920K of conventional memory on EGA and VGA systems by not using graphics mode and by managing TSRs in an innovative way.

Can printer sharing get any better than this?



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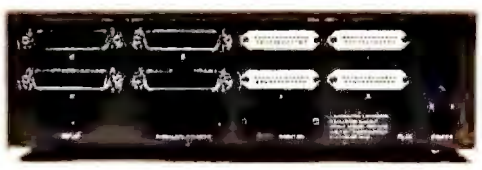
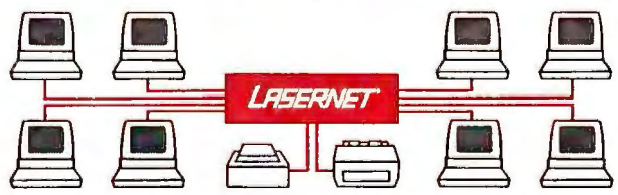
Performance like the only PSU that can **share a multiple-emulation printer,** and **faster throughput** for large graphics and printing jobs. Compatibility with all types of printers and plotters, and over 25 high-level graphics, desk-top publishing, spreadsheet and word processing packages.



The PSU-82C/SP has parallel and serial inputs and outputs for both high-speed throughput and long-distance sharing.

Bundle all these features with a three-year warranty and direct factory assistance, and you've got value that can't be beat. But the proof is in the comparing.



Network up to eight PCs with any two printers or plotters with LASERNET.

When shopping for a high-performance printer/plotter sharing unit, take a look at the LASERNET "C" series. See if you agree there's no better performing PSU for the money.

For more information on the "C" Series or other members of the LASERNET family, call us toll free at **1-800-854-7226,** (in California call 1-714-586-9950) FAX 1-714-583-9514, or write Western Telematic Inc., 5 Sterling, Irvine, CA 92718.

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Circle 325 on reader service card

Hayes Personal Modem 2400plus

The Littlest Hayes Is Affordable, Too

The Hayes Personal Modem 2400plus wears the standard-bearer's label and a price tag suitable for home office users. For $199, you get the 2400-bps modem, *Smartcom EZ* software, and all the necessary cabling.

Of course, you give up a little. There's auto-dial and auto-answer but no auto-hangup. And instead of front-panel LEDs to alert you to your call status, you get audio tones or screen messages. But the Personal Modem 2400plus gives up nothing in ease of use. Just plug it right into an electrical wall outlet. It comes with a 9-foot cable, 25-pin adapter, and RJ-11 jack for connecting to computer and phone.

But Hayes added goodies not found in its Smartmodems in this one-box solution. The menu-driven *Smartcom EZ* software is a $49 value that lets you build a phone book and make keyboard macros (although a text editor and scripts for popular on-line services are omitted). Emulation is restricted to VT100/102 and TTY terminals, and XMODEM is the only file transfer protocol supported.

Hayes throws in software for the CheckFree electronic bill-paying system and 2 hours of time on the PC-Link information network. The hardware and software are not locked to each other—you can run other communications packages on the 2400plus, and *Smartcom EZ* works with other standard modems. *Smartcom EZ* requires DOS 2.0 or later and 256K of memory. Hayes Microcomputer Products Inc., 705 Westech Dr., Norcross, GA 30092; 404/449-8791. —*Mark Henricks*

Reader service no. 639

SoftType

Cheap, Well-Behaved Windows Fonts

Until recently, the LaserJet soft font–generation market belonged almost exclusively to Bitstream's *Fontware*, thanks to innovative deals that bundle the program with *Ventura Publisher, PageMaker, Microsoft Word, WordPerfect*, and other type-oriented software. But while the font-generation program and a handful of typefaces may come gratis, additional Bitstream typefaces are expensive—typically you pay $195 for one typeface in four styles.

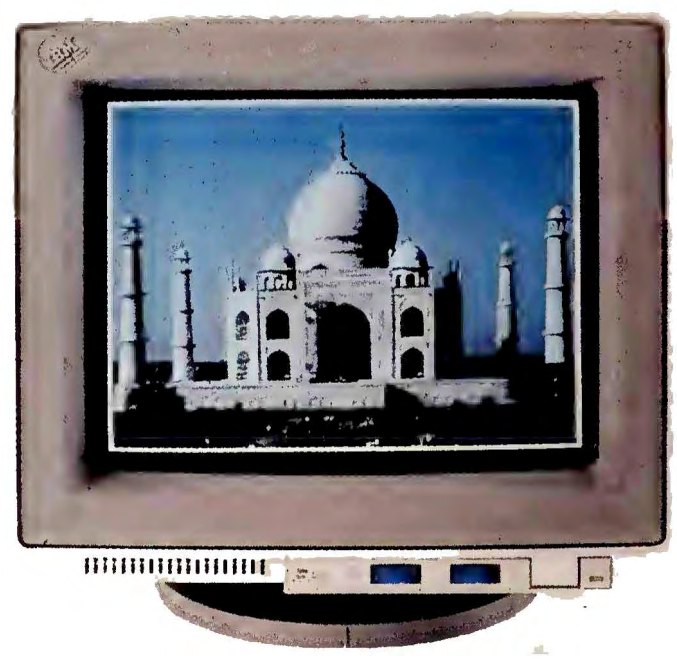
Enter Z-Soft's *SoftType*, a $199 *Windows*-based program with 62 high-quality URW typefaces, including such favorites as Bodoni, Futura, Garamond, Palatino, and Univers. You can generate fonts for *Windows* applications or *Ventura Publisher* in .01-point increments from 1 to 72 points—*SoftType* automatically installs screen and printer fonts in *Windows* and generates *Ventura* font metric files. The program produces fonts for both PostScript and LaserJet laser printers and some dot matrix printers. And because it's a *Windows* application, *SoftType* can build fonts in the background, a boon to desktop publishers who must frequently generate one or two fonts but can't always afford the concomitant finger tapping.

SoftType makes it easy to manage fonts without having to memorize cryptic file names. But its most remarkable feature, unique among font generators, is that it lets you generate your own custom type styles from standard URW designs by adding preset drop shadow, gradient, condensed, expanded, outlined, slanted, and rotated effects—or create combinations of effects. *SoftType*'s only requirement is *Windows 2.1* or later; it also runs under *Windows 3.0*. Z-Soft Corp., 450 Franklin Rd. #100, Marietta, GA 30067; 404/428-0008, 404/427-1150 (fax). —*Scott Spanbauer*

Reader service no. 638

Color Display 8515

Big Blue Goes For a More Colorful Image



The analog Color Display 8515 offers more viewing area than most 14-inch monitors and supports up to 1024-by-768-pixel resolution, with 256 colors chosen from a palette of 256,000.

To celebrate the third birthday of its VGA and 8514/A products, IBM has introduced a crisp display that handles both graphics standards (as well as the earlier EGA and CGA, if the adapter supports those). The $950 Color Display 8515 offers more viewing area than most 14-inch monitors: 9.8 by 7.4 inches. The analog monitor supports up to 1024 by 768 resolution, with 256 colors from a palette of 256,000, when hooked to IBM's 8514/A adapter.

That makes it ideal, IBM says, for the *Windows* and OS/2 graphical environments. And with its medium-persistence phosphors and .28mm dot pitch, the display shows fonts more clearly than does IBM's earlier .31mm 8514 monitor. The 8515 has screen refresh rates up to 70 Hz (43 Hz interlaced for 8514/A operation). IBM does not, however, support 800 by 600 super-VGA operation.

The 8515 tilts 25 degrees vertically and 300 degrees horizontally. All controls are in front for easy adjustment, with separate controls for foreground and background brightness. IBM U.S. Marketing and Services, 1133 Westchester Ave., White Plains, NY 10604; 800/426-2468. —*Eric Bender*

Reader service no. 640

WHAT'S MORE IMPRESSIVE THAN OUR ONE YEAR WARRANTEE, TOLL-FREE TECHNICAL SUPPORT, & ON-SITE SERVICE?

Switchboard

Mix and Match a Custom Keyboard

The modular Switchboard lets you customize the locations of keys and add numeric and cursor keypad modules as well as a trackball module that's compatible with the Microsoft Mouse.

It's hard to find a custom fit in an off-the-rack world, especially with commodity items such as keyboards. But DataDesk's modular Switchboard lets you customize key locations to suit your working style—and it works with everything from veteran PCs to shiny new PS/2s.

The standard 101-key Switchboard comes in three modules: an alphanumeric unit with 15 horizontal function keys, a numeric keypad, and a cursor keypad. You can plug the modules into the keyboard's base unit in any order. With the numeric keypad to the left of the alpha keys, for example, the board is a handy tool for southpaws. You can also swap <Ctrl> and <Caps Lock>, a boon for the trained pinkies of *WordStar* devotees.

But the real fun starts when you add modules. Prefer your function keys on the side? DataDesk offers a set of 15 vertical function keys that plug into either side of the unit. Need to emulate an IBM 3270 terminal? You can add a module containing 24 programmable function keys. When you're not talking to mainframes you can program these keys to run macros; the module contains 32K of erasable programmable ROM, letting you assign macros for up to nine applications per key without the need for key-macro utilities.

And if your applications demand a pointing device, you can replace the cursor keypad with a Microsoft Mouse–compatible trackball module. The module features four cursor keys above the trackball and a <Space> bar–like mouse button below, making it equally accessible for right-handers or lefties.

The Switchboard retails for $239.95. Pricing for additional modules was not available at press time. DataDesk Int'l, 9314 Eton Ave., Chatsworth, CA 91311; 800/826-5398, 800/592-9602 California, 818/998 0330 (fax). —*Daniel Tynan*

Reader service no. 644

Info Select

Post-Tornado PIM

Match the ease of use of the *Tornado* personal note manager with the capabilities of a personal information manager, and you get *Info Select*.

This follow-on to Micro Logic's hot-selling note-taker/file manager boasts talents such as scheduling appointments, planning projects, and organizing names and addresses—tasks that were clumsy with *Tornado 1.8*. Yet it stays comfortably within the cozy *Tornado* command structure that likens data base files to stacked sheets of paper.

You get greatly expanded note taking and word processing powers, including the ability to merge notes, colorize text, and date-stamp. But data import is still limited to ASCII and *WordStar* files plus screen captures, and you can't move and size note windows with the mouse.

You can create, sort, and quickly do fuzzy searches of 10MB data bases, simplifying the organization of to-do lists and address files. You can even create hypertext links between windows. The package also dials phone numbers from your data base.

You can tuck *Info Select* into expanded memory and run it memory resident. Using a bundled utility, you can keep *Info Select*'s program and data files on disk and cut system memory overhead to 7K when the program is inactive. *Info Select* hot-keys up over EGA or VGA graphics (a challenge that stumped *Tornado*) and supports network operation, although without file locking. *Tornado* owners can convert their existing files and upgrade for $49.95; otherwise, the price is $99.95. The company will continue to offer *Tornado*. Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602; 800/342-5930, 201/342-0370 (fax). —*Mark Henricks*

Reader service no. 648

Pacioli 2000

Low-Cost Accounting or Your Money Back

If you've been toying with the idea of automating your small business's accounting, M-USA Business Systems offers a low-cost answer. *Pacioli 2000* is a $49.95 accounting system from the author of *Dac-Easy*, the program that pioneered low-priced accounting.

Pacioli 2000 includes eight basic modules—general ledger, accounts receivable, accounts payable, inventory control, billing, purchasing, budgeting, and auditing. The package supports 999 separate accounts and lets you keep them open for up to three years. A multiuser system right out of the box, it supports an unlimited number of users on NETBIOS-compatible networks (including Novell's NetWare) with both password protection and file and record locking.

Pacioli 2000 features pull-down menus and mouse support. It includes on-line, context-sensitive help and comes with an instructional video. M-USA offers free, unlimited technical support. *Pacioli 2000*, which requires DOS 2.1 or later (3.1 or later for networks), 640K of RAM, and a hard drive, comes with an unconditional 90-day money-back guarantee. M-USA Business Systems, Inc., 17440 N. Dallas Pkwy. #207, Dallas, TX 75287; 800/421-5355, 214/407-0914 (fax). —*Roberta Furger*

Pacioli 2000 supports 999 separate accounts.

Reader service no. 641

OUR $1299 PRICE.

The FastData 386-SX:

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Includes 40mb, 2mbs memory and monitor.

$1299 includes everything. The specs are impressive indeed: 16mhz Intel 80386-SX processor, two full megabytes of 80 nanosecond memory and a 40mb 28ms IDE hard disk. The features you need have been included: monochrome monitor and video card, parallel and dual serial ports, battery-backed clock, your choice of a high-capacity 5.25" or 3.5" floppy drive, and unbeatable expandability.

A FastData computer owner is a happy owner. Each system is covered by our *FastSHIP* parts replacement program and our no charge on-site service available to most U.S. locations. Should you ever experience a problem with your FastData computer, we'll be there with answers through our toll-free technical support line. And, within the first thirty days of ownership, if you are not completely satisfied with your FastData personal computer, you can return it for a full refund of the purchase price (no restocking fees).

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Intel NetPort Print Server, Microtest Lanport

Network Printer Service—Sans PC

Want to avoid dedicating a computer as a NetWare print or modem server? Both Intel's NetPort Print Server and Microtest's Lanport let you hook one or two printers or plotters to your LAN's ethernet cable, and Lanport lets you share modems.

Intel's NetPort is a modem-sized (4-by-7-by-1-inch) box with three ports (parallel, serial, and thin ethernet). It includes all necessary software, so you don't need to load anything on the NetWare server or workstations. Once the LAN administrator identifies a NetPort-attached printer to NetWare's Pconsole utility, it can act just like a printer attached to a NetWare server.

The Lanport fits in the same footprint as the NetPort, but you must choose your configuration—either one or two serial ports or a single parallel port (but not one of each), and either an ethernet connector or a DB-15 (for use with an external transceiver). Like the NetPort, the Lanport contains all the software for the print server. Unlike the NetPort, the Lanport doesn't support Novell's *NetWare Print Server* utility.

The Lanport's modem support is a significant advantage—the two-serial-port model can even handle a printer and a modem. Before you can access the shared modem, you must load a 14K memory-resident utility so that the modem can work with *Procomm Plus, Crosstalk Mk.4,* or *pcAnywhere.*

The $695 Intel NetPort requires NetWare 2.1*x* or a later version and thin ethernet and comes with a 3-year warranty. Microtest Lanport costs $495 to $695, depending on port configuration. It requires NetWare 2.1*x* and thin ethernet or an external transceiver for thick or twisted-pair ethernet, and it has a one-year warranty. —*Robert Lauriston*

Intel PCEO, Mail Stop CO3-07, 5200 Elam Young Parkway, Hillsboro, OR 97124-6497; 800/538-3373, 800/525-3019 (fax back).
Reader service no. 642

Microtest, 3519 E. Shea Blvd., Phoenix, AZ 85028; 800/526-9675, 602/971-6963 (fax).
Reader service no. 643

The Intel NetPort is a modem-sized box that lets you connect two printers or plotters directly to your LAN's ethernet cable rather than having to dedicate PCs to the job.

Poqet PC

Is That a PC in Your Pocket?

Your BMW has been stuck in rush-hour traffic for an hour, you've called everyone you can think of on your car phone, and the radio reports that they won't get that truckload of molasses off the road for another hour. What to do?

How about running the quarterly earnings spreadsheet one more time on your Poqet PC? This go-anywhere, full-powered PC aims to cure executive boredom wherever a Brooks Brothers coat pocket can be found.

The Poqet cures executive boredom.

The Poqet PC has DOS 3.3, a well-implemented DOS shell, a file transfer program, and five standard utilities including calendar and calculator ensconced in 640K of ROM. It also has 512K of RAM on board and ships with another 64K RAM card. Software for this diskless PC is loaded via ROM cards in one of the two RAM/ROM card slots; only a few ROM applications are available, but Poqet predicts others by summer's end. Meanwhile, you can swap files and some applications between the Poqet PC and your desktop using the accompanying serial cable at 115,200 bits per second.

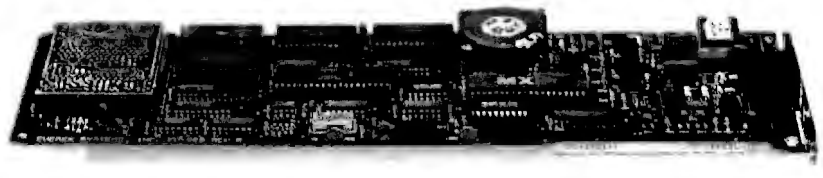
But if you're going to use the Poqet PC in your car, better learn to steer with your knees; you need to hold the Poqet with one hand while you hunt and peck with the other. Even on a desktop, there just isn't enough PC to stay in one place when you really get typing. But you can only use one hand at a time anyway; the Poqet's tiny keys are bunched so closely on its tiny keyboard (2 inches narrower than an average notebook) that not only is touch-typing out of the question, your fingers will have trouble hitting one key at a time. And the keys' short travel means that you may leave more letters out of words than you put in them.

The screen makes a better mirror than a display. It could benefit from a nonglare surface, but that would further diminish the minimal contrast between the dark gray background and the tiny black letters. Configuring for block cursor mode is a must with this nonbacklit display.

The good news is that you can enjoy the Poqet PC for about 100 hours on just two AA batteries. This palmtop benefits from 16 pending power-management patents, which means you'll have literally days' worth of people coming up to you in airports and coffee shops to admire your executive toy. Most of them will have to be content with merely admiring though; at $1995, the Poqet PC is definitely not for the hoi polloi. Poqet Computer Corporation, 650 N. Mary Ave., Sunnyvale, CA 94086; 800/624-8999, 408/739-5589 (fax). —*Mike Hogan*
Reader service no. 637

Fax/Modem.
Send/Receive.
View/Print.
Bells/Whistles.
Good/Cheap.

Why/Wait.



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Circle 73 on reader service card

PercentEdge

Financial Aid Is Just a Hot Key Away

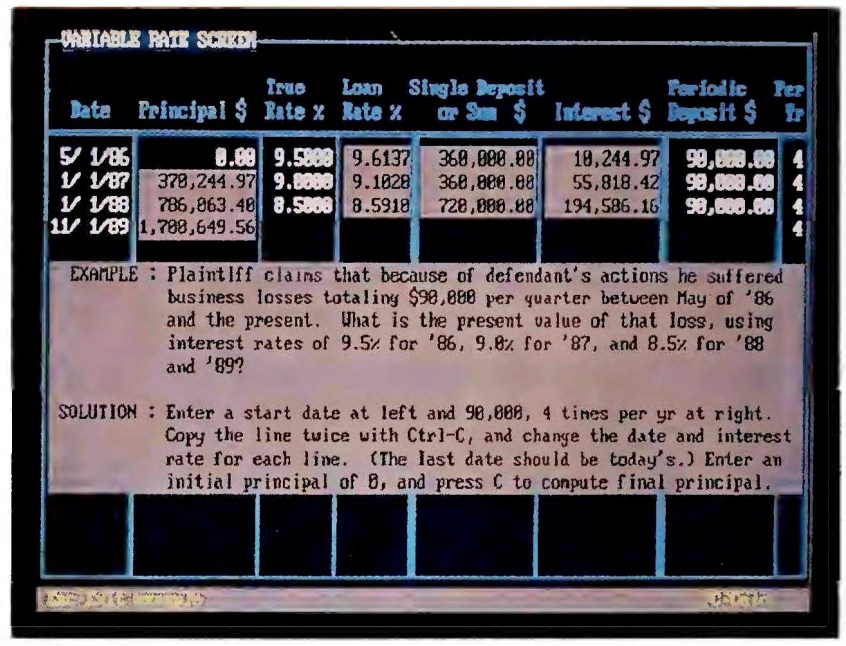
PercentEdge is a memory-resident application that can sharpen the ability of attorneys, accountants, and other small-business professionals to cut through occasional interest-rate–related problems. Figuring loan amortization schedules or calculating the present value of an amount of money in a legal settlement no longer has to be a big ordeal.

PercentEdge analyzes the relationship between time and money in four important areas—amortization, mortgages, present-value calculations, and variable rate transactions. Even the average homeowner would find it useful for computing the monthly payments required to retire a given mortgage or for financial planning in general. For each of the four transaction groups, you can solve a number of problems.

Instant hot-key access, context-sensitive help, a pop-up calculator, export capabilities, and a library of examples make *PercentEdge* a viable alternative to more complex spreadsheet templates or the pencil-and-calculator approach to problem-solving. And Timeslips had an international accounting firm certify that *PercentEdge*'s methods conform to recognized accounting standards.

You can load and unload the $99.95 program from a floppy disk system with at least DOS 2.1 and 320K of memory. It will run as a memory-resident program using only a 7K kernel when not active. Timeslips Corp., 239 Western Ave., Essex, MA 01929; 800/338-5314 (U.S. only), 508/768-6100, 508/768-7660 (fax). —*Mark Henricks*

Reader service no. 645



Memory-resident PercentEdge analyzes the relationship between time and money in four key areas—amortization, mortgages, present-value calculations, and variable rate transactions (shown above).

ProSpeed 386SX

NEC's SX to Go

If you're accustomed to the convenience and power of 386-based operating environments like *Windows/386* and *Desqview 386*, you no longer have to settle for less on the road thanks to the emergence of battery-powered 386SX laptops.

The ProSpeed is one of the rare full-powered luggables.

NEC's 15-pound ProSpeed 386SX is a welcome addition to the thin ranks of full-powered luggables. It has a number of important productivity features built in: VGA graphics, an 82-key keyboard with 12 dedicated function keys, and a full cursor-control keypad. There's even password security software in ROM. Hard and floppy disks are standard. An optional expansion chassis supports one standard 8-bit and three standard 8/16-bit slots, extra ports, a power supply, and a drive bay.

The system comes with 1MB of RAM, expandable to 9MB. With the expansion chassis you can install another 7MB of memory, which will run at bus rather than CPU speed. A variety of modem and battery options are available, starting with a 2½-hour battery for $199 and a 2400-bps modem for $599. A 3½-hour battery costs $399. The expansion chassis is $899.

With a 40MB hard disk, the ProSpeed 386SX costs $5799; if you want a 100MB drive, you'll pay $6599 total. NEC Technologies, 1255 Michael Dr., Wood Dale, IL 60191; 800/366-3632. —*Michael Goodwin*

Reader service no. 636

32-Bit Dual-Speed Token Ring Controller

Bringing EISA, Token Ring Together

You can mix high-powered EISA servers into your existing token ring network without losing performance or Compaq support if you use the 32-bit Dual-Speed Token Ring Controller.

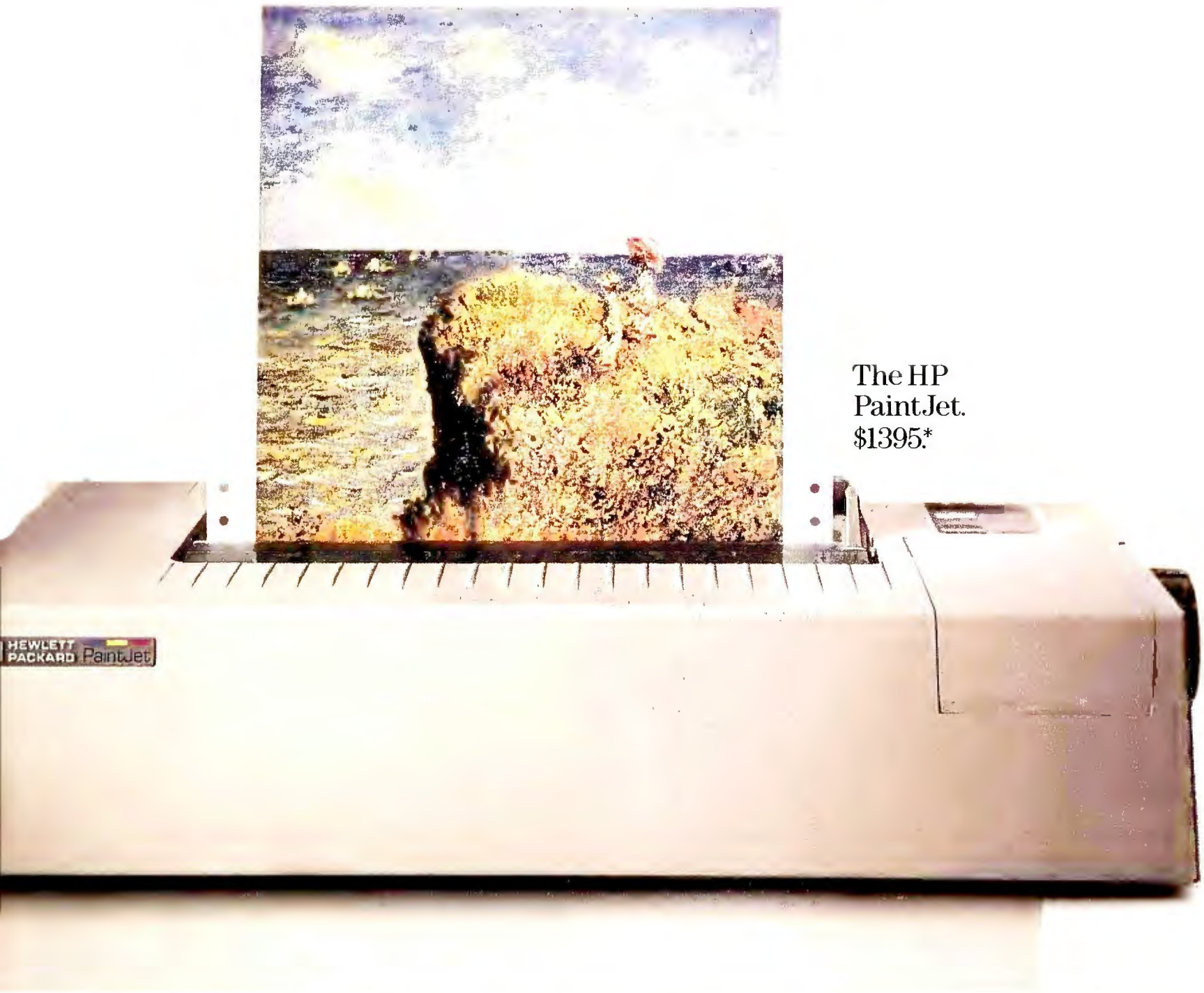
The card transfers network data at either 4 or 16 mbps, matching IBM's 32-bit Token-Ring Network 16/4 Adapter/A controller. But with EISA bus mastering, the Compaq controller bursts data at up to 33MB per second, which Compaq claims tops IBM's Micro Channel architecture alternative in demanding network bridge and client-server applications.

Codeveloped with Proteon, the $1299 Dual-Speed Token Ring Controller requires one 32-bit EISA slot and comes with drivers for a range of network operating systems, including NetWare 386, NetWare 2.1*x*, and *LAN Manager*. The card also supports connections to shielded or unshielded twisted-pair cabling. It includes 128K of on-board memory to download control code. If you're using a Systempro or Compaq Deskpro 486/25, the software configuration utility frees you from fiddling with switches or jumper cables during setup. Compaq Computer Corp., State Hwy. 249, Houston, TX 77070; 800/231-0900. —*Mark Henricks*

The controller bursts data at up to 33MB per second.

Reader service no. 647

Monet, not money.



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$1395.*

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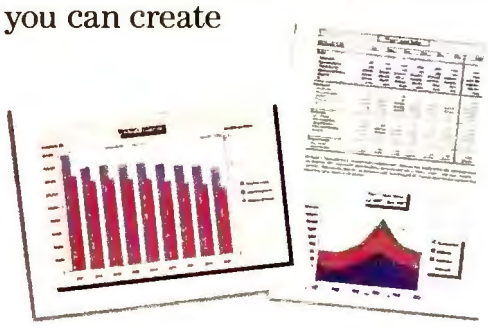

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UPDATE

Harvard Graphics 2.3

Show-Stopping Presentations

Harvard Graphics is still the most popular graphics package on PCs, thanks to its easy, fill-in-the-blanks approach to chart building and editing. But Harvard is under pressure from *Windows*-based packages that let you edit WYSIWYG screens and offer desktop presentation features ensuring consistent fonts, rules, backgrounds, and so forth from chart to chart.

It's nearly impossible for a character-based package like *Harvard* to compete at that level, so version 2.3 plays to its strong suit, further increasing the sophistication of its excellent monitor-based slide shows. *Harvard* has always offered several types of transitions between screens and allowed users to create slide shows that run automatically without *Harvard* itself being loaded. Version 2.3's new HyperShow module adds branching: Click on a button in a chart, and you jump out of the set sequence to, say, a slide that provides more detail on a subsidiary's revenue growth. You can install up to ten buttons per image and even distribute branching run-time shows—an excellent medium for interactive graphical reports.

The program now provides a graphical gallery of preformatted charts, so instead of having to pick chart types by name, you can select a basic type and get a screenful of further customization options. Select a basic 3-D clustered bar format, and you get a wealth of second-level choices. You also can cycle through 12 recommended color palettes while still in the gallery, which makes it easier to pick just the chart you need without further editing.

Harvard 2.3's forte is monitor-based slide shows.

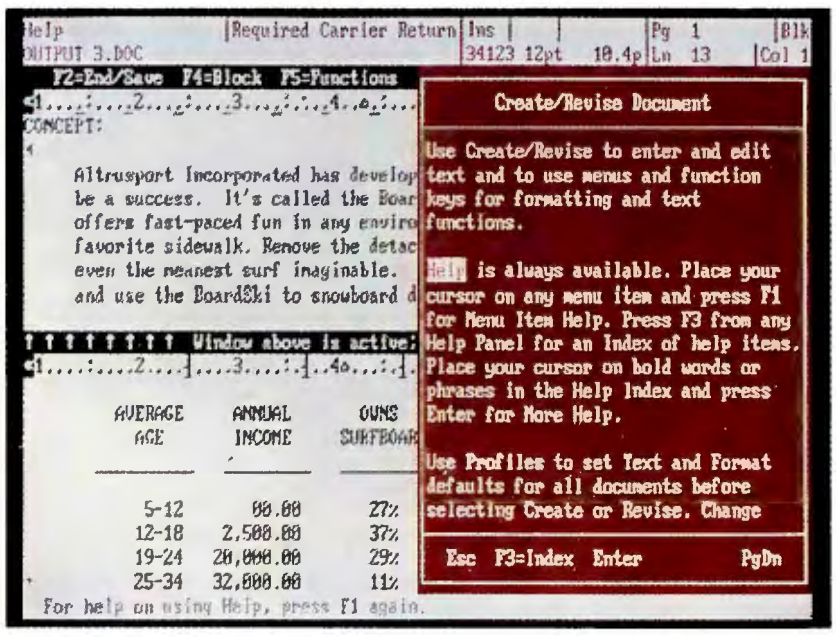
Software Publishing has beefed up and bundled in *Draw Partner*, a graphic arts add-on that is now accessible from *Harvard*'s main menu. You can draw freehand, add arcs and wedges, and skew text. Best of all, no matter how much you modify a chart, it stays connected to its underlying numeric data.

For the time being, version 2.3's charting gallery, HyperShow, and the full integration of *Draw Partner* should extend *Harvard*'s winning streak. This $495 package requires at least DOS 2.0, 512K, and a hard disk. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94039; 415/962-8910. —*Eric Knorr*

Reader service no. 652

DisplayWrite 5.0

Corporate Word Processing Gets Ready for the Nineties



IBM adds more than 35 new features and other enhancements to DisplayWrite 5.0, including split-screen editing, improved mail merge, and better multicolumn formatting.

Playing catch-up in the word processing sweepstakes, IBM has answered the pleas of an estimated 800,000 *DisplayWrite* users by adding more than 35 features and improvements to version 5.0.

None of these changes is particularly novel, but true Blue *DisplayWrite* users will nonetheless be overjoyed to find split-screen editing, improved mail merge, and better multicolumn formatting in version 5.0. The split-screen feature makes it easier to see and edit, say, a *1-2-3* file imported in text format before merging it into a *DisplayWrite* document.

Better still, the new version offers a command-line interface that will let veterans skip menu scrolling (just like you've always done with navigational commands) without sacrificing the pulldown menus that benefit novices. *DisplayWrite 5.0* offers nine levels of zoom in page preview mode and a few new built-in Bitstream fonts—including Courier and Times Roman—scalable from 6 to 36 points.

Version 5.0 provides support for GDDM bit-mapped images generated on a mainframe rather than for TIFF or PCX images. That, together with its lack of mouse support, keeps *DisplayWrite* firmly ensconced as a corporate word processor.

DisplayWrite 5.0 sells for the same $495 as *DisplayWrite 3* and *4* and maintains complete file compatibility with those versions. Registered users of older versions can upgrade for $95. Version 5.0 supports 80 printers and is compatible with Novell, 3Com, and IBM networks. Additional LAN workstation licenses cost $295 each. IBM Desktop Software, 472 Wheelers Farms Rd., Milford, CT 06460; 800/426-7699. —*Susan Lusty*

DisplayWrite users will be glad to find split-screen editing and improved mail merge.

Reader service no. 655

Everything you need. Today and tomorrow.

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Pacioli 2000 . . . Full-featured, network-ready, accounting software.

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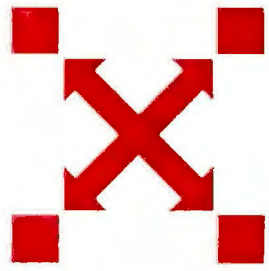
NETWORK READY



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Minimum Hardware Requirements:
IBM or compatible computer with 640Kb, hard disk, monitor, 1 or 2 floppy drives, DOS 2.0 or higher, printer.

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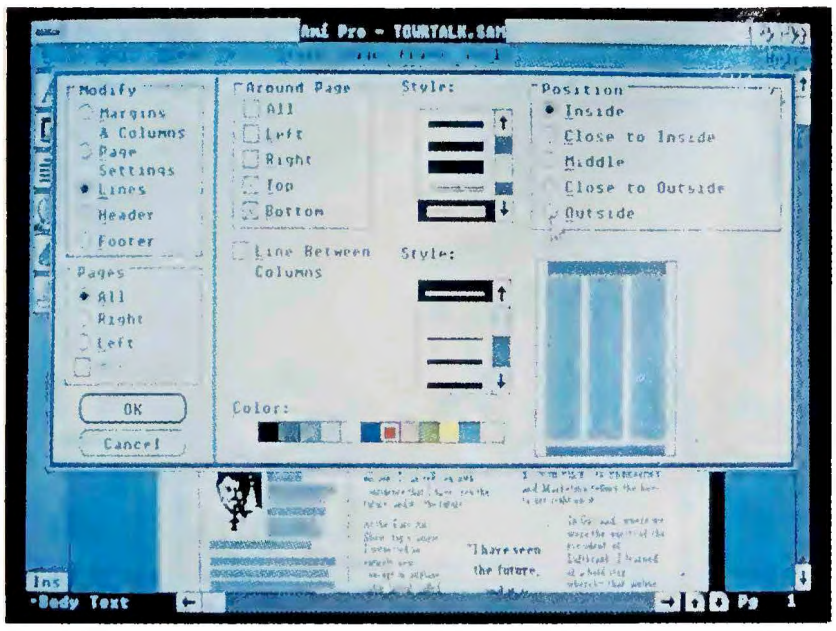
Circle 7 on reader service card

Ami Professional 1.2

Word Processor Catches the NewWave



Ami Professional 1.2 takes advantage of Windows 3.0's memory management and NewWave's object management prowess.

The latest version of Samna's graphic word processor leverages the new capabilities of *Windows 3.0* as well as the object management prowess of Hewlett-Packard's *NewWave.*

Tailored for both environments, *Ami Professional 1.2* lets you treat pieces of text or graphics as objects you can move among *Ami Pro* files or other *NewWave* applications with the mouse. These objects provide dynamic links among applications so data can be shared among documents and updated simultaneously.

Thanks to *Windows 3.0*'s robust extended memory capabilities, you can mix much larger text and graphic elements in documents without sacrificing much performance. But Samna will continue to bundle *Windows 2.11* run-time with *Ami Pro,* since many users still lack the hardware for the new environment.

A high-end word processor with desktop publishing capabilities, *Ami Professional* has always offered WYSIWYG screen displays and style-sheet formatting. It supports *Windows 3.0*'s screen enhancements such as 3-D push buttons, proportional system fonts, and scroll bars. Advanced word processing features include a four-level undo command and the power to create tables and custom forms with protected cells or fields.

The $495 *Ami Professional* requires a 286-based computer, a CGA or other *Windows*-compatible graphics adapter, DOS 3.0 or a later version, 640K, and a hard disk. Registered users who purchased *Ami Professional* before May 15 can upgrade to version 1.2 for $10. Samna Corp., 5600 Glenridge Dr., Atlanta, GA 30342; 800/831-9679, 404/851-0007, 404/255-9460 (fax). —*Mike Hogan*

Reader service no. 654

Entry Level System (ELS) NetWare Level 1 V.2.12

New Power for Small Novell Networks

Novell's 2.12 upgrade of its low-cost Entry Level System (ELS) NetWare Level 1 has been a long time coming, but it's improved in form and function. Many features are ported over from big brother NetWare 286 version 2.15.

Novell claims that version 2.12 runs twice as fast as the old version. You can now use IBM PS/2 Models 30 286, 50 Z, 55 SX, and 70 as file servers, and NetWare runs faster still if you don't use the servers as workstations. Many of NetWare 2.15's handiest administration features, such as resource accounting, disk use restrictions, and password encryption, have been added to the entry-level product. Unfortunately, you'll need third-party products to allow peers to share each other's printers, as they can with NetWare 286.

Installation for the four-user network operating system has been significantly simplified. With fewer decisions to make and only 7 disks to shuffle (instead of 14), you should be able to install the new NetWare ELS in 7 minutes, according to Novell. A new SETUP command lets you create a basic four-user net—including user accounts, security files, and log-in scripts—with one keystroke.

Upgrading from older versions is relatively painless. User files and bindery security files can be used as is in the new environment. The software works with the same broad range of hardware as its more powerful NetWare kin. Upgrades from 2.0a are $380, while first-time purchasers will pay $795—a bargain compared to configurations of Advanced NetWare, which start at $3000. Novell, Inc., 122 East 1700 South, Provo, UT 84606; 800/453-1267. —*Michael Goodwin*

Reader service no. 653

Direct Access 5.0

Menu Maker, Plus

Version 5.0 of *Direct Access* makes it even easier for you to set up menus for other users, protecting them from the complexities of DOS and giving them clearly defined options for loading applications.

For example, *Direct Access 5.0* will automatically build a menu for you by comparing the executable files on a hard disk to a data base of more than 1000 popular programs. When creating your own menus, you can easily copy file names into the command sets. You still can't edit the directory tree display, but you now can display both the directory tree and file list on the same screen. You get six menu levels rather than two and mouse support as well.

Direct Access 5.0 maintains a log of how often and how long users spend in each application, letting managers see which resources are the most utilized and helping service providers create reports for billing purposes. *Direct Access 5.0* even gives you a measure of protection by detecting corrupted program files that may have been infected with a virus. But the program can't protect your system from infection, nor can it identify the type of virus. The $99 package requires DOS 2.1 or a later version and at least 256K. Upgrades are $35 from version 4.1 and $45 from earlier versions. Delta Technology Int'l, 1621 Westgate Rd., Eau Claire, WI 54703; 800/-242-6368, 715/832-0700 (fax). —*Lincoln Spector*

Reader service no. 656

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

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2 ► Menu Power.

And what about Menu Power, the program that automatically organizes your programs into a menu system. That's right, just run Menu Power and it sets up menus, automatically recognizing 400 of the most popular programs. There's no need to remember complicated DOS commands because Menu Power gives you the ability to run programs with a single keystroke.

3 ► Paint 'n Print.

Paint 'n Print, a dynamite painting and drawing program, lets you create professional looking computer art right on your screen. Use Paint 'n Print to draw your own spectacular artwork or to edit one of the many clip art pictures all ready for you on disk. Paint 'n Print is also great for developing graphic images to export to any other programs like word processors or page layout programs that accept .PCX files.

4 ► Perfect Forms.

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5 ► Flu-Shot +.

And if that's not enough, there's the award-winning Flu-Shot+, a sophisticated anti-computer virus program that protects PC systems against invasion by potentially damaging computer viruses. Developed by Ross M. Greenberg, a leading expert on computer virus protection, Flu-Shot+ was awarded the PC Magazine Editor's Choice award. No PC system should be without it.

Normally these programs sell for $19.95 each. But they're here together in a special offer — the Expert Software Top 5 package. Don't pass up these great software values!

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You won't type one single line of code. Alpha Four works intuitively to build "smart menus" that can call other menus, execute macros, create temporary variables, and customize data entry and help screens.

And Alpha Four's innovative menus and keyboard shortcuts are faster and more productive than the Assist Mode of dBASE III and the Control Center of dBASE IV. The searching and indexing features extend the power of dBASE and provide sequential searches, index searches, searches by any field, (including memo fields) and multiple searches.

Alpha Four delivers the extensive features of dBASE, along with sophisticated relational capabilities, without the crippling learning curve. Build an index of several databases, then link up to ten files by simply defining a linked set. These sets can be combinations of other sets and all fields can be read from the data entry and report screens.

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Just name it. Quickly define the sections (or bands) of your report, the title, up to nine subgroupings and a summary. Text is handled for you with a host of advanced features. Or, if you're up against a tight deadline, Alpha Four can create reports for you, using its Quick Report option.

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Because it is fully dBASE file compatible, Alpha Four users can share data easily with other dBASE users. Only Alpha Four offers such effortless data sharing.

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Expand Your Available Memory for 1-2-3, Cheaply and Without Additional Hardware.

Get More and Faster Memory for Lotus 1-2-3 Versions 2.0, 2.01, 2.2.

If you're a user of Lotus 1-2-3 versions 2.0, 2.01 and 2.2, you're familiar with the frustrating MEM light which appears at the bottom of your screen when your worksheet file is too large for available memory. And there's nothing more annoying than having to stop what you're doing just when you're deep in concentration and on a roll.

In the past, the alternatives for resolving a memory problem were to break up the worksheet into smaller files, invest in an expanded memory board or use EMS emulation software to convert extended memory into expanded memory. Unfortunately, breaking up worksheets is always cumbersome and often unfeasible, investing in extra hardware is expensive, and using EMS emulations are inadequate.

Another problem with both expanded memory boards and EMS emulation software is that they cannot always properly address memory above 640K because the "pointer space" required by 1-2-3 tends to be used up before the extended memory can be accessed.

More Room for Your Worksheets.

AboveMEM was developed specifically to solve this memory problem by accessing extended memory directly, and using a minimum amount of base memory. AboveMEM is an add-in utility invoked directly from 1-2-3. When running, AboveMEM takes up only 5-21K of conventional memory so everything is left for your worksheets. The program provides for faster recalculations, range copies and moves and increase DOS memory from 640K to 736K on systems with EGA/VGA by accessing an additional 96K of video memory when not in the graphics mode.

Give your PC the memory it needs to do the worksheets you want without buying expensive hardware. Give your PC AboveMEM.

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286, 386 or 496 based PCs and PS/2s. DOS 3.1 or higher 512K RAM, 64K free extended memory. Lotus 1-2-3 release 2.0, 2.01 or 2.2

ABOVE SOFTWARE

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Just Sit Down and Create a Great Form!

It's easy to see why FormTool Gold is the best-selling forms package in the world. It's the fastest, easiest way to create, edit, manage and print custom, professional forms for immediate information gathering.

The ability to quickly gather data and put it to work is critical to corporate information flow. FormTool Gold's "Intelligent Line Drawing" and its hardware compatibility make it an indispensible tool for businesses of any size. That's why FormTool has found a home in well over half of the Fortune 500 companies, along with thousands of educational institutions, government agencies, hospitals and financial organizations around the world. They've discovered FormTool's productivity and information gathering power.

Unklike competitors, FormTool Gold doesn't require additional memory, graphics card, color display, a mouse or scanner. It runs beautifully on anything from an XT to a 386. FormTool Gold now supports hundreds of dot matrix, letter-quality, daisywheel, thermal, as well as Hewlett-Packard and all-new support for PostScript lasers.

Draws Forms with Unmatched Speed.

FormTool Gold streamlines the PC's ability to draw. Lines of any weight, boxes of any size, grids of any complexity and more can be quickly drawn with just a few keystrokes. If a grid isn't quite right, one keystroke redraws it to meet your exact specifications, then displays it on the screen with our new WYSIWYG display.

FormTool Gold's ability to make instant revisions to your forms gives you the flexibility to create exactly the proper form to meet the precise requirements of your work flow. And FormTool Gold is so simple to use, it's ideal for users of any experience level — right out of the box!

No other forms package delivers the sleek drawing power of FormTool Gold.

Enter Text Into Your Forms In Seconds.

To handle text, FormTool Gold contains a forms-oriented word processor that allows you to move quickly through the form, inserting captions, instructions, word-wrapped text, logos and more. FormTool will enter your text into position automatically.

ZW 1020 **FormTool Gold** 5¼" & 3½" **$99.00**
IBM PC, PS/2 & compatibles with 256K.

BLOCPublishing

The Only Way to Accurately Fill-In Pre-Printed Forms.

PC WORLD BEST BUY

Businesses gather and distribute information by filling-in hundreds of thousands of pre-printed forms each year. Many of these forms are multi-page, multi-part or contain interleaved carbons. Moreover, some are double-sided, containing legal language and require signatures, making them, in effect, a binding contract. These complex forms are filled-in using typewriters, word processors or by hand. Calculations must be made and filled-in. Clearly, the task of filling in pre-printed forms is tedious and time-consuming.

FormFiller 3.0 is the only software product that addresses the waste and inefficiency that is associated with filling in pre-printed forms. FormFiller 3.0 automates the entire process of form fill-in, and allows the power of your PC to vastly enhance speed and efficiency, while virtually eliminating the margin for error. Data entry personnel simply tab from blank to blank to perform fill-in, and can instantly access an extensive help system at any time. The templates for your forms can contain non-printable notes or instructions that guide fill-in for a controlled flow if information, and is backed by FormFiller 3.0's advanced data validation and formatting features.

The FormFiller 3.0 Concept.

FormFiller 3.0 features a completely redesigned menu system — faster and sleeker than ever — just point and shoot to perform any task... This new functionality allows you to quickly design "Master Templates" of your forms. These templates perfectly synchronize your computer and printer (dot-matrix, letter-quality, daisy wheel and laser) for pinpoint-precise positioning of fill-in data every time.

Extensive Math & Financial Functions.

You can perform dozens of mathematical and financial functions within the form — from addition and subtraction to depreciation, interest and amortization.

FormFiller 3.0 also allows you to fill-in data directly from your database (dBASE II and III), spreadsheet (WKS and WK1), ASCII or DIF formats.

It comes complete with a free copy of PC Converter Plus, which will translate data from dozens of other databases.

ZW 8002 **FormFiller 3.0** 5¼" & 3½" **$149.00**
IBM PC, XT, AT, PS/2 & compatibles with 512K, DOS 2.0 or higher and 2 floppy drives, or one floppy drive and a hard disk.

BLOCPublishing

Create 18 Types of Binding Legal Documents for Your Business.

Personal Lawyer Business Edition gives you the ability to create 18 types of binding legal documents right on your PC — in just minutes. It works quickly and interactively to help you produce documents that cover legal situations that arise often in your business. Just type answers to questions asked on the screen.

Lawsuits often result when there are misunderstandings between the parties involved in a project or task. By creating a written document that clearly states the terms to which both parties agree, Personal Lawyer can more than pay for itself the first time you use it. You'll spend less time on legal fees, while providing the protection needed for your company.

Personal Lawyer Business Edition begins by asking you to select the type of document you wish to create. The system then asks a series of questions relating to your particular situation. As you type your answers to these questions, help and background information is available with just one keystroke. From your original answers, Personal Lawyer will ask a series of follow-up questions, just as an attorney would, to establish the precise details to be included in the document.

When Personal LAwyer has the information it need, it automatically assmebles the final document using its advanced "Text Builder." You simply print the document and sign it.

- **Work for Hire Agreement**
- **Maintenance Agreement**
- **Personal Guarantee**
- **Release of Lien**
- **Promissory Note**
- **Trade Secret Protection**
- **License of Intellectual Property**
- **Assignment of Intellectual Property**
- **Bill of Sale**
- **Security Agreement**
- **Warranty Agreement**
- **Software Escrow Agreement**
- **Letter of Offer to Purchase**
- **Demand Letter**
- **Rejection of Goods Letter**
- **Termination of Contract**
- **Notice of Contract Breach**
- **Notice of Contract Assignment.**

ZW 2270 **Personal Lawyer Business**
5¼" & 3½" **$99.95**
IBM PC/XT/PS2 & compatibles with 256K, one floppy, a hard disk and DOS 2.1 or higher. Requires an 80-column display.

BLOCPublishing

ALL-NEW EDITION!

Instantly Makes Your PC Run up to 60 Times Faster! NEW! Version

You read the headline right — up to 60 times faster! FAST! employs advanced speed enhancement techniques and brings them to a new, sophisticated level that delivers blazing speed to any program you run. And it's simple to use — just load it and go!

An IBM XT vs. a Compaq 386!

In our lab test, we matched a stock IBM PC XT, equipped with FAST!, against a stock Compaq DeskPro 386. The results were astounding — the XT outran the Compaq in a data transfer performance benchmark.

How Is It Possible?

FAST! incorporates the proven speed-enhancing performance of 'disk caching' and adds an innovative twist: FAST! includes a form of 'intuitive logic' that actually anticipates what data your CPU will be seeking, and reads that data from your fixed or floppy drive into a special RAM buffer (or "cache") — BEFORE the CPU asks for it!

As a result, your CPU spends virtually no time at all waiting for disk reads — an inherent logjam that slows processing time.

And using FAST!, you'll notice that the more disk-intensive the application, the more time FAST! will save — and the faster your applications will run.

And since FAST! reduces drive read time so dramatically, it also reduces wear on the disk drive — extending its life.

- FAST! 3.1 makes Windows 3 run between 50-75% FASTER.
- Supports Plus Development's 80 MB Hard Card.
- Supports large SCSI drivers.
- Double word move on 286 machines.
- Autocad 386
- DESKVIEW
- dBASE IV
- Works with everything.

ZW 3850 **FAST!** 5¼"
Regularly $99.00 ..... **NOW $79.95**
ZW 3855 **FAST!** 3½"
Regularly $99.00 ..... **NOW $79.95**
FAST! will run on the IBM PC, XT, AT, PS/2 and compatibles with 128K RAM and DOS 2.1 or greater. Supports fixed or floppy disk systems, and supports conventional, expanded or extended memory

The Accounting System That Grows.

Money Matters is a less complicated approach to financial management for the home and small office. It combines fast, on-screen transaction handling, instant balance updates, simple check writing, invoicing and detailed financial reporting.

The beauty of Money Matters is that it actually adapts its functionality to the way you run your business, instead of cramming some complex accounting concept down your throat. If you're a contractor, for example, you can easily track costs and hours for each phase of a project. If you run a small retail store or factory, you can track inventory any way you like for complete financial control.

Getting Started Fast...

You don't have to know anything about accounting to become instantly productive with Money Matters. There are no time-consuming set-up procedures to or accounting techniques to learn. Choose from 14 pre-defined business categories. Quickly enter starting data into Money Matter's handsome interface and from then on, each function is as easy as writing a check.

Take Care of Your Customers.

...And your vendors. Money Matters can easily handle up to 4,000 vendor and customer accounts. Track year-to-date figures, print mailing labels, lists, and reports.

Take Care of Your Company.

You'll collect receivables sooner because Money Matters helps you stay better organized so invoices go out on time... stay on top of late payments... even automatically add finance charges if you want to.

Let Money Matters Handle These Jobs:

- Invoicing/Billing
- Check Writing
- Financial Reporting
- Receipts/Deposits
- Bank Reconciliations
- Automatic Payments
- Payroll Tracking
- Tax Information
- Inventory Control
- Job Costing
- Sales Tax Calculations
- Credit Card Accounting
- Transaction Histories
- Expense Analysis
- Personal Finances
- And Many More

Get @Accounting™ FREE
When You Purchase Money Matters

@Accounting provides a seamless interface between Money Matters and Lotus 1-2-3 Release 2.2 allowing you to send financial information to a complete spreadsheet. *A $195.00 value!*

ZW 1210 **Money Matters** 5¼" & 3½"
Regularly $89.95 . . . . . **NOW $69.95**
IBM, PC, XT, AT, PS/2 or compatible, MS-DOS or PC-DOS, 2.1 or higher. 512K RAM and hard disk Printer — parallel or serial, 80 or 132 column, impact or laser. 640K required with @Accounting

If You Sell Your Time... Make Every Minute Count — and Account for Every Minute!

Timeslips® III Turns Time Into Money!

If you're going to compete with the big guys, you'd better track time and money the same way they do. You have to be a little smarter, a little tougher. And a lot more careful about your time and your money.

Introducing Timeslips III, the comprehensive time and billing software designed for people like you. Individuals working at home. And small professional firms.

Timeslips III lets you record, analyze, and bill both time and expenses with ease and complete accuracy. In fact, many customers report up to a 25% increase in billable time. With an equal improvement to the bottom line. Which is the kind of performance that's made Timeslips III the most widely used time and billing software in business today.

Track and bill activities with Timeslips III in great detail. With a handy pop-up timer that records your time while you work. With custom invoices in formats you determine. And with accounts receivable reports and billing worksheets so you can keep a close watch on every minute you spend, and every dollar you have coming to you.

Track 250 activities, for as many as 250 people, working on 128 projects per client — with a maximum of 3,400 clients.

There's also an optional accessory that links Timeslips III directly to DAC Easy, Peachtree, Bedford, and many other general ledger packages.

Everything you need to keep precise track of billable time is right at your fingertips. Timeslips III features sleek screen design of fields and elements.

Timeslips III Provides Tools for Powerful Financial and Productivity Analysis...

Timeslips III is a workhorse for worksheets, reports and graphs. You can manipulate data in dozens of ways to give you up-to-the-minute information — and take corrective action where needed.

ZW 2600 **Timeslips III** 5¼"
Regularly $299.95 . . . . . **NOW $169.95**
ZW 2605 **Timeslips III** 3½"
Regularly $299.95 . . . . . **NOW $169.95**
IBM PC, XT, AT, PS/2, compatibles with 384K.

TIMESLIPS
CORPORATION

Instantly Calculate and Analyze Mortgage Rates, Present Values, Amortization and Variable Rates.

This speedy financial tool allows you to quickly enter information about anything from annuities to loan balances to amortization schedules — then, using a sleek interface, PercentEdge will calculate and present a custom analysis of any specific financial transaction.

Once you've got the numbers, you can crunch with flexibility and superior interactivity. Like calculating multiple balloon payments, unlimited "what-if" scenarios, and comparing several scenarios — simultaneously on your screen.

How Much Can I ACTUALLY Afford?...

Now real estate professionals, as well as first-time buyers can — in seconds — calculate the maximum affordable price of a property. Just give PercentEdge the monthly budget, the interest rate, the life of the loan and the downpayment. Bang! You'll get the number.

Wondering About Present Values?...

Questions about a pension plan, annuity or other time/value calculation? By leaving the appropriate boxes or cells blank on the Present Value Screen, and filling in the known data, you can compute rates, dollar amounts, and dates.

Easy Amortization Schedules...

The Amortization Screen shows you how a loan will be paid back over time. It simultaneously creates an amortization table to show the outstanding principal owed, the principal paid each period, the interest of each period, and the interest to date. The table can be saved as a Lotus®-formatted file for inclusion in a 1-2-3® spreadsheet.

Determine When You'll Be a Millionaire...

...if you deposit $1,000 a month at 11% interest (by the way, you'll have to wait 21 years). With the Variable Rate Screen, you can calculate a bank balance at the end of a series of deposits.

ZW 1240 **PercentEdge** 5¼" **$99.95**
ZW 1245 **PercentEdge** 3½" **$99.95**
IBM PC, XT, AT, PS/2 or compatibles with 320K.

TIMESLIPS
CORPORATION

Bring the Entire North American Continent to Your PC Screen.

Now, view an assortment of different maps of the U.S. and the entire North American continent right on your PC. View U.S. political maps, U.S. and state topographic maps, regional and state political maps, state maps with major cities, statistical maps and maps depicting highways and tourist attractions.

Educational & Informative.

U.S. Atlas is a great teaching tool for children and adults of all ages. Business people, librarians and students will love the way information is displayed in easy-to-read windows. Simply select a state, country or even a city to explore information such as population, average temperatures and precipitation, latitudes and longitudes, local times, area codes and zip codes. U.S. Atlas is like having an atlas, almanac and U.S. fact book all in one. And, all on your PC!

Simple 'Point-and-Shoot' Operation.

With a mouse, all the information you could want is as easy as pointing and clicking. Fully-detailed, spectacular EGA/VGA maps pop up instantly.

Export Impressive Maps to Your Graphics Program.

Print state reports with maps and text, graph data from your maps or rework your information with special database updating capability. Export your favorite maps to any graphics program that accepts .PCX and TIFF file formats. Add notes to map text with a special "notepad" feature.

The Perfect Trip Planner.

Tourists and travelers will benefit greatly from the detail presented by U.S. Atlas. Plan a vacation or business trip without having to have a series of paper maps. In fact, U.S. Atlas is perfect for travel agents who want to show their clients a detailed view of where they're going.

Discover facts from the population of Boston or Los Angeles to the great places to visit in San Francisco or Philadelphia. The incredible detail contained in U.S. Atlas allows you to be a computer tourist of so many great cities in the country, just sitting right at your PC. For school papers dealing with geography, U.S. Atlas is an invaluable help in pinpointing those hard-to-get details.

Without a doubt, U.S. Atlas is the complete U.S. map software. It's like America at your fingertips.

ZW 2560 **USA Atlas** 5¼" & 3½"
Regularly $59.95 . . . . . **NOW $49.95**
IBM PC, XT, AT, PS/2 or compatibles

THE SOFTWARE TOOLWORKS

Circle 259 on reader service card

Quickly Convert Files Between Word Processor Formats!

Now those indispensible word processing files you created six months ago can be easily converted to the format you're running now. WORD FOR WORD is ideal for exchanging files of different formats with business associates, customers, friends — you can even convert files created on your home or laptop computer to the format used in your office — with all of the formatting commands (like bold, underline, centering, tabs, etc.) intact!

WORD FOR WORD is the fastest! It can convert a 25-page document in less than one minute — 600% faster than the competition!

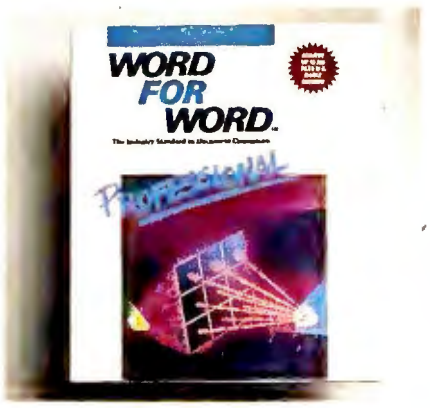
Allows Lotus 1-2-3 Conversion INTO Your Word Processor!

WORD FOR WORD allows you to import spreadsheet data into your word processing format! And no other product allows you to perform conversion between "integrated" packages like Enable, Framework, Q&A and pfs: First Choice. Supports Navy DIF, Peachtext and Enable, RapidFile and WANG PC.

Converts ALL Attributes!

...contained in the original: margins, tabs, indents, soft and hard carriage returns, boldface, italics, underlines, superscripts/subscripts, newspaper columns, headers, footers, centering, footnote formats, ruler lines, page ends — and more!

WORD FOR WORD saves the time of re-inputting and extensive re-editing when the need arises to either convert or to communicate with another word processor software program.



- **Batch Processing Ability.** Converts up to 200 files in a single session. Supports DOS Wildcard conventions.
- **Exception Reporting.** For non-convertible features, you can print an exception report or to view the embedded codes in the context of the document.
- **"Smart" ASCII.** Allows you to import any standard ASCII file to a supported word processor — and preserves all page formatting features.
- **"Stripped" ASCII.** Eliminates unnecessary characters for smooth importation to DTP and typesetting systems.

ZW 1320 **Word For Word** 5¼" & 3½"
Regularly $149.95 . . . . . **NOW $95.00**
IBM PC, XT, AT and compatibles with 256K RAM.

THE SOFTWARE TOOLWORKS

The Personal Weather Forecaster.

Instant, Up-To-The-Minute Meteorological Information.

Wondering about the forecast for a business or vacation destination? With WeatherBrief, your PC becomes a personal meteorological center, allowing access to the WeatherBank information service. Via modem, you'll receive up-to-the-minute forecasts for any region or the country or the world — in just a few seconds! In fact, this is the same service used by radio and television stations. The maps that appear on your screen are the very same images downloaded to television control rooms. Weather professionals depend on the precise, timely meteorological information provided by WeatherBank — now you can, too.

Dazzling Maps.

The detailed, color-enhanced maps display current precipitation, temperature, cloud cover, storms, lightning, hurricane tracks, jet stream movement, freezing levels, soil temperatures and radar-gathered information. The fast, menu-driven operation provides information for family use, business travelers, travel agents, pilots and others.

As Much Detail as You Want!

What's the weather like in Paris, Tokyo, Rome, Sydney or Moscow? A menu selection displays complete information in seconds. WeatherBrief provides fast, accurate forecasts including freezing levels and off-shore data. WeatherBrief also includes agricultural outlooks and extensive climate statistics (such as rainfall, average temperatures, etc.) for any region.

WeatherBrief is a great new use for the PC — and a practical tool for anyone who "can't change the weather, but needs to plan for it."

FREE! 1200 Baud MODEM!

This Practical Peripherals Modem is FREE with the purchase of WeatherBrief. Includes 5-year warranty!

ZW 1009 **WeatherBrief** 5¼" & 3½" . **$99.95**
IBM PC, XT, AT. Requires modem.

THE SOFTWARE TOOLWORKS

The World at Your Fingertips.

This innovative program brings the entire globe to your computer screen, combining a complete atlas, almanac and world fact book into one exciting, informative package. You'll have instant access to over 240 fully detailed, color maps along with a vast database of useful international information.

Explore the geography, people, government and economy of any nation on Earth, including such details as climates, coastlines, population, labor force, military strength, inflation, industry, and more.

Indispensible Guide and Reference Tool.

World Atlas is an ideal reference tool for travelers, educators, business people, librarians and students. It's an indispensible guide that brings together all types of important information that would take months to research. With just a couple of keystrokes any bit of data is on your screen.

And World Atlas includes a travel section containing information of particular interest to travelers, such as monetary conversion rates, seasonal facts and language.

World Atlas is very easy to use. Just point to a country on any index map, click — the desired map appears instantly. From there, simply select specific information and statistical maps for individual countries from sleek, drop-down menus. You can easily print customized reports mixing maps and text — even export maps to desktop publishing programs for use in your newsletters, reports and other publications.

And all information contained in World Atlas is obtained from world organizations and U.S. Government sources for up-to-date accuracy.

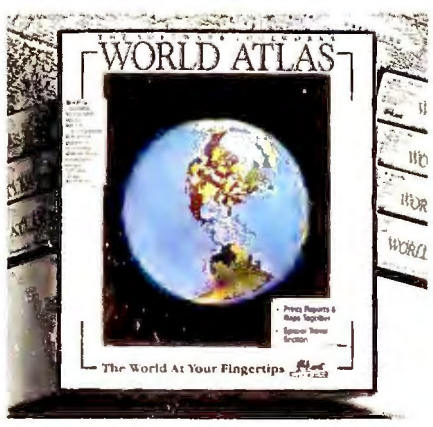
Index Maps. Index maps are used to access other maps. The world index map divides into 14 regional index maps: Antarctica, Caribbean, East Asia, Europe, Middle America, North Africa, North America, Oceania, South America, South Asia, Southeast Asia, Southern Africa, Southwest Asia, Soviet Union.

STATMAP Option. A STATMAP shows statistical data from every country in the world on one map on the following topics: January/July Temperatures, Income per Capita, Inflation Rate, Literacy Rate, Population Density, Time Zones and more.

TOPOMAP Option. Topographic maps show rivers, water bodies, and physical features such as mountains, deserts, and plains.

ZW2570 **World Atlas** 5¼" & 3½"
Regularly $79.95 . . . . . **NOW $59.95**
IBM PC or compatibles with 640K. Hard disk; EGA or VGA graphics card color monitor; Microsoft mouse or compatible.

THE SOFTWARE TOOLWORKS



Powerful *Hand-held* Computing!

►What Will It Take to Put a PERSONAL ORGANIZER In Your Pocket?

We proudly present the Personal Organizer. The hand-held personal computer that fulfills the promise of "portable computing power." This little powerhouse allows you to quickly key-in information on its remarkably fast keypad — anywhere. You can then use the information you've collected on your desktop PC. Just download your data, using the cable that's included.

FREE SideKick and PC Advantage.

The Personal Organizer includes SideKick from Borland, and PC Advantage from Travelling Software. That's over $200.00 of software absolutely free — real PC software that runs on your IBM PC or compatible.

Everything is included: the Personal Organizer unit, connector cables to load and unload data from your PC, a carrying case and detailed user's guide.

You get a notepad, desktop organizer, appointment calendar and stand-alone calculator. In fact, with 8K of available memory, it's like having a PC — in your pocket!

►WordFinder Pocket Version — 220 & 224.

The "ANYTIME, ANYWHERE" Writing Aid... Imagine having a complete dictionary and thesaurus at your fingertips — contained in a powerful, *hand-held unit* that speeds through 4½ megabytes of memory in seconds! Small enough to fit in your pocket! *This remarkable reference system even checks spelling.*

It's simple — just type a word and touch a command, and *you'll see on the screen a list of synonyms.* Select a synonym of a synonym to explore variations for more clarity and style. WordFinder has a large 20-character LCD display screen. The entire unit is just 3" by 4" by ¾"! This is a must accessory for business professionals and a great gift for students and writers.

ZW 2480 **Personal Organizer**
Regularly $99.95 . . . . . **NOW $75.00**
Leather-like case, cable, battery and back-up battery included. Plus, SideKick software (a $79.00 value) and PC Advantage (a $130 value).
ZW 2520 **WordFinder 220 Version**
(synonyms, spelling only) **$49.00**
ZW 2525 **WordFinder 224 Version**
(synonyms, spelling and definitions) . . **$70.00**

Your Hard Disk is a Time Bomb!

Please Read This Carefully If You Own a Hard Disk.

Fragmentation Is Fatal!

When your hard disk was new, it ran lean and swift, retrieving files in just a few seconds. But as you added programs and files, your hard disk became fat and sluggish — in fact *a fragmented, "dirty" hard disk can take up to 100 seconds to retrieve a file that used to take just 10 seconds* — that's ten times slower!

The problem? Fragmentation kills hard disk performance. It causes excessive head movement across the media, creating bad spots throughout the drive. It's aggravating — and it's dangerous! A fragmented hard disk, left unmaintained, is almost certain to crash. That means major data loss. Disk Optimizer 4.0's sleek, *easy-to-use menu system* makes hard disk maintenance simple.

Over 250,000 users have discovered that Disk Optimizer saves time and money, while providing complete protection from hard disk errors and erasures.

Why Optimize My Disk?

Unfortunately, DOS is doing its best to slow hard disks down — by breaking files up into pieces. Storing different chunks in different places. As a result, loading is slower. Sorting is slower. Everything takes longer because your hard disk has to chase around picking up and laying down different pieces of your file.

After un-fragmenting with Disk Optimizer, a file that once occupied twenty different sectors in twenty different locations is now back in one contiguous piece.

Absolutely Disaster Proof.

...Even if you yank the plug from the wall in the middle of the program! Disk Optimizer checks the un-fragmented version for completeness and integrity. Then — and *only* then — does it go back and erase the fragmented version.

ZW 3280 **Disk Optimizer** 5¼″
Regularly $69.95 . . . . . **NOW $49.95**
ZW 3285 **Disk Optimizer** 3½″
Regularly $69.95 . . . . . **NOW $49.95**
IBM PC and compatibles. DOS 2.1 and above.

SOFTLOGIC SOLUTIONS

Pack More of Your Data Onto Less Disk Space!

You know what happens. The more you use your computer, the more information you create. And the faster you fill up your floppies and hard disk.

The 10 MB drive that once seemed enormous is now jammed with important files. That 20 MB that should have lasted years is crowded in a matter of months.

Of course, you could always go out and buy a bigger hard drive. Or you could get Cubit. This remarkable software is designed to squeeze the maximum usable storage space from your hard disk, as well as your floppies and tape cassettes.

Use Cubit, and a word processing file that once took up 20K now takes as little as 10K. The archival records you use to keep on floppies now stay right on your hard drive, providing instantaneous access in a minimum of precious space.

What Is CUBIT?

In brief, Cubit is an advanced software tool that automatically reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved.

Some programmers call this effect "data compression," others "disk expansion." Either way, the result is the same. All your magnetic media is made to store information in the most efficient way possible. Regardless of the form your data takes.

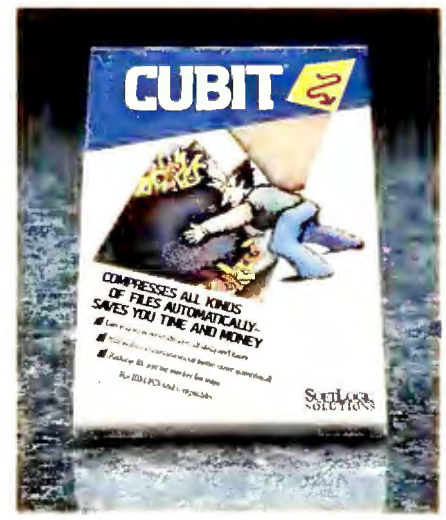
How Much Disk Space Will You Save?

The vast majority of data created on PC's is standard ASCII text — letters, numbers, punctuation and other English language symbols. You can expect excellent performance with all kinds of data. Including spreadsheet files, program code, graph and image files, even binary data.

Cubit's storage expansion capability is identical whether it's used with hard disks, floppy disks, streaming tape cassettes or standard data cassettes. Original storage capacity of media is not a factor.

ZW 3310 **Cubit** 5¼″
Regularly $69.95 . . . . . **NOW $49.95**
ZW 3315 **Cubit** 3½″
Regularly $69.95 . . . . . **NOW $49.95**
PC-DOS/MS-DOS 2.0 or higher, 128K RAM.

SOFTLOGIC SOLUTIONS



Give Your Files Fully Descriptive, 60-Character Names!

Seldom do we see software that adds such pure usefulness to everyday computing as Extend-A-Name Plus. The preposterous "eight-plus-three" DOS filename system has forced users to devise complex codes and cryptograms to remember file names. These crazy abbreviations always seem so easy to remember when you first think of them, but just try to find the file in six months — even in a subdirectory.

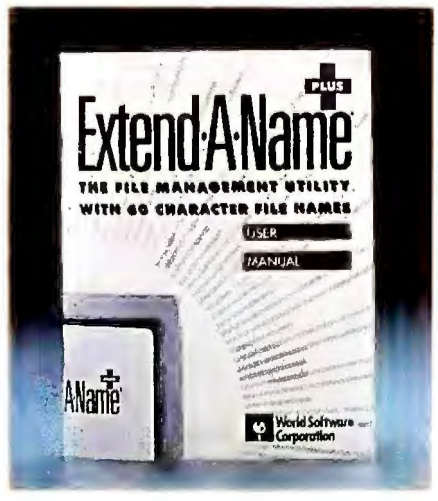
Extend-A-Name Plus is a RAM-resident program that allows you to give your files descriptive, 60-character names (including spaces and a variety of special symbols).

In addition, this very elegant system contains a host of fast, easy file management features that virtually eliminate the need for subdirectories and hard disk managers.

But Extend-A-Name Plus doesn't stop there. It allows you to find any file across a subdirectory by either the extended, or the DOS name. It's the only system that allows you to create subgroups within subdirectories. Unique "path trees" allow you to change directories by just "pointing-and-shooting." And Extend-A-Name Plus is faster and more capable than the document management facilities within Microsoft Word and WordPerfect.

What the Heck Is "F$1QTRRZ.WK1?"

Maybe it's "The first quarter results for the financial department." It could be "Quarterly sales in all western territories." Extend-A-Name Plus lets you spell it out, so you can find it fast. Finding your own files — as well as files anywhere across a network (Novell, 3COM, Banyan, Token Ring and others) — becomes amazingly simple.



Works Within Your Application.

Unlike other file managers, Extend-A-Name Plus was designed to work from *within* your application. Extend-A-Name Plus supports WordPerfect, MS-Word, Multimate, Lotus 1-2-3, Symphony, Quattro (& Pro), PlanPerfect, Q&A, pfs: First Choice, pfs: Write, PC Write, Paradox, AutoCAD, and many others.

ZW 1500 **Extend-A-Name Plus** 5¼″ . . **$79.95**
ZW 1505 **Extend-A-Name Plus** 3½″ . . **$79.95**
IBM PC/XT/PS2 & compatibles. MS-DOS 3.0 or higher. Compatible with EMM 4.0. Hard drive required.

World Software Corporation

Are You Burned Out on dBASE?

"Sure dBASE has its drawbacks and it's tough to use, but I've got a lot invested in it..."

While most businessmen and managers enjoy the enormous benefits of using dBASE III Plus to manage their database, they also tangle with the problem of learning curves. Some tasks are so complex, they're simply never used. For the programmer, the system contains some very serious limitations.

The answer is dBXL, the amazing dBASE III Plus superclone that's easier to use and more capable than dBASE, while extending its power and scope of functionality. dBXL's advanced interface makes working with it simpler for novices and faster for experienced users and programmers. And dBXL is completely compatible with dBASE, so you can access the same data files, reports, programs and index files using the same command structure.

dBXL puts performance into those areas that dBASE doesn't touch. Like its remarkable new interface that includes true windowing, sophisticated language extensions and built-in charts and other graphic devices. dBXL provides useful tools to store, manipulate, retrieve and perform in-depth analysis of data.

Programmers using dBXL will discover enhancements such as multi-dimensional arrays, user-defined functions, automatic memory swapping, "C" language interface, the ability to create complex multi-file relationships, and a unique Fix Option that streamlines debugging.

Networking and UNIX Capabilities.

dBXL provides pathways to networks and other operating environments. Your applications and files can be easily moved to the UNIX environment to quickly harness the productive power of this multi-user platform. You can even integrate your databases with a number of SQL database servers.

More dBASE than dBASE...

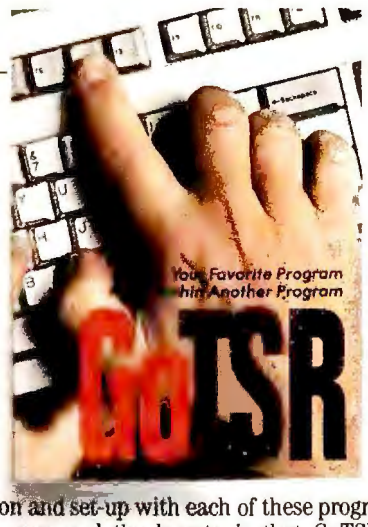
dBXL outruns the program it was patterned after. Windowing, for example, allows dBASE programmers, for the first time, to create, move, size, overlay, remove and restore windows.

ZW 5030 **dBXL** 5¼″
Regularly $249.00 . . . . . **NOW $159.00**
ZW 5035 **dBXL** 3½″
Regularly $249.00 . . . . . **NOW $159.00**
Requires a min. of 430K TPA (RAM free of the operating system, device drivers, and any other memory resident software). For most systems, this will entail a min. of 512K RAM, dBXL will use 64K of EMS (when avail.). Requires MS-DOS or PC-DOS 2.0 or later.

WORDTECH SYSTEMS, INC.

Circle 259 on reader service card

Pop Up Your Favorite Program Anytime from Within Another Program.



Uses Only 4K of Memory!

GoTSR gives you the power to quickly pop up your favorite program anytime from within another program. Turn your favorite word processor, spreadsheet or database into a TSR (Terminate and Stay Resisdent) program using only 4K of memory and make it available at the touch of a key.

GoTSR will even pop up over a graphics program. It's perfect for those times when you want to use your favorite program while still in another. All you do is press the hot-key you've chosen to pop up your program and then hit the hot-key to go back to your other program.

Say you're writing a report in WordPerfect and you need some information from a dBASE database. If you're using GoTSR, just press the hot-key and up pops dBASE. Then, just find the information you want in your database, press the hot-key again, and you're back at the same place you left off in WordPerfect.

You can use GoTSR with more than one program to create a system where a group of your favorite programs can pop up into each other. It's perfect for those people who need to see different information from different programs, but can't afford the time to exit and reload their programs over and over.

Eight Versions for Eight Great Programs.

GoTSR comes in a version to work with the following programs: Microsoft Word, dBASE, WordPerfect, Lotus 1-2-3, Wordstar, Multimate, Quattro, and Paradox. Installation and set-up with each of these programs is easy and the beauty is that GoTSR is stingy when it comes to memory. Since it only uses 4K of memory, there's plenty left to spare. And it will automatically find whatever kind of memory you have, whether it's expanded, extended or hard disk.

8 PROGRAMS FOR ONE LOW PRICE!

ZW 3370 **GoTSR (All 8 programs)** 5¼"
Regularly $165.00 ..... **$89.95**
ZW 3375 **GoTSR (All 8 programs)** 3½"
Regularly $165.00 ..... **$89.95**
IBM PC, XT, AT, PS/2 or compatible with either hard disk, expanded or extended memory. Currently does not work with any protected mode programs.

TSR SYSTEMS LTD.

The Premier Grammar, Style and Punctuation Checker for the PC!

Remember the last time you read someone else's badly written letter? How did it reflect on him? More importantly, how does your own writing reflect on you?

Successful people communicate clearly... and powerfully. RightWriter is an intelligent system that flags common errors in your writing and helps you produce clean, crisp letters and proposals — applying 4,500 rules of grammar, style, usage and punctuation to letters, reports, proposals, press releases and more!

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RightWriter is the most accurate system for business and technical writing. RightWriter analyzes documents produced by leading word processors for errors in grammar, style, usage, and punctuation. Using more than 4,500 rules, RightWriter helps make your writing clear, concise and powerful.

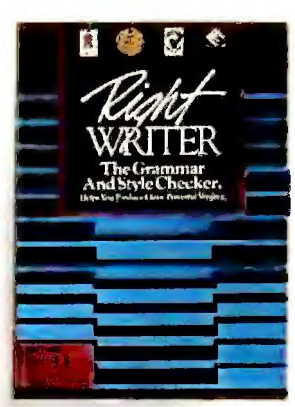
Just create your documents as you normally would, then, with a one-word command, RightWriter will check your document and display errors and comments.

Now Runs From Within WordPerfect 5.0 & 5.1!

Specific Recommendations. *RightWriter flags common writing errors such as passive voice and noun-verb agreement.*

Readability and Strength Index *shows the educational level a reader requires to understand your writing.*

Parts of Speech, Sentence Structure. *Other indexes measure your adjective and adverb usage, and use of jargon.*



Word Processor Compatibility.

Bank Street Writer®	*PeachText®*
Edix/Wordix®	*pfs: Write®*
Enable®	*pfs: Prof. Write®*
HomeWord II®	*pfs: First Choice®*
IBM Writing Asst.®	*Q&A Write®*
Leading Edge®	*Samna®*
Microsoft® Word	*SideKick®*
Microsoft® Works	*WordPerfect®*
Microsoft® Write	*WordStar®*
Multimate Adv.®	*WordStar 2000®*
Multimate®	*VolksWriter®*
New Word®	*XyWrite®*
Office Writer®	*All Standard*
PC-Writer®	*ASCII Editors*

ZW 2860 **RightWriter** 5¼ & 3½
Regularly $95.00 ..... **NOW $79.00**
Runs on IBM PC, XT, AT and compatibles with 384K. Hard disk or floppy. Call RightSoft at (800) 992-0244 for upgrades and support.

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The Professional Mail List Manager.

Creates Lists, Labels, Envelopes, Mail Merge, and More!

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FastPak Mail does it all. Prints labels, post cards, reminders, notices, customized letters, envelopes and more. It automatically eliminates duplicates, performs sophisticated zip-sorting, prepares and labels bulk mailings and sorts for lowest possible postage rates right out of the box!

And FastPak Mail has been designed to quickly import names and addresses from most popular database applications, like dBASE, so you can easily customize mailings without re-keying information.

FastPak Mail is an ideal tool for direct mail campaigns — it's fast, feature-rich, and can easily handle up to 64,000 names and addresses. In fact, this remarkable package actually contains many features found in high-end systems written expressly for direct marketers.

Ready-to-Print Lists and Labels.

FastPak Mail will support virtually any label made — by any manufacturer. Choose from pre-defined formats available from the menu, or quickly create your own format.

Print all of this and more... labels (any configuration), envelopes, rotary index cards, clear adhesive labels, file folder labels, diskette labels, audio and video cassette labels, equipment ID labels, packing labels and more. Just select the type you need from the list of built-in formats and go!

Merge Information — In Minutes.

FastPak Mail will allow you to easily merge names and addresses into the body of any letter. You can quickly produce custom mailings to selected lists — even merge information into the body of your letter. And if you have existing lists stored in other applications, they can be quickly and accurately converted for use in FastPak Mail.

Bulk Mail Sorting and Preparation.

All bulk mail regulations and associated labels are available from the menu, and all sorting is done to achieve the least possible cost — like 9, 5, and 3 digit zip code sorting. FastPak Mail even produces sack labels.

ZW 4550 **FastPak Mail** 5¼" & 3½"
Regularly $79.95 ..... **NOW $59.95**
IBM PC, XT, AT, PS/2 and compatibles with 256K. Supports hundreds of dot matrix or laser printers.

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Create Binding Legal Documents on Any PC!

Now you can produce binding legal documents for everyday legal situations without hiring an attorney.

Personal Lawyer works by asking you a set of questions related to your specific situation. Once the complete set of questions has been answered, Personal Lawyer will compile the information, select paragraphs from a pre-determined set within the system, and actually "write" an enforceable document for the circumstances you've described using its unique "text-builder."

This program has been developed under the supervision of attorney Douglas B. Jacobs, and the documents produced are legally binding. You could save thousands of dollars in legal fees by preparing documents yourself on your PC, quickly, easily — and inexpensively — with Personal Lawyer.

► **Last Will and Testament.** This portion of the Personal Lawyer program permits you to bequeath general or special gifts and make many other decisions for competent estate planning.

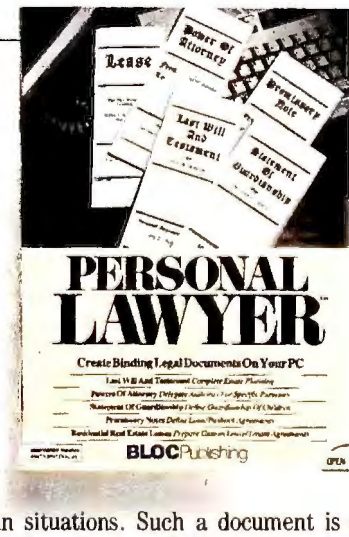
► **Promissory Note.** Promissory notes provide the written ability to agree to accept a loan on certain terms and to define the payback of the loan.

► **Power of Attorney.** This program will help you write three very useful legal documents — a General Power of Attorney, a Special Power of Attorney, and a Revocation of a Power of Attorney. They can give the power to take care of your assets, either generally or for specific matters.

► **Statement of Guardianship.** This document authorizes temporary consent for certain situations. Such a document is often useful to give your child's teacher or school the requisite authority to take the child on field trips and class outings.

► **Residential Real Estate Lease.** This portion of the program allows you to easily write a legally binding lease for such residential property as a house, duplex, apartment or rental condominium.

(The PERSONAL LAWYER meets the requirements of 49 states and the District of Columbia — the state of Louisiana is excluded because much of its legal system is based on French rather than English law.)



ZW 2250 **Personal Lawyer**
5¼" & 3½" **$59.95**
Requires minimum 256K RAM. Supports color or monochrome and fully supports virtually ALL printers.

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Professional Formatting for Repetitive Printing Tasks.

Fast, Practical Label, Report, List and Envelope Printing.

PageGarden is the first laser utility that creates custom formats for any repetitive or standardized print task. PageGarden gives you the ability to add dramatic graphic style to reports, lists, labels, name badges, envelopes, tickets and more without having to spend hours working with your desktop publisher. And PageGarden delivers speed. An HP-LaserJet and PageGarden will blow the doors off the printer drivers included in leading word processors and desktop publishers.

Produce Striking Listings and Reports.

Save time — and paper — with condensed, easy to read printouts. Personalize reports with smart headers. Use the PageGarden "confidential" stamp. Print multiple files at the same time, each file in its own format.

Mix Custom Graphics, Logos and Effects with Any ASCII Text.

PageGarden creates a format from your design — you simply add ASCII text from your database, spreadsheet, word processor — anywhere! Each time you print a dozen copies of a report, stacks of mailing labels or 300 name badges, they'll all have a custom, professional look. You can easily drop in logos or graphics stored in .PCX format (without going back to their native application), add gray areas, black-on-white type, sequential numbers, boxes with rounded corners, circles and dozens more.

Special Features.

Sequential numbering (part numbers, ticket numbers, etc.), white-on-black letters (even on HP LaserJets), rounded corners, gray images and type, and more!

Use with These Applications:

- Databases
- Spreadsheets
- Word processors
- Text editors
- Mail list programs
- Personal organizers
- Accounting systems
- Time billing systems
- Programmer's utilities
- Graphics created with popular paint illustration programs
- Label programs

KW 8060 **PageGarden** 5¼ & 3½
Regularly $99.95 . . . . . **NOW $79.95**
IBM PC, PS/2, compatibles; 256K. Requires an HP LaserJet Plus, HP LaserJet series II, HP LaserJet IIP, HP LaserJet IID, PostScript or 100% compatible laser printer. No special video adapter is required. Does not support DeskJet.

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► The Sleekest Menu. ► Fast, Simple "Move & Copy." ► Detailed Labeling & Cataloging.

Instant One Keystroke Access to Programs.

Most PC users, no matter how advanced, hate the time-consuming gobbledegook-like commands involved in accessing their programs and files. You have to type a backslash here, a cryptic command there, then wade through directories and subdirectories to get to work. And if your hard disk fills up, moving files involves more complex commands and tedious operations. Sound familiar?

That's why busy computer users everywhere are turning to DiskVision. This innovative 3-in-1 system completely eliminates the ridiculous requirements of DOS.

► **HARD DISK MANAGER: The Fastest, Easiest Menu.**

Turn on your computer and start working! Programs and files are accessed instantly — no navigating through DOS commands.

Features advanced security and allows an unlimited number of sub-menus. DiskVision gives you complete control of all files and programs on your floppies or hard disk.

► **FILE ARCHIVE MANAGER: Streamlined New Archiver.**

Clean up cluttered hard disks — just tag files on the menu screen — then instantly "move," "copy," or "erase" them. Move any files — from anywhere to anywhere — with no DOS commands! Transfer and archive files without altering them — assuring total recoverability at any time. Sort files by date and erase aged files automatically.

► **NEW DISKETTE MANAGER 4: Diskette Labeler/Cataloging.**

Instantly create labels for your diskettes. Now includes "File By File" commenting. Automatically labels archived diskettes. Supports virtually any label size made. Easily locate files by fast, simple searches through the catalog. Catalog 1000 diskettes of 32,000 files!

KW 4500 **DiskVision** 5¼" & 3½"
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Runs on IBM PC, XT, AT, PS/2 and compatibles. Requires 14K.

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Run Your Printer – While Working (at top speed) on Your PC.

PrintRite allows users to run print jobs of any size — while continuing to work, at top speed, on their computer. PrintRite spools your print jobs to disk (and compresses them), allowing applications to generate print jobs at maximum speed — and save hours of printing time — and it occupies less than 50K of memory. Spend time working — not waiting for print jobs!

Designed for Easy, Efficient Operation.

Stop wasting time waiting for your printer to finish a document so you can continue to work on your PC. Harness the power of professional mainframe spooling technology — in an easy to use package.

Introducing PrintRite. Designed for fast, efficient operation, its streamlined pull-down menus allow you to print documents, lists, labels, spreadsheets — anything — *while you continue to work, uninterrupted, on your PC.*

PrintRite compresses spooled files to disk for ultra-efficient use of memory. Each file is spooled separately (rather than in one large file) to eliminate costly hard-disk fragmentation. And only PrintRite allows you to control *five printers* at one time, so you can dedicate specific printers for certain tasks.

Pop PrintRite up anytime and view the queue and documents on-line. Change the printing order, specify the number of copies, sideways printing, add items — even pause and restart.

Groups Similar Print Jobs for Maximum Efficiency.

PrintRite automatically groups types of printing jobs together (like spreadsheets, text, graphics and sideways jobs) for more

efficient use of the equipment.

Spooled files are compressed to save disk space and prevent loss of data that can occur with other memory print buffers. PrintRite guarantees 100 percent protection of every bit of your data with its auto-backup.

Now Laptop Users Can 'Print' — Without a Printer.

To your laptop computer, PrintRite looks like a printer. Your print jobs are spooled to disk and stored (compressed) in a DOS file.

KW 4960 **PrintRite** 5¼" & 3½"
Regularly $99.95 . . . . . **NOW $79.95**
Runs on IBM PC, XT, AT, PS/2 and compatibles. Requires 50K memory. Will support virtually any printer

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Now PopDrop Can Load RAM-Resident Programs Into EXPANDED Memory!

► **PopDropPLUS** includes PopDrop *and* PopLoad — for loading RAM-resident programs into Expanded Memory.
(Pop Drop available separately for users without Expanded Memory)

Shatter the 640K Barrier.

Now, in one package, the software solution to the downside of DOS — its crippling memory limitations. PopDropPLUS gives users the ability to manipulate RAM-resident programs in 640K RAM, as well as the ability to break 640K and load RAM-resident programs into Expanded Memory.

Not just another slow, inefficient "swapping" utility, PopDropPLUS allows your RAM-resident programs to run just as fast as they do when loaded into conventional memory.

The Solution.

PopLoad actually allows you to load up to 50 of your RAM-resident programs into Expanded Memory and execute them from within any application — even if the RAM-resident programs do not support Expanded memory!

Your lower 640K of "conventional memory" is free to handle your larger applications without conflict or interference. With PopDropPLUS, "RAM-resident" is no longer a dirty word.

Eliminate RAM-Resident Conflicts.

PopDropPLUS also includes a utility that allows you to remove, replace, deactivate and reactivate spell checkers, keyboard macro programs, print spoolers, desktop organizers and more — without rebooting! PopDrop eliminates memory and keyboard conflicts that result from loading certain RAM-resident programs together.

PopDrop works by dividing your memory into layers — up to 16 — each of which may contain several programs. After loading DOS and your permanent programs, RAM-resident programs are loaded with these layers between them.

KW 2150 **PopDropPLUS** 5¼" & 3
Regularly $99.95 . . . . . **NOW $79.95**

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TO STAND UP TO THE FIERCE BUSINESS COMPETITION OF THE '90S, YOU BETTER SIT DOWN.

A Must for Upper and Middle Management, Entrepreneurs and The Success-Oriented With Vision.

Reserve Your Seat To The Breakthrough Conference of the Decade. "A Day In The Future: A Blueprint for Success in the New Global Marketplace"

A Revolutionary Business Strategy For Personal and Corporate Success.

In every facet of business, the rules are changing. Keeping pace with the new realities can be tough. How often are you confronted with issues such as:

- Developing strategies that stand up to the competition
- Addressing employee demands for a more satisfying work environmment
- Keeping pace with constantly evolving technologies

Finding solutions to these challenges means adapting to a new set of rules. Rules that none of us were taught, but all of us can learn.

That's why attending **A Day In The Future™** is so important for your success today and tomorrow. In only one day, you'll discover what it takes to prosper in the new global environment. You'll "futurize" your business strategy and learn how to be an effective direction-setter, team coach, and agent of change.

In addition, you'll learn some practical ways to:

1. Globalize your perspective:
   - The new framework for trade and competitiveness
   - Designing innovative, global strategies
   - Bridging differences between cultures
2. Empower your workforce:
   - How to simultaneously manage today and tomorrow
   - Developing an environment for continuous learning
   - How to design, manage and reward the "smart" team
3. Orchestrate your technology:
   - Proven steps to the information-based organization
   - Using technology to increase team productivity
   - Improving communication through teleconnectivity

The challenge of the '90s is adapting to a world without walls. Nowhere will you gain a better understanding of the skills it takes--and how to acquire them--than at this dynamic business presentation

The only Multimedia, Interactive Workshop Designed To Help You Learn The "New Rules"-- Quickly and Simply.

While most conventional executive development programs offer only dry recitals of facts and figures, **A Day In The Future™** uses a powerful and innovative blend of learning methods such as:

- live presenters
- original music
- experts on video
- panoramic graphics
- on-stage drama

It is based on the Action Learning Model developed by Dr. Philip R. Harris, Ph.D., of the California Space Institute and the whole-brain learning research of Ned Herrmann, former director of Management Education at General Electric.

An Impressive Roster of Experts Moderated by William Shatner

"We'd all be better prepared for the future if we could just spend one day there."

A Day In The Future™ has assembled some of today's most talented business experts and visionaries. With William Shatner as narrator, you'll here from such leaders as:

- Robert D. Haas, CEO of Levi Strauss & Co., the largest apparel manufacturer in the world.
- Marsh Fisher, co-founder of Century 21, the world's largest real estate organization, and creator of the breakthrough software program, IdeaFisher
- James Bolt, Xerox's former corporate director of Human Resource Planning and Development and founder of Executive Development Associates.
- Michael Ray, Ph.D., professor of Innovation and Creativity at Stanford University and author of Creativity in Business.

Come Gain The Competitive Edge and Receive a Valuable Blueprint For Standing Up To The Competition:

A 100 Page Resource Manual and audio tapes for a step-by-step action plan.

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- September 6, 1990, Los Angeles Beverly Hilton.
- September 18, 1990, San Francisco St. Francis Hotel.

Register by August 17, 1990 and receive a complimentary copy of Executive Development by author James Bolt.

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William Shatner will appear live at the California premier events of **A Day In The Future™.**

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14 SX Systems: Big Deals in Small Boxes

Looking for a space-saving entry-level workstation? Our exclusive street-price comparison points out the standout Best Buy.

TJ Byers

JOHN GREENLEIGH

Thanks to local area networks, there are very few stand-alone PCs left in corporate offices; a desktop computer is either a network server or a workstation. Servers are high-powered, super-reliable (and expensive) systems that hold enough hard drives to satisfy the mass storage needs of a work group. Workstations—machines that actually sit on people's desks—can get away with offering far less.

How much less? Without the ability to run 386-specific applications on your workstation, you'll miss out on a whole new generation of powerful software—so a 286 is out of the question. On the other hand, you might not need to buy a full-fledged 386. They're expensive, and most will grab the lion's share of your desktop.

Enter the 386 SX machine, today's entry-level workstation par excellence. Although far lower in price and somewhat slower than 386 systems, SXs still run 386-specific software like *Windows 3.0, Paradox/386,* and (probably) whatever else the next five years have in store.

1ST QTR
2ND QTR
3RD QTR
4TH QTR
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28

Moreover, SXs are generally about a third smaller than full AT-sized systems, a boon for those of us who can't see our desktops as it is.

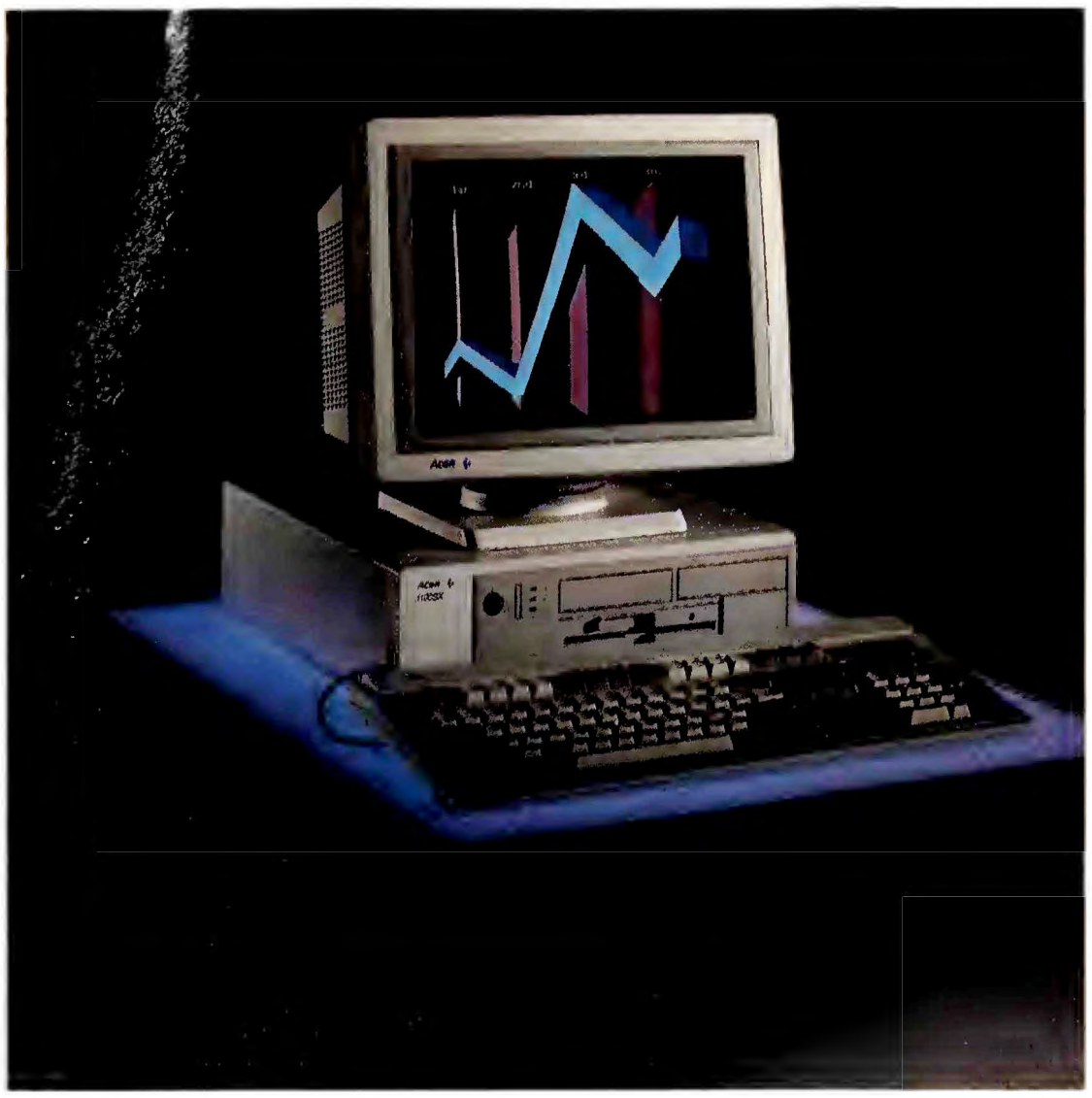
A small chassis means less room for drives, but that shouldn't be a problem for networked users who can access the server's hard disk subsystem. Of course, SXs also make perfectly adequate stand-alone systems, especially if the manufacturer can sell you a high-capacity hard drive.

Processing performance is the biggest SX trade-off. Throughput on the average 16-MHz SX system is roughly 10 percent slower than on the average 16-MHz 386. Moreover, most 386 systems run at 25 MHz or faster these days; buy one of those and you'll get approximately twice the performance of a 16-MHz SX. But as always, you'll pay for what you get: Within one product line, a 25-MHz 386 generally costs between 60 and 70 percent more than a similarly configured SX.

To help you find the best SX values, *PC World* put 14 16-MHz SX systems through their paces: Acer's 1100SX, Arche's Rival 386SX, AST's Bravo/386SX, Blackship's 386SX-16, Compaq's Deskpro 386s, CompuAdd's 316s, Dell's 316SX, Epson's Equity 386SX, Hyundai's Super-386S, IBM's PS/2 Model 55 SX, Mitsubishi's MP 386S, Packard Bell's Force 386SX, Tandy's 4016 SX, and Wang's PC 350/16S. In addition, we tested the brand-new Dell 320LX (see the sidebar "Dell Breaks Another Speed Barrier With the First 20-MHz SX").

The Best Buy? Acer's 1100SX takes this high honor by virtue of its excellent performance, good expansion slot capacity, and low street price. Epson's Equity 386SX came close to sharing the glory, but a couple of hardware problems and unexceptional technical support left us reluctant to recommend it. Finally, only the lack of a nationwide on-site service option kept us from awarding a Best Buy to the Blackship 386SX-16, a budget-priced mail-order clone.

JOHN GREENLEIGH



Acer's Best Buy 1100SX is one of the fastest systems tested, and at $3078 on the street, it's also one of the least expensive. Thanks to an integrated motherboard, you get four free 16-bit slots; you also get four months of free on-site service.

The SX Challenge

As always, price and performance loom large in our system comparisons, and our new street price listing gives you another resource in the search for your best deal (see the sidebar "The Word on the Street"). In addition, several requirements are especially pertinent when comparing SXs: Due to these machines' small footprint (averaging 16 inches square), space for boards, drives, and even memory is at a premium. Consequently, we give extra points for a high ceiling on CPU-speed RAM, generous expansion board capacity, and the availability of a high-capacity drive.

Performance SX performance varies widely from system to system. What's more, these variations are more noticeable with 16-MHz SXs than with, say, 25-MHz 386s, since a given percentage difference in performance has a larger impact at slower CPU speeds. Our performance test suite includes both DOS and OS/2 benchmarks. When a system did not come with its own version of OS/2, we used IBM's OS/2 version 1.1 for testing—but due to potential compatibility problems, we don't recommend running a computer with any version of OS/2 but its own.

CPU-Speed RAM Capacity All the SX systems have two buses running at two different speeds: an 8-MHz expansion bus, and a CPU-speed memory bus, which is at least twice as fast. How much memory you can install on the memory bus, either on the motherboard or in a special CPU-speed slot, directly affects the longevity of your system. For example, a system that can hold only 4MB of CPU-speed RAM may be fine for current applications, but future programs and operating environments could need as much as 16MB, OS/2's maximum. We think you have a right to expect at least

8MB of high-performance memory; only 9 of the 14 systems offer that.

Expandability You cannot expect a small chassis to hold as many expansion boards and drives as a full-sized system. However, it's reasonable to demand four free slots—with video, a floppy controller, a hard drive connector, and at least one parallel and one serial port installed as expansion boards or built into the motherboard. A big plus—especially for systems that will stand alone—is a 300MB (or larger) hard drive available as an option from the manufacturer; 6 of the 14 systems offer one.

Design and Construction Good looks and a sleek profile aren't everything. The important things to watch for are secure mechanical connections, a solidly constructed chassis, and easy access to peripherals (including the math coprocessor). A crisp, clear monitor and a durable keyboard with good touch are must-haves. Up-front on/off and reset controls make life easier, as does software-driven setup and configuration (no DIP switches or jumpers to set).

Service and Support Even the best-designed systems break down. A one-year warranty is absolutely essential, and on-site service can save your business lots of downtime; mail-order vendors especially should offer it as an option if it isn't included in the price of the system. In the tech support area, look for long support hours, quality documentation, and speedy response to problems. Our tests of technical support quality involve blind calls to both manufacturers and dealers.

To help you compare prices on a level playing field, all the machines are set up and priced as closely as possible to the standard *PC World* SX configuration: 4MB of RAM, one 1.2MB (or 1.44MB) floppy drive, an 80MB to 110MB hard drive, at least one parallel and one serial port, a VGA video controller and a color monitor, a 101-key keyboard, and DOS 3.3. All but five systems reviewed come with disk caching software; we note those five in text, along with all other significant departures from the standard configuration.

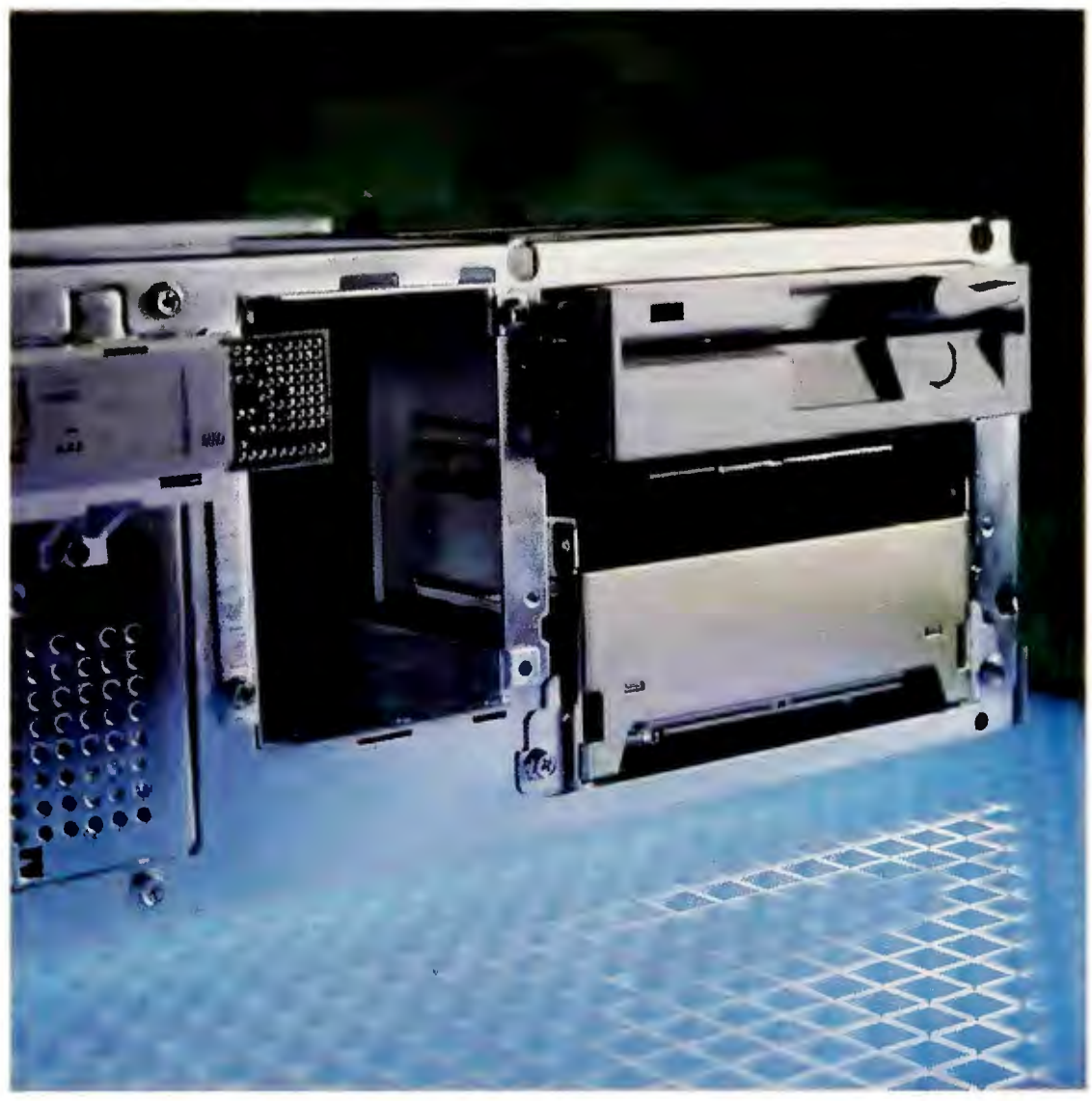
Acer 1100SX

Acer's Best Buy 1100SX is the second-fastest machine in this roundup, tying with the Epson for top honors under DOS and maintaining a high position in OS/2 tests as well. Moreover, at a $3078 street price (in the *PC World* configuration) it's one of the least expensive. The 1100SX comes with four months of on-site service and enjoys the backing of one of Taiwan's largest computer manufacturers.

The 1100SX holds a respectable 8MB of CPU-speed RAM. And like all but three of the systems in the roundup, the Acer comes standard with a built-in, high-speed IDE (Integrated Drive Electronics) connector designed for IDE hard disks that include all controller electronics. In addition, the highly integrated motherboard holds a VGA board, a floppy controller, one serial port and one parallel port, and a mouse port. That leaves all four 8/16-bit expansion slots free.

The Acer 1100SX holds up to four drives—no mean feat for a small-footprint box. The unit comes set up for two half-height 3½-inch drives in the upper bay and one half-height 5¼-inch drive in the lower—all externally accessible. It's possible to pull the 5¼-inch drive and replace it with two more 3½'s, but only one of them will be accessible from the outside.

Acer's free on-site service is limited to four months, but that's not bad when combined with a year's carry-in dealer service. We called the toll-free tech support number three times and got through to a live technician with minimal delay every time.



JOHN GREENLEIGH

If price is paramount, Blackship's 386SX-16, with the lowest street price in the roundup, will pique your interest. But expandability is its biggest plus: There's room for five boards and five storage devices—in three half-height external and two 3½-inch internal bays.

FEATURES EVALUATION

Street Price, Size, Support—Acer's Winning Hand

Since these SXs are all small-footprint boxes, expansion room is critical. Acer's high-performance 1100SX scores strongly on capacity for CPU-speed RAM, boards, and drives and delivers a fine service-and-support package as well—all for a low street price. Four systems that rate nearly as well: Arche's Rival 386SX, Blackship's 386SX-16, Compaq's Deskpro 386s, and Epson's Equity 386SX.

● Yes
○ No
◒ Deficient

	Acer 1100SX	Arche Rival 386SX	AST Bravo/386SX	Blackship 386SX-16	Compaq Deskpro 386s	CompuAdd 316s	Dell System 316SX
Standard features							
Street price [1]	$3078	$3138	$3164	$2406	$5076	$2638	$3349
List price [1]	$4307	$4360	$4685	$2406	$6516	$2638	$3349
Coprocessor support	387SX	387SX	387SX	387SX	387SX	387SX	387SX
Disk coching softwore	●	●	●	○	●	●	●
Built into motherboord							
Porollel port	●	○	●	○	●	●	●
Seriol port	●	○	●	○	●	●	●
Floppy disk controller	●	○	●	○	●	●	●
Hord disk connector	●	○	●	○	●	●	●
Mouse port	●	○	○	○	●	○	○
CPU-speed RAM							
Copocity	8MB	8MB	4MB	8MB	13MB	4MB	[illegible]
Expandability							
8/16-bit slots/number free	4/4	6/4	3/2	7/5	4/4	3/2	3/3
8-bit slots/number free	0/0	2/1	1/1	1/0	0/0	2/2	0/0
Moximum number of third/holf/ full-height drives occommodoted	0/4/0 [6]	0/3/1	0/3/0 [7]	0/5/2 [7]	2/2/0 [7]	0/3/0 [8]	1/2/0 [9]
Lorgest hord disk monufocturer sells	338MB	380MB	320MB	1.2GB	320MB	110MB	190MB
Design and construction							
Switchless setup	●	○	○	○	○	○	○
Compoct footprint	●	●	●	●	●	●	●
Complete documentotion	●	●	●	○	●	●	●
Tilt-and-swivel monitor	●	●	●	●	●	●	●
Front-ponel on/off switch	●	○	○	○	●	○	●
Front-ponel reset button	●	●	○	●	○	○	○
Service and support							
Worronty period (months)	12	24	12	12	12	12	12
Free on-site service	● [12]	○	○	○	dealer	○	●
Toll-free support number	●	●	○	●	dealer	●	●
Doily support (hours)	10	10	7.5	8.5	dealer	11	12
Weekend support	◒ [14]	○	○	○	dealer	○	○
Electronic bulletin boord	●	○	●	○	dealer	○	●
	BEST BUY						

[1] Except os noted, price bosed on 4MB RAM, 1.2MB or 1.44MB floppy drive, 80MB to 110MB hord disk, one porollel ond one seriol port, VGA controller ond color monitor, 101-key keyboord, ond DOS 3.3 or loter version.
[2] Same os footnote 1, but with o 60MB hord disk.
[3] Same as footnote 1, but with o 40MB hord disk.
[4] Micro Chonnel slots.
[5] One 8-bit slot is lost when o dedicoted memory boord is instolled.
[6] Only one drive moy be 5¼-inch form foctor, which tokes up two drive boys.

	Epson Equity 386SX	Hyundai Super-386S	IBM PS/2 Model 55 SX	Mitsubishi MP 386S	Packard Bell Force 386SX	Tandy 4016 SX	Wang PC 350/16S
Standard features							
Street price	$3275	$3005	$4B33 [2]	$3271 [3]	$2591	$4B47	$5735
List price	$6265	$4090	$6405 [2]	$5340 [3]	$5694	$4B47	$5735
Coprocessor support	387SX	387SX	387SX	3B7SX	387SX	3B7SX	3B7SX
Disk coching softwore	●	○	●	●	○	○	○
Built into motherboord							
Porollel port	●	●	●	●	●	●	●
Seriol port	●	●	●	●	●	●	●
Floppy disk controller	●	●	●	●	●	●	●
Hord disk connector	●	●	●	○	●	●	●
Mouse port	●	●	●	○	●	●	○
CPU-speed RAM							
Copacity	14MB	16MB	4MB	BMB	4MB	4MB	BMB
Expandability							
8/16-bit slots/number free	4/3	4/3	3/3 [4]	6/4	4/4	3/3	4/4
8-bit slots/number free	1/1	2/2 [5]	0/0	0/0	1/1	0/0	2/1
Moximum number of third/holf/ full-height drives occommodated	0/3/1	1/2/1	0/2/0 [10]	0/3/0 [7]	0/4/1 [8]	0/3/1 [11]	0/3/1 [7]
Lorgest hord disk monufocturer sells	100MB	100MB	60MB	40MB	100MB	344MB	100MB
Design and construction							
Switchless setup	○	○	●	○	○	○	○
Compoct footprint	●	●	●	●	●	●	●
Complete documentotion	●	●	●	●	●	●	●
Tilt-and-swivel monitor	●	●	●	●	●	○	●
Front-ponel on/off switch	●	●	●	●	●	●	●
Front-ponel reset button	●	●	○	●	●	●	○
Service and support							
Worronty period (months)	12	1B	12	12	12	12	12
Free on-site service	○	dealer	dealer	○	● [12]	dealer	○
Toll-free support number	○	dealer [13]	dealer	●	●	dealer	●
Doily support (hours)	9	dealer	dealer	10	16	dealer	10
Weekend support	◒ [14]	dealer	dealer	○	◒ [14]	dealer	◒ [14]
Electronic bulletin boord	●	dealer	dealer	●	○	dealer	○

[7] Internal bay is 3½-inch farm factar.
[8] One of the externally accessible bays is 3½-inch form factar.
[9] The third-height externally accessible bay and the half-height internal bay are 3½-inch farm foctor.
[10] Bath bays are 3½-inch farm factar.
[11] Twa externally accessible bays are 3½-inch farm factar.
[12] First faur manths anly.
[13] Far a limited time, end users can call a tall-free dealer tech support line.
[14] 24-haur vaice mail to leave queries; callback during regular business haurs.

Dell's low-profile 316SX comes with the company's famous one-year on-site service-and-support package, but performance is merely average, and you get only three free slots. And for once the Dell price is only fair.

There are a few nice extras: The 1100SX comes with a mouse, and unlike with most systems in this roundup, you use software instead of switches and jumpers to set up the system. But the main draws are top speed, generous expansion capacity, and a good price, making the Acer 1100SX a sweet deal—and a clear Best Buy.

Arche Rival 386SX

The Rival 386SX is a reasonably priced system ($3138 on the street in the *PC World* configuration) with an excellent slot count and an outstanding two-year factory warranty. However, its performance is less than breathtaking, and the lack of an Arche version of OS/2 makes using the system as an OS/2 workstation inadvisable. If you want to run OS/2 on the system, you'll have to take your chances and use IBM's, the only version you can buy separate from a system.

As with the Acer 1100SX, the motherboard can hold up to 8MB of RAM. There are eight slots to start with; after you install all necessary boards, two 8-bit and three 8/16-bit slots remain open. The system unit holds three vertically stacked half-height 5¼-inch drive bays. The top two bays are externally accessible, and you can use the two bottom ones to hold a full-height drive.

Arche's two-year factory warranty is a valuable extra, there's a toll-free tech support line, and although there's no free on-site service, Arche will sell it to you for only $128 per year. All three of our tech calls were answered promptly.

While the Rival 386SX could be faster, it offers strong expansion capability, a comfortable ceiling for CPU-speed RAM, an outstanding warranty, and a painless price. If it provided better performance and a native version of OS/2, it would win Best Buy status for sure; as it is, it's still a very fine value as a DOS system.

AST Bravo/386SX

While not quite as fast as the Acer 1100SX, the AST Bravo/386SX is still a comer, taking fourth place overall in a closely packed bunch of front-runners. And with a street price of $3164 (in the *PC World* configuration), it's quite reasonable. Unfortunately, its capacity for CPU-speed RAM and expansion boards is a bit low.

The Bravo/386SX holds only 4MB of CPU-speed RAM—enough to quickly switch between four or five active 640K *Windows* programs, but no more. The integrated motherboard includes all necessary ports and controllers, but you'll still need a VGA board, which cuts you down to three free slots. There are three half-height drive bays: two externally accessible 5¼-inch bays and an internal bay designed for the 3½-inch IDE hard drive.

AST service and support could be better. There's no on-site service available and no toll-free tech support phone line for end users, and support hours end at 3 p.m. PST. On the bright side, all our tech support calls were answered promptly, and the company's BBS makes tech queries easy. You might need support for configuration, since some jumper setting may be required.

Compaq's reputation is unrivaled, but it's no secret that quality doesn't come cheap.

The Bravo/386SX's high speed and reasonable price are big pluses. But its limited RAM and board capacity, short support hours, and toll phone line make it an also-ran.

JOHN GREENLEIGH

Blackship 386SX-16

An amazingly low $2406 direct-sale price (in the *PC World* configuration) makes Blackship's 386SX-16 the least expensive system in this roundup. Moreover, it's fast, offers a huge 1.2GB hard disk option, and has ample capacity for expansion boards. But its low price precludes much in the way of extras: There's no disk caching software or Blackship OS/2, and on-site service is for local customers only.

The motherboard (made by Mylex, not Blackship) holds up to 8MB of RAM. Of the system's eight slots, five remain free—a fine count for a small-footprint box. In addition to three externally accessible half-height bays, there's space inside for two full- or two half-height 3½-inch drives.

Blackship is a mail-order operation, so if your system needs service, you'll need to mail it in for warranty repair (unless you live close by). There's a toll-free tech support line, and when we tested it, two of our calls were answered right away; on the third we had to leave a message, and no one ever called back.

On-site service and an implementation of OS/2 with Blackship's name on it would make the 386SX-16 a more attractive buy. Even so, thanks to high speed, excellent price, and great expandability, this system is one of the best bargains in the roundup.

Compaq Deskpro 386s

Compaq systems have always stood out in a crowd, and the Deskpro 386s is no exception, from its good performance (top score under OS/2, third place under DOS) to its large capacity for CPU-speed RAM. Too bad the street price is also exceptional. At $5076 (in the *PC World* configuration) the 386s is the second most expensive system in the roundup.

The Deskpro 386s supports up to 13MB of CPU-speed system RAM, and thanks to a highly integrated motherboard, you get four free 8/16-bit expansion slots. Three 5¼-inch drive bays are built into the front of the chassis. The top two bays are third-height, and the bottom bay is half-height. There's also an internal half-height, 3½-inch drive bay for the IDE hard disk.

Compaq prefers to handle service and support through highly qualified dealers, so features and quality may vary from one location to another. A random sample revealed that weekend technical support was available from about half the dealers, and all provided a fax machine for technical queries.

Compaq's reputation for excellent design, construction, and support is unrivaled, but it's no secret that quality doesn't come cheap. The Deskpro 386s is one of the safest buys you can make, but its high price keeps it from being a Best Buy.

CompuAdd 316s

If you're a bargain hunter, CompuAdd's 316s will make your heart beat faster. With a direct-sale price of $2638 (in the *PC World* configuration), it's one of the cheapest machines in this roundup. And (in what seems like an unbelievably cool deal) for only $17 more CompuAdd will throw in a Panasonic dot matrix printer,

THE WORD ON THE STREET: REAL-WORLD PRICES FOR REAL-WORLD BUYERS

Michael Goodwin

There are at least three kinds of prices in the computer business: list prices, mail-order prices, and dealer prices. While they're all "real," some are more real than others. Starting this month, *PC World* will base its system reviews and buying recommendations on street prices (an average of up-to-the-minute dealer prices drawn from an extensive phone survey in eight major cities from coast to coast) or direct mail-order prices.

Up to now, *PC World* has based its price/performance comparisons on manufacturers' list prices and modest estimates of how much less than the retail price you'll actually pay. Unfortunately, this puts vendors that offer steep dealer discounts at a significant disadvantage.

To resolve this problem and to provide you with the most useful real-world prices for making the smartest buying decisions, we conducted a telephone survey of PC dealers in Boston, New York City, Atlanta, Chicago, Dallas, Houston, San Francisco, and Los Angeles. For every SX in this roundup (except those sold by direct mail order), we had our researcher call as many as five dealers in each city, identify himself as a local customer, and ask for a quote in the standard *PC World* configuration. Results were averaged to arrive at the price in each review.

Of course this process isn't perfect. Street prices are volatile and may change by the time a review is published. Moreover, we have no way of verifying the accuracy of dealer quotes, nor of evaluating the quality of peripherals a dealer may install to reach the standard configuration. Even so, we feel the results are a big improvement over a tally of list prices. Now when we tell you which PC is the best deal, you can rest assured we've backed up that opinion with street smarts.

Michael Goodwin is an associate editor for PC World.

PC WORLD TEST REPORT

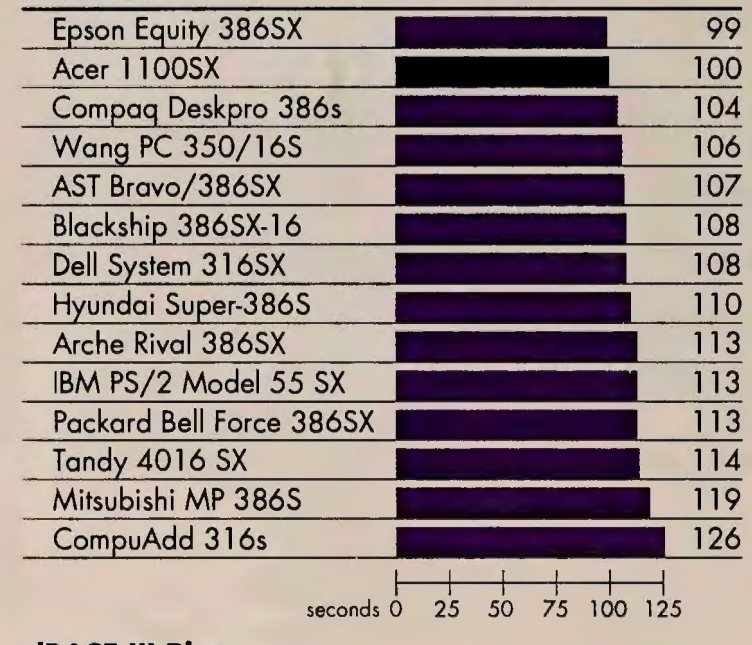
Acer, Epson Are 16-MHz SX Speed Champs

In overall DOS and OS/2 performance, Acer's 1100SX and Epson's Equity 386SX are almost impossible to separate. AST's Bravo/386SX and Compaq's Deskpro 386s are close behind the leaders, with Compaq's well-crafted OS/2 pushing its machine to the top in that category.

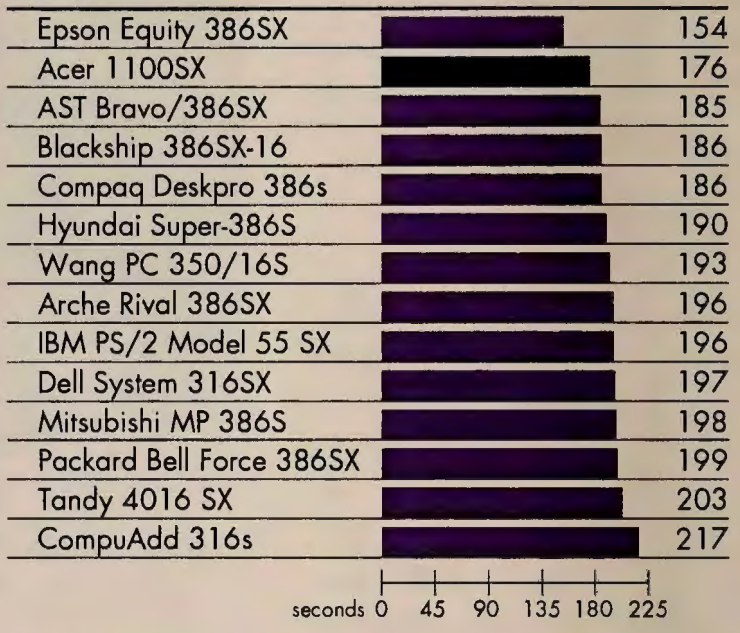
■ Best Buy

DOS

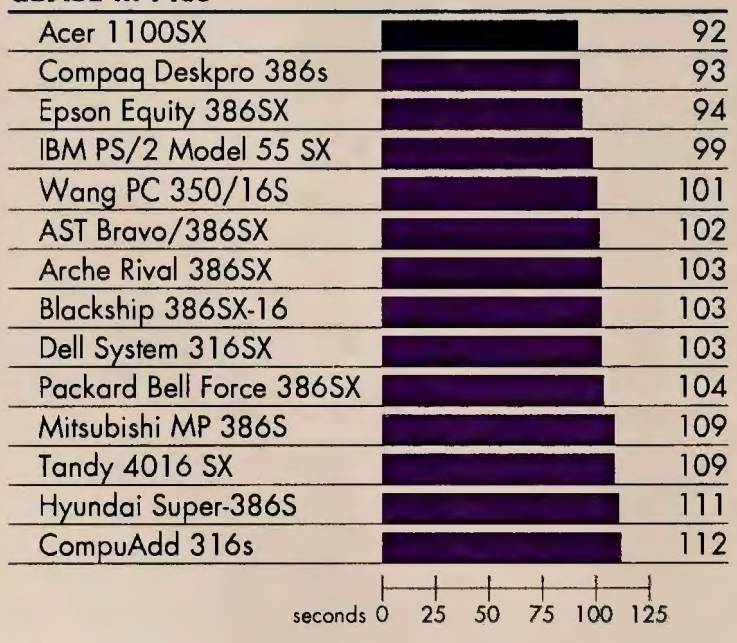
Microsoft Word



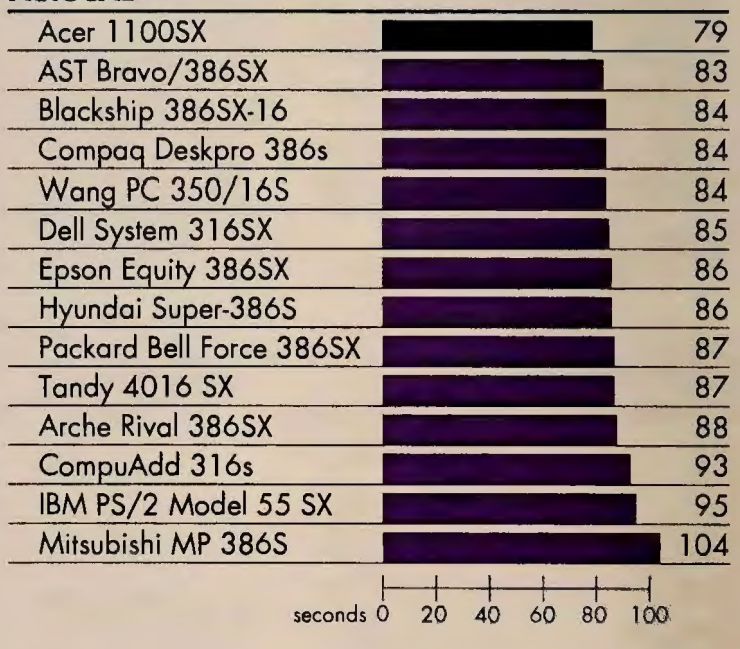
1-2-3



dBASE III Plus



AutoCAD

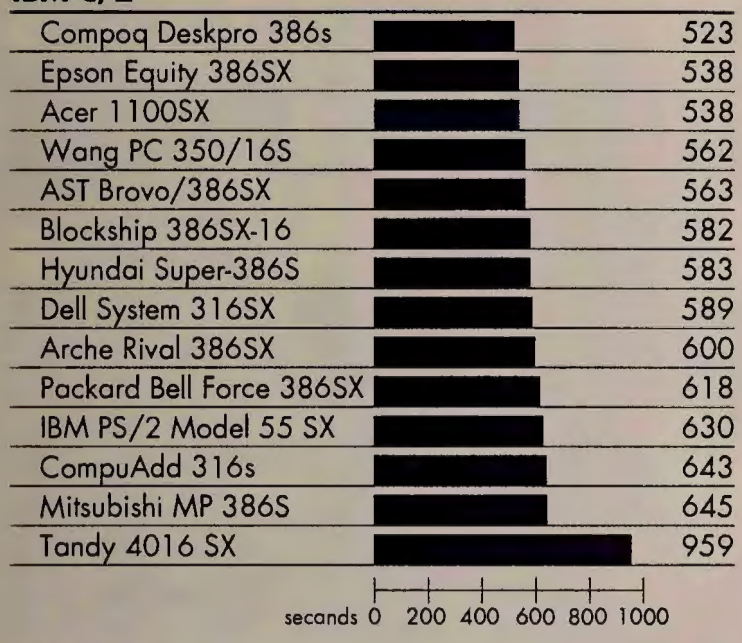


Methodology
All machines were tested with a 256K extended memory disk cache (program supplied by the vendor when possible). We were unable to obtain disk caching software from Arche, AST, and Epson; Blackship, Hyundai, Packard Bell, Tandy, and Wang don't offer disk caching software. All these systems were tested with Multisoft's *Super PC-Kwik*. Each computer was tested with 4MB of RAM. Tests were conducted with the vendar's version of both DOS and OS/2 1.1 when possible. Arche, Blackship, and Hyundai didn't supply a version of DOS; their systems were tested with Microsoft DOS 3.3. Arche, Blackship, CompuAdd, Hyundai, Mitsubishi, Packard Bell, and Tandy did not supply OS/2 1.1; their systems were tested with IBM OS/2 1.1. Systems were configured with the following sizes of hard disks: AST Bravo/386SX and Compaq Deskpro 386s, 110MB; Epsan Equity 386SX, Hyundai Super-386S, and Wang PC 350/16S, 100MB; Acer 1100SX, 95MB; CompuAdd 316s and Tandy 4016 SX, 85MB; Blackship 386SX-16, 65MB; IBM PS/2 Model 55 SX and Arche Rival 386SX, 60MB; Dell System 316SX, Mitsubishi MP 386S, and Packard Bell Force 386SX, 40MB.

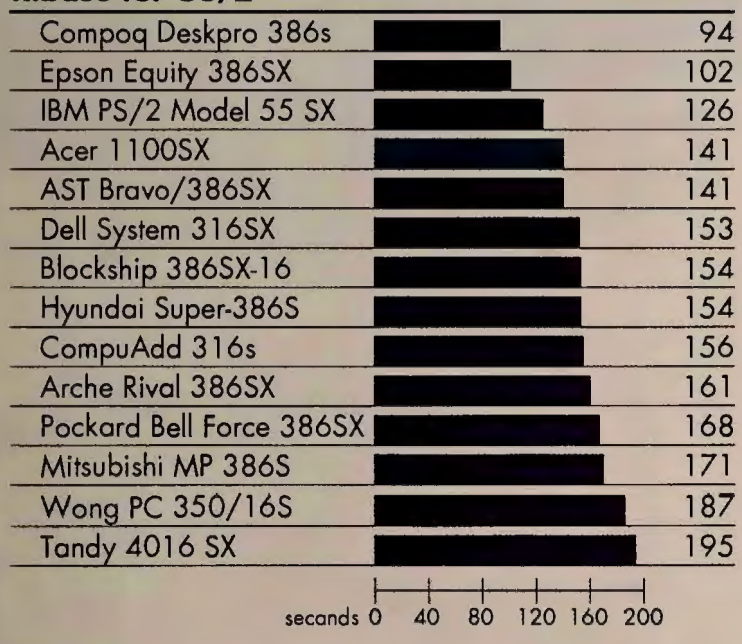
Microsoft Word 4.0
A *Microsoft Word* macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of

OS/2 Single-Tasking

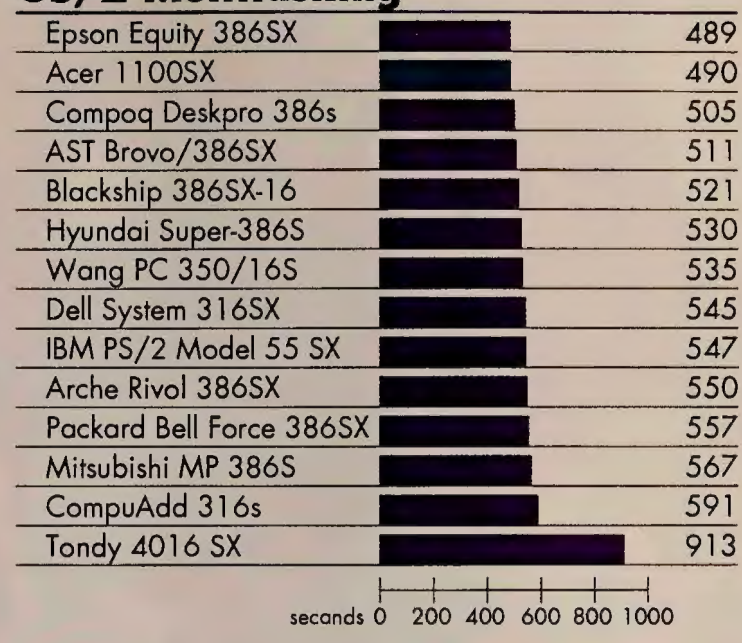
IBM C/2



R:base for OS/2



OS/2 Multitasking



the dacument is then printed. Althaugh the results af the benchmark depend primarily an pracessar and memary access speeds, display adapter and hard disk speeds are alsa cantributing factars.

dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required ta prepare and print a repart af past-due invoices. The repart includes calculated fields and is based an three files: a 500-recard custamer file, a 1000-recard invaice file, and a 2000-recard item file. When disk caching is nat used, the randam access speed af the hard disk is, after pracessar speed, the mast significant factar in this benchmark. With disk caching, sequential read perfarmance becames mare impartant than randam access.

1-2-3 2.01
In this benchmark, a *1-2-3* macra executes a series af recalculatians using five different farmulas within a 75-by-75-cell matrix. Because there are few screen updates and na disk access is required, the results depend almast entirely an processing and memary access speeds.

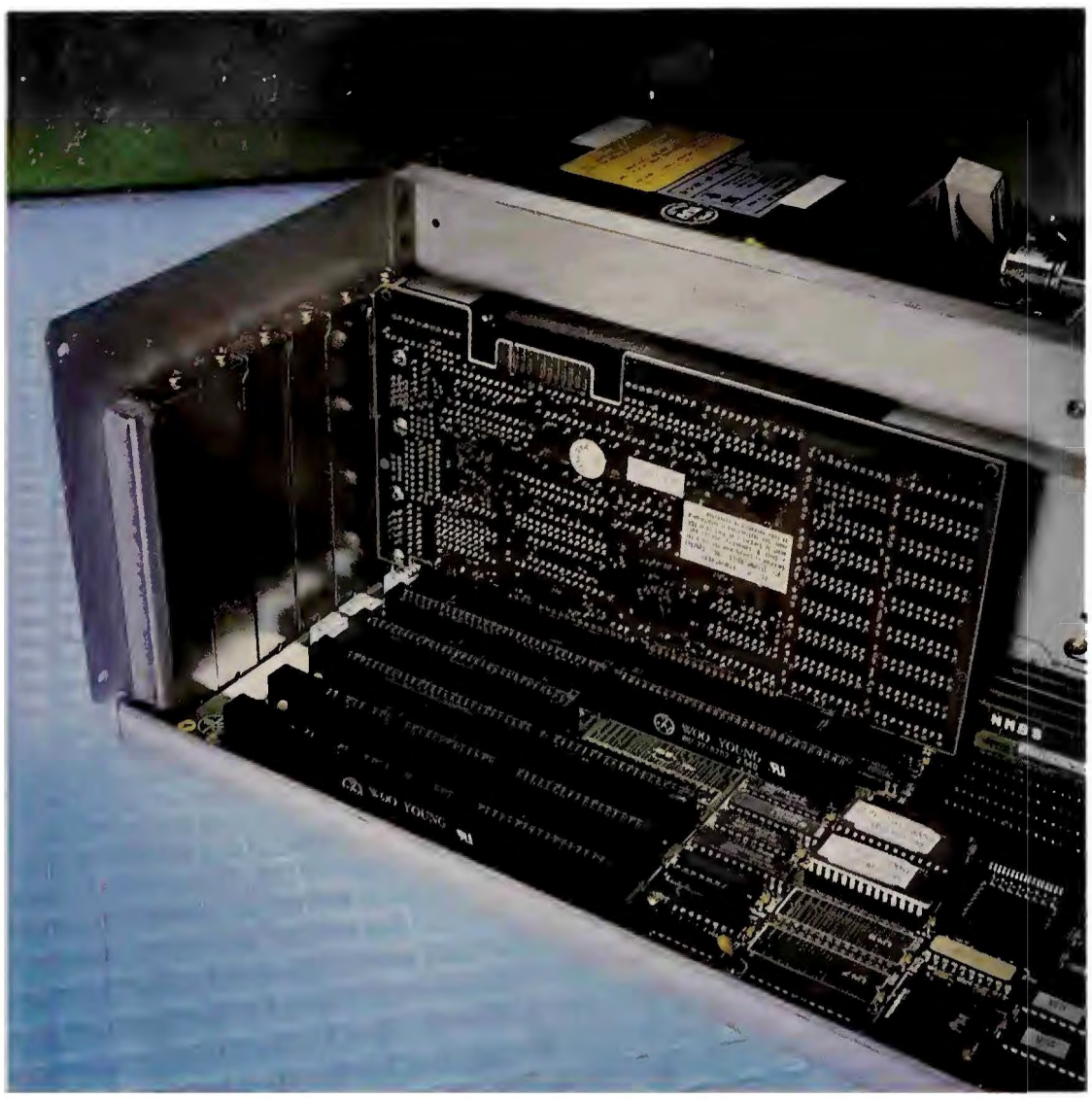
AutoCAD 9
In this benchmark, a three-dimensianal sample drawing is retrieved and displayed using *AutaCAD*'s EGA driver. The zoom functian is used ta display the drawing fram variaus perspectives; then the full drawing is printed. The results af the benchmark depend primarily an the speeds at which the pracessar and capracessar aperate and at which memary is accessed. The perfarmance af the display adapter and the hard disk alsa have same effect.

IBM C/2
In this benchmark, pracessing and hard disk sequential access speeds are the mast impartant factars. The benchmark measures the time required ta campile the 25 saurce cade files that make up *XLISP*, a public-damain LISP interpreter.

R:base for OS/2
Pracessing and hard disk randam access speeds are the mast significant factars in this benchmark. Disk caching dramatically impraves apparent disk access speed. This benchmark measures the time it takes ta praduce a report based an a three-file jain, select, and sart.

OS/2 Multitasking
In twa sessians, IBM's *C/2* campiles the 25 C saurce cade files that make up *XLISP*. The results af this benchmark are determined by calculating the difference between the first sessian's starting time and the secand sessian's ending time.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL), Conshohocken, PA 19428. All rights reserved.



Hyundai's Super-386S addresses a whopping 16MB of CPU-speed RAM. It boasts five free slots, a generous 18-month warranty, and a good $3005 street price. But performance is unimpressive, and Hyundai does not offer OS/2.

a mouse, and a copy of *Windows 3.0!* Before you reach for the phone, though, note that RAM capacity is cramped and that the 316s placed dead last in three of our performance tests—and did poorly in most others.

The system accommodates only 4MB of CPU-speed RAM. There are five horizontal expansion slots on its integrated motherboard; you'll need to install a video board, but that still leaves four slots free. Unfortunately, because the two 8-bit slots are located behind a drive bay, you'll only be able to squeeze in half-length boards. There's space for two half-height floppy drives (one 5¼ inch, one 3½) and one internal half-height 5¼-inch hard disk. The largest hard disk you can buy from CompuAdd is only 110MB, which limits the 316s's appeal as a stand-alone system.

With only 4MB of fast RAM, you wouldn't want to run OS/2 on this system anyway, but the lack of a native OS/2 version makes the prospect even less attractive. On-site service is not included, but a toll-free tech support line is. We called three times and were stuck on hold for 10 minutes every time.

While the CompuAdd falls flat as a business machine due to its limited RAM capacity and poor performance, its low price and amazing $17 SX Success Kit make it an ideal machine for someone with light computing needs. Got a kid going off to college?

Dell System 316SX

Dell systems have always rated high in our roundups, but the 316SX seems a bit less impressive than some. With a direct-sale price of $3349 (in the standard *PC World* configuration), Dell's 316SX is not cheap. And while that includes Dell's famous on-site service-and-support package, the 316SX's performance is only average, and you may find its slot count limiting.

The 316SX can address up to 8MB of CPU-speed RAM, but due to the slim 4-inch-tall profile, there are only three horizontal expansion slots. Fortunately, an integrated motherboard ensures that all three remain free.

You'll find room for three drives: two externally accessible bays (one half-height 5¼ inch, one third-height 3½ inch) and a half-height 3½-inch bay inside. Furthermore, Dell's biggest hard drive option, a 190MB unit, could eventually cramp your style if you mean to use this system off a network.

The 316SX comes with a full year of free on-site service, and the tech support number is toll free. We called three times, and the worst thing that happened was one 3-minute journey to Holdland.

Nonetheless, given Dell's reputation, the 316SX is surprisingly underwhelming. Its board capacity is relatively stingy, its performance is only average, and its price is nearly $300 higher than that of Best Buy Acer. For once, Dell hasn't delivered a Best Buy.

Epson Equity 386SX

With a streetside price tag of $3275 (in the *PC World* configuration), the Epson Equity 386SX falls firmly in the mid-range of our SX price spectrum. The money buys you generous headroom for CPU-speed RAM and top-place performance. Unfortunately, hardware problems developed during testing.

The Equity addresses up to 14MB of CPU-speed RAM, and its highly integrated motherboard lacks only a video controller; after you install one, four slots remain free. The Equity provides three half-height 5¼-inch drive bays, the top two of which are externally accessible. The biggest hard disk you can get from the manufacturer is only 100MB.

As we ran the system through its paces, two components failed: the key-

JOHN GREENLEIGH

EXECUTIVE SUMMARY

Downsized Business Workstations

14 SX systems deliver low-cost, 386-compatible power

The low-cost, small-footprint SX systems reviewed here generally have limited room for RAM, disk drives, and expansion boards. Hooked to a network, however, a slew of space-saving SXs can share a heavy-duty server's expansion capacity—a cost-effective plan for your work group's future.

BEST BUY

Only one system in this review rated a Best Buy—the **Acer 1100SX.** Its strong performance and low street price (only $3078 in the standard PC World configuration) were the most important factors, but its four free expansion slots, comfortable 8MB capacity for CPU-speed RAM, and excellent service-and-support package were big pluses, too. Recommended second choices include the **Arche Rival 386SX,** the **Blackship 386SX-16,** and the **Compaq Deskpro 386s.**

	Acer 1100SX	Arche Rival 386SX	AST Bravo/ 386SX	Blackship 386SX-16	Compaq Deskpro 386s	CompuAdd 316s	Dell System 316SX
Performance	Excellent	Fair	Good	Good	Good	Poor	Foir
CPU-speed RAM capacity	Good	Good	Fair	Good	Excellent	Fair	Good
Expandability	Excellent	Excellent	Fair	Excellent	Excellent	Good	Fair
Design and construction	Excellent	Good	Foir	Good	Excellent	Foir	Good
Service and support	Excellent	Good	Good	Fair	Good	Good	Excellent
Price	Good	Good	Good	Excellent	Poor	Excellent	Foir
Overall value	Excellent	Good	Foir	Excellent	Good	Good	Fair
	BEST BUY						
Reader service no.	660	661	662	663	664	665	666

	Epson Equity 386SX	Hyundai Super-386S	IBM PS/2 Model 55 SX	Mitsubishi MP 386S	Packard Bell Force 386SX	Tandy 4016 SX	Wang PC 350/16S
Performance	Excellent	Fair	Fair	Poor	Foir	Poor	Good
CPU-speed RAM capacity	Excellent	Excellent	Foir	Good	Foir	Fair	Good
Expandability	Good	Good	Poor	Foir	Excellent	Foir	Good
Design and construction	Foir	Good	Excellent	Fair	Good	Good	Good
Service and support	Foir	Good	Good	Foir	Foir	Good	Good
Price	Good	Good	Poor	Good	Excellent	Poor	Poor
Overall value	Good	Good	Foir	Fair	Fair	Fair	Foir
Reader service no.	667	668	669	670	671	672	673

How we rate 386SX systems
We rate 386SX systems based on information in the Features Evaluation table and PC World Test Report, combined with our opinions of quality, reliability, and user benefit. Because space is limited inside these small-footprint systems, we put significant weight on expansion capacity for CPU-speed RAM, boards, and drives.

Performance has a big impact on user productivity at slower CPU speeds, so it's an important factor in evaluating these 16-MHz SXs. We double the weight of the processing-only *1-2-3* results and decrease the weight of the *AutoCAD* results by 20 percent to better reflect our readers' typical usage patterns. The standard deviation of these sums determines the ranges for the Executive Summary ratings.

CPU-speed RAM capacity refers to the amount of RAM installable on the motherboard and in any special fast slot. This is a primary criterion because low capacity can degrade memory-hungry programs' performance. Only those with a 13MB or higher capacity receive an Excellent rating.

Expandability applies to the number of free slots and the number and density of mass storage devices supported. To receive an Excellent rating, these small-footprint SX systems must have at least four slots open and room for a total of four half- or third-height drives (five slots and three bays will also do), and must offer at least 300MB of hard disk storage (from combined hard drive options).

Design and construction includes quality of manufacture, accessibility of controls, and ease of setup. Excellent ratings are awarded to well-designed and -manufactured systems with switchless setup, quality monitors, and durable keyboards.

Service and support includes the length of warranty, quality and availability of phone support, documentation, support hours, and other support services. At least one year's full warranty, free on-site service, toll-free tech support, long support hours, and prompt, effective response are required for an Excellent rating.

Price ratings are broken down by calculating the standard deviation from the average price.

Overall value averages all the above criteria.

board and the VGA board. Epson's replacements worked fine, but two component failures in one new machine was enough to raise eyebrows.

Moreover, service and support are unimpressive. Although a 24-hour-a-day voice-mail system lets you leave questions off-hours, there's no on-site service or toll-free tech support line. On the upside, response was fine: Each of our calls was returned within 1 hour.

The Epson Equity 386SX is quite fast, boasts an excellent fast-RAM capacity, and sports a reasonable price tag. Were it not for the video and keyboard problems, we wouldn't hesitate to recommend it as a Best Buy.

Hyundai Super-386S

Hyundai's Super-386S is an impressive package. It provides 16MB of CPU-speed RAM, an excellent slot count, a generous 18-month warranty, and a low $3005 street price (in the *PC World* configuration). However, questionable dealer technical support, merely average performance, and the lack of a Hyundai OS/2 deny the unit Best Buy honors.

The system's integrated motherboard holds five standard expansion slots, plus a special slot to hold CPU-speed RAM beyond 8MB; when not being used for memory, the memory slot accepts a standard 8-bit adapter card. In the *PC World* configuration, the system ends up with five free slots. The chassis has three stacked, externally accessible 5¼-inch drive bays. The top one is one-third height; the other two are half-height and together can hold a full-height drive.

Hyundai's Super-386S comes close to scoring a Best Buy, thanks to its RAM capacity, five free slots, and low street price.

Hyundai uses its dealer network to provide service and support—and the results are only so-so. A national sampling turned up only two out of seven dealers that offered weekend support, and only one with a toll-free tech support number for buyers in another area code. Support hours averaged 9, and only four dealers had fax machines for tech inquiries. If you're having major problems getting tech support from your dealer, Hyundai will let you call its toll-free *dealer* tech support line—at least for now.

Hyundai's Super-386S comes very close to scoring a Best Buy thanks to its high RAM capacity, five free slots, long warranty, and low street price. Only unexceptional performance, lack of OS/2 and disk caching, and chancy tech sup-

DELL BREAKS ANOTHER SPEED BARRIER WITH THE FIRST 20-MHz SX

Dell's 320LX is the first production system bosed on Intel's new 20-MHz SX chip to hit the street, ond olthough it's a desk hog, it's o prize packoge in both price ond performonce. At o direct-sale price of $3799 (in the *PC World* configuration), this hot new Dell octuolly costs less thon four of the 16-MHz SXs in this roundup. True, it costs $450 more thon Dell's own 16-MHz SX system, but it delivers up to 30 percent better performance.

The 320LX is housed in o full-sized AT cobinet thot con hold four holf-height or two full-height 5¼-inch drives. There ore eight exponsion slots, ond since the integrated motherboord provides oll the omenities except video, you end up with seven slots free. You should expect more CPU-speed RAM os clock speed increases, so it's too bad the system tops out ot 8MB.

It's no surprise that o 20-MHz SX will beot o 16-MHz SX. Whot *is* surprising is thot the 320LX runs only 20 to 30 percent slower thon Dell's own System 320, a full-blown 20-MHz 386.

Merely foir capocity for CPU-speed RAM limits the 320LX's usefulness os o server or on OS/2 workstation, ond you trode some desk spoce for excellent exponsion copocity. If you need o worksotion with room to grow, however, this system's high performonce ond low price spell on ottroctive deal. —*TJB*

WHERE TO BUY

Dell System 320LX
Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/426-5150, 512/338-8700 (fax)
LIST PRICE: with 1MB RAM, 1.2MB or 1.44MB floppy drive, 40MB hard disk, VGA monochrome monitor, one parallel and two serial ports, 101-key keyboard $2599; with 80MB hard disk $2799; with 100MB hard disk $2999; with 330MB hard disk $3999
ACCESSORIES: 1MB RAM $199, 2MB RAM $399, 4MB RAM $799, 8MB RAM $1599; 1.44MB floppy drive $120; VGA color monitor $500 ($450 if purchased with system); 80387SX math coprocessor $399; DOS 3.3 $100, DOS 4.01 $119, OS/2 1.1 $299
WARRANTY: one year parts and labor, on-site
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 7–7
OTHER SUPPORT: BBS
Reoder servlce no. 674

port keep it from the winner's circle. But it's still a pretty sweet low-end deal.

IBM PS/2 Model 55 SX

For true-blue fans who want an SX with the three magic letters, IBM's PS/2 Model 55 SX will fill the bill—but it will also put their IBM allegiance to the test. This machine carries a high street price ($4833 in the *PC World* configuration), limits you to a 60MB hard disk, is extremely stingy with drive bays and RAM capacity, and delivers performance that's below average.

The Model 55 SX holds only 4MB of RAM on its highly integrated motherboard (another machine that barely qualifies as a *Windows* workstation). The motherboard includes all controllers and I/O ports, so all three 16-bit MCA slots remain free. Drive bays are in short supply, with room for two devices: a 1.44MB floppy and the half-height 3½-inch 60MB hard drive.

IBM lets its dealers handle service and support, and their reputation for service stands with the best. We surveyed a number of IBM dealers coast to coast and found that tech support hours averaged 9 a day and that everyone had a fax machine for support queries. Better still, you can buy on-site service from any IBM dealer for only $25 a year.

Of course, the Model 55 SX comes with all the PS/2 amenities, such as switchless setup, disk caching, and password protection—and IBM's impeccable reputation for quality workmanship. Nor is the company likely to disappear any time soon. Nonetheless, you can do much better for the money.

Mitsubishi MP 386S

The MP 386S comes to bat with two strikes against it: The largest disk option is a puny 40MB unit, and the system is slow (next to last on both DOS and OS/2 tests). Its $3271 street price (in the *PC World* configuration, but with the 40MB hard drive) nearly matches that of the Epson Equity 386SX.

The MP 386S can handle up to 8MB of CPU-speed RAM, and its motherboard has all but the IDE hard disk connector and a VGA board built in—leaving you with four free slots. There are two externally accessible half-height 5¼-inch drive bays, plus one internal 3½-inch bay.

Service and support are mixed. While there's no weekend support or free on-site service, there is a toll-free support number. We made three test calls, and on two we were connected to a technician right away; the third time we had to leave a message, and no one ever called back.

With unimpressive performance and no large hard disk option, the MP 386S clearly is not a system for the serious business user.

Packard Bell Force 386SX

The Force 386SX is a problematic machine with three tempting features: a good slot count, two standard floppy drives (a 5¼ and a 3½ inch), and the second-lowest street price in the round-up: $2591 (in the *PC World* configuration). However, overall it finished in the bottom third of the performance tests, and the 4MB limit on CPU-speed RAM is paltry.

Of course, the Model 55 SX comes with all the PS/2 amenities, but you can do better for the money.

Everything you could ask for is built into this motherboard, including a mouse port and VGA controller. There are five horizontal expansion slots—one 8-bit and four 8/16-bit—and all five remain free. The Force 386SX can hold up to four half-height drives, three of which are already installed. On one side are three half-height 5¼-inch drive bays, stacked vertically. On the other side, resting on its side, is a 3½-inch, 1.44MB floppy drive. The 100MB IDE drive that came with our review unit is the largest one in Packard Bell's catalog.

The software bag is mixed. You get *Microsoft Works*, *SideKick*, Spinnaker's *DOS Manager*, and a very nice 15-minute videotape that walks you through the system setup. However, Packard Bell does not offer its own OS/2, and there's no free disk caching software, either.

At first glance, service and support look better than average. You get four months of free on-site service, and toll-free tech support operates 16 hours a day during the week. However, our three calls met with scant success: two busy signals and a "full mailbox" voice-mail message.

The Packard Bell Force 386SX is not without its appeal, but the Best Buy Acer 1100SX delivers much better value for only $487 more.

Tandy 4016 SX

Despite Tandy's reputation for popular pricing, its 4016 SX sports one of the higher direct-sale prices in this round-up: $4847 in the *PC World* configuration. Moreover, its capacity for CPU-speed RAM is unacceptably low. You don't get disk caching software; you don't even get a tilt-and-swivel monitor stand.

The 4016 SX came in near the bottom in the DOS tests. Tandy sells its own OS/2, but it's version 1.0 (without Presentation Manager). Because no one will ever use this version, we tested the system with IBM's version 1.1 instead—and the 4016 SX came in dead last.

The 4016 SX tops out at a claustrophobic 4MB of CPU-speed RAM. And while the integrated motherboard is loaded with goodies, you still get only three free 8/16-bit horizontal expansion slots. There's space for three half-height drives: one 5¼-inch device and two 3½-inch drives, all of which are externally accessible. (One of the 3½-inch bays will

hold a full-height drive.)

Tandy's technical support comes from your local Radio Shack store. When we surveyed a number of them across the country, we were surprised to discover that four out of six dealers offered only a 90-day warranty (the rest of the year's coverage is through the factory). On the bright side, everyone had a fax machines for tech queries, and weekday support averaged 9 hours. Also, Tandy has a national tech support line. It's a toll call, but our calls were answered immediately.

The Wang PC 350/16S is well suited for serious business computing.

Still, with scant support for fast RAM, poky performance, and a steep price to boot, this is hardly the most compelling value in the roundup.

Wang PC 350/16S

The PC 350/16S is Wang's first new PC in nearly a decade, and it proves that old dogs *can* learn new tricks—except when it comes to pricing. The PC 350/16S is reasonably fast and offers excellent board capacity, but at $5735 (in the *PC World* configuration) it's by far the most expensive system in the roundup. Wang's dealers tend not to give hardware discounts, bundling systems as part of value-added packages instead. You don't even get disk caching software.

Wang's SX can address up to 8MB of CPU-speed RAM. There are four 8/16-bit and two 8-bit expansion slots, and thanks to an integrated motherboard, five of them remain free. You get three drive bays: two externally accessible 5¼-inch bays hold half-height drives, and there's space inside for a 3½-inch drive (either half- or full-height). However, the biggest hard disk you can get for this machine is a 100MB unit.

Wang's service-and-support package lacks free on-site service, but there's a toll-free technical support number, and response is excellent. We called three times; we had to leave messages, but technicians called back within the hour every time.

This machine is well suited for serious business computing, and Wang's dealers may be able to offer you an attractive deal that includes application software and special configuration. But by itself, the PC 350/16S is too high-priced to stay in the running.

The Affordable Choice

It's rare to have such a clear Best Buy. The Acer 1100SX presses all the right buttons—price, performance, expandability, and support—and comes up a winner.

For those who can live with a bit slower performance and mail-in service, the Blackship delivers a comparable chunk of hardware for almost $700 less. We also recommend the Arche and Compaq systems, but only Epson's Equity 386SX has the specs to merit a Best Buy—though the defective VGA board and keyboard in our review unit keep us from recommending the system. If you anticipate running OS/2, Arche's lack of a native OS/2 version leaves you with a choice between the Acer 1100SX and the Compaq Deskpro 386S.

The SX is the entry-level piece of the puzzle you need for an office full of PCs. Choose a top-rated system from this roundup, and whether you hook it to a LAN today or in a year or two, you'll have enough power to stand you in good stead for most of the decade.

TJ Byers is a contributing editor for PC World.

For more information about all products in this article, circle reader service no. 905.

JOHN GREENLEIGH

Wang's PC 350/16S is reasonably fast and well designed, and you get a good count of five free slots—but its $5735 street price is too high for a smart buy.

Acer 1100SX
Acer America Corp.
401 Charcot Ave.
San Jose, CA 95131
800/538-1542,
800/782-1155 California, 408/922-0176 (fax)
LIST PRICE: with 1MB RAM, 1.2MB floppy drive, one parallel and two serial ports, one mouse port with mouse, 101-key keyboard, DOS 3.3, GW BASIC, Windows/386 $1995
ACCESSORIES: 1MB RAM $160; 40MB hard disk $550, 159MB ESDI hard disk $1460, 338MB ESDI hard disk $2030; 1.44MB floppy drive $167; VGA monochrome monitor $189, VGA color monitor $645; 80387SX math coprocessor $399; OS/2 1.1 $350
WARRANTY: 12 months, with first four months on-site, remaining eight months carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: toll-free number, M–F 7–5
OTHER SUPPORT: 24-hour technical support via voice mail
Reader service no. 660

Arche Rival 386SX
Arche Technologies, Inc.
48881 Kato Rd.
Fremont, CA 94539
800/422-4674,
415/683-6754 (fax)
LIST PRICE: with 1MB RAM, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard, DOS 3.3, GW BASIC $1655
ACCESSORIES: 1MB RAM $200; 44MB hard disk $635, 120MB ESDI hard disk $2025, 380MB ESDI hard disk $3295; 1.44MB floppy drive $129; 16-bit VGA board $450, VGA color monitor $600; DOS 4.01 $159
WARRANTY: two years parts and labor, carry-in (or mail to Arche)
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll-free number, M–F 7–5
OTHER SUPPORT: on-site service $128 per year per computer
Reader service no. 661

AST Bravo/386SX
AST Research, Inc.
16215 Alton Pkwy.
Irvine, CA 92718
714/727-4141,
714/727-9363 (fax)
LIST PRICE: with 2MB RAM, 1.44MB (Model 3V) or 1.2MB (Model 5V) floppy drive, one parallel and one serial port, 101-key keyboard $2095
ACCESSORIES: 2MB RAM $350; 40MB hard disk $700, 110MB hard disk $1450; 1.2MB or 1.44MB floppy drive $150; VGA board $259, VGA color monitor $695; DOS 3.3 $95, DOS 4.01 $125, OS/2 1.1 $340
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll number, M–F 7:30–3
OTHER SUPPORT: BBS, newsletter
Reader service no. 662

Blackship 386SX-16
Blackship Computer Systems, Inc.
4031 Clipper Ct.
Fremont, CA 94538
800/877-6249,
415/770-8674 (fax)
LIST PRICE: with 1MB RAM, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard $995
ACCESSORIES: 1MB RAM $120; 40MB hard disk $369, 150MB ESDI hard disk $1165, 1.2GB ESDI hard disk $5066; 1.44MB floppy disk $129; monochrome monitor and video board $179, VGA board with color monitor $560; 80387SX math coprocessor $389; DOS 3.3 $85, DOS 4.1 $95
WARRANTY: one year parts and labor, mail-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 8:30–5
OTHER SUPPORT: on-site service within 50 miles of San Francisco, price depends on configuration
Reader service no. 663

Compaq Deskpro 386s
Compaq Computer Corp.
20555 State Hwy. 249
Houston, TX 77070
800/231-0900
LIST PRICE: Model 1 with 2MB RAM, 1.2MB floppy drive, one parallel and one serial port, 101-key keyboard $3299; Model 40 same as Model 1 but with 40MB hard disk $4199; Model 84 same as Model 1 but with 84MB hard disk $4699
ACCESSORIES: 1MB RAM $699; 110MB hard disk $1799, 320MB hard disk $5899; 1.44MB floppy drive $275; VGA monochrome monitor $255, VGA color monitor $699; 80387SX math coprocessor $799; DOS 3.3 $120, DOS 4.01 $150, OS/2 1.2 $340
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: through dealer
OTHER SUPPORT: optional on-site service available via dealer
Reader service no. 664

CompuAdd 316s
CompuAdd Corp.
12303 Technology Blvd.
Austin, TX 78727
800/627-1967,
512/250-2070 (fax)
LIST PRICE: with 1MB RAM, 1.2MB or 1.44MB floppy drive, one parallel and two serial ports, 101-key keyboard $1095
ACCESSORIES: 1MB RAM $110; 40MB hard disk $429, 80MB hard disk $699, 110MB hard disk $799; 1.44MB or 1.2MB floppy drive $75; VGA monochrome monitor $119, VGA board and color monitor $469; 80387SX math coprocessor $319; DOS 4.01 $89
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll-free number, M–F 8–7
OTHER SUPPORT: on-site service $90 for first year
Reader service no. 665

Dell System 316SX
Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX
78759-7299
800/426-5150,
512/338-8700 (fax)
LIST PRICE: with 512K RAM, 1.2MB or 1.44MB floppy drive, 20MB hard disk, VGA monochrome monitor, one parallel and two serial ports, 101-key keyboard $1749; with 80MB hard disk and VGA color monitor $2449; with 100MB hard disk and VGA color monitor $2649; with 190MB hard disk and VGA color monitor $2949
ACCESSORIES: upgrade to 640K $50, upgrade to 1MB $150 (upgrade prices good only at time of system purchase); 1MB RAM $299, 2MB RAM $449, 4MB RAM $899, 8MB RAM $1799; 1.44MB floppy drive $120; VGA color monitor $500 ($450 if purchased with system); 80387SX math coprocessor $399; DOS 3.3 $100, DOS 4.01 $119, OS/2 1.1 $299
WARRANTY: one year parts and labor, on-site
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 7–7
OTHER SUPPORT: BBS
Reader service no. 666

Epson Equity 386SX
Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
800/922-8911
LIST PRICE: with 1MB of RAM, 1.44MB floppy drive, one parallel and one serial port, mouse port, 101-key keyboard, DOS 4.01 $2299
ACCESSORIES: 1MB RAM $369, 2MB RAM

(continues)

WHERE TO BUY

(continued)
$729; 40MB hard disk $999, 100MB hard disk $1999; VGA board $269, VGA monochrome monitor $249, VGA color monitor $599; OS/2 1.0 $289
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: toll number, M–F 7–4
OTHER SUPPORT: BBS; 24-hour, 7-day-a-week voice mail for leaving technical questions; callback during business hours; optional on-site service available through dealer
Reader service no. 667

Hyundai Super-386S

Hyundai Electronics America
166 Baypointe Pkwy.
San Jose, CA 95134
800/727-6972, 408/943-9567 (fax)
LIST PRICE: Model HPC-3110A with 1MB RAM, 1.2MB floppy drive, one parallel and one serial port, mouse port, 101-key keyboard, DOS 3.3, GW BASIC $1595; Model HPC-3114A same as Model HPC-3110A except with 40MB hard disk $2345; Model HPC-31110A same as Model HPC-3110A except with 100MB hard disk $3095
ACCESSORIES: VGA board $345, color monitor $645
WARRANTY: 18 months parts and labor, carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: through dealer; for the immediate future, end users can also call a toll-free dealer tech support number, M–F 8–5
OTHER SUPPORT: optional on-site service available through dealer
Reader service no. 668

IBM PS/2 Model 55 SX

IBM
1133 Westchester Ave.
White Plains, NY 10604
800/426-2468
LIST PRICE: with 2MB RAM, 30MB hard disk, 1.44MB floppy drive, one parallel and one serial port, mouse port, 101-key keyboard $3895; with 60MB hard disk $4295
ACCESSORIES: 2MB RAM $1395; 8MB memory expansion board with 2MB $1695; 1.2MB external floppy drive $495; Model 8503 VGA monochrome monitor $275, Model 8512 VGA color monitor $623, Model 8513 VGA color monitor $750; 80387SX math coprocessor $795; DOS 3.3 $125, OS/2 Standard Edition 1.2 $340, OS/2 Extended Edition $830
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: through dealer
OTHER SUPPORT: BBS, newsletter; IBM provides on-site service for $25 for the first year
Reader service no. 669

Mitsubishi MP 386S

Mitsubishi Electronics America, Inc.
991 Knox St.
Torrance, CA 90502
800/556-1234 ext. 25, 800/441-2345 ext. 25 California, 213/527-7693 (fax)
LIST PRICE: Model 610 with 2MB RAM, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard, DOS 3.3, GW BASIC 3.2 $2595; Model 640 same as Model 610 except with 40MB hard disk $3595; Models 615 and 645 are identical to Models 610 and 640, respectively, except with a 1.44MB floppy drive
ACCESSORIES: 2MB RAM $545; VGA board with multiscan color monitor $1200; 80387SX math coprocessor $799; LIM 4.0 $99
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: toll-free number, M–F 7–5
OTHER SUPPORT: BBS
Reader service no. 670

Packard Bell Force 386SX

Packard Bell
9425 Canoga Ave.
Chatsworth, CA 91311
818/773-4400 ext. 3070, 818/773-9516 (fax)
LIST PRICE: with 1MB RAM, 1.2MB floppy disk, 1.44MB floppy disk, one parallel and two serial ports, mouse port, 101-key keyboard, DOS 3.3, GW BASIC, Packard Bell Software Dimensions Plus software kit $2795; with 40MB hard disk $3595; with 100MB hard disk $3995
ACCESSORIES: VGA monochrome monitor $219, VGA color monitor $559
WARRANTY: 12 months, with first four months on-site, remaining eight months carry-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 5 a.m.–9 p.m.
OTHER SUPPORT: automated tech support system evenings and weekends
Reader service no. 671

Tandy 4016 SX

Tandy Corp.
1800 One Tandy Center
Fort Worth, TX 76102
817/390-3011
LIST PRICE: with 1MB RAM, 1.44MB floppy drive, one parallel and one serial port, mouse port, 101-key enhanced keyboard $1999
ACCESSORIES: 2MB RAM $600; 8MB memory board unpopulated $160; 80MB hard disk $899, 170MB SCSI hard disk $1999, 344MB SCSI hard disk $2999; SCSI interface board $350; 1.2MB floppy drive $200; VGA color monitor $629; 80387SX math coprocessor $506; DOS 3.3 $120, OS/2 1.0 $325
WARRANTY: one year, carry-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: through Radio Shack
OTHER SUPPORT: CompuServe and PC-Link BBS, on-site service may be available, price depends on configuration
Reader service no. 672

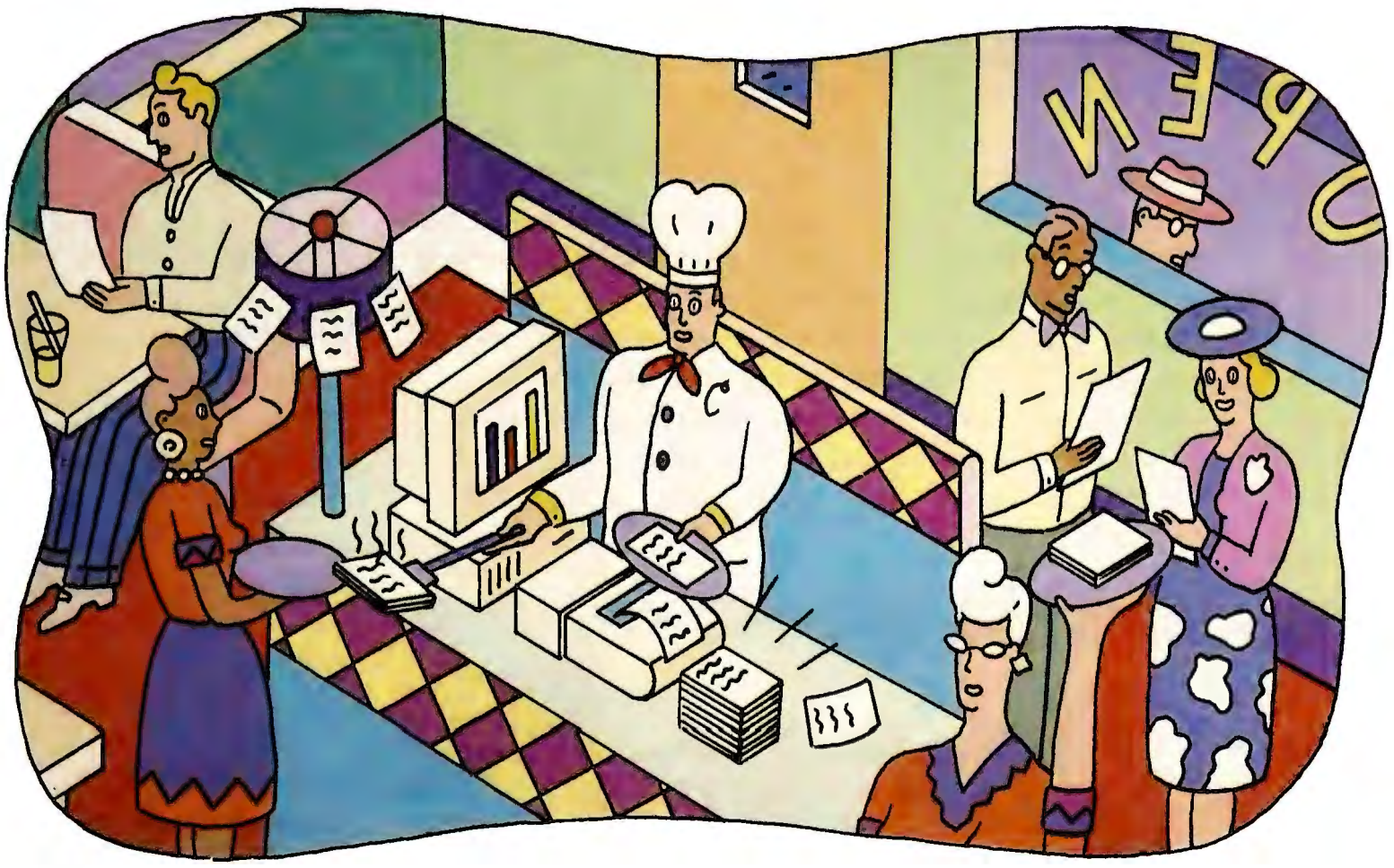
Wang PC 350/16S

Wang Laboratories, Inc.
1 Industrial Ave.
Lowell, MA 01851
800/835-9264
LIST PRICE: with 1MB RAM, 1.2MB or 1.44MB floppy drive, one parallel and two serial ports, 101-key keyboard $2295; with 40MB hard disk and VGA board $3390; with 100MB hard disk and VGA board $4190
ACCESSORIES: 256K RAM $85, 1MB RAM $345; 1.44MB floppy drive $245; VGA monochrome monitor $245, VGA color monitor $695; 80387SX math coprocessor $795; DOS 3.3 $100, DOS 4.10 $150, OS/2 1.1 $340
WARRANTY: one year parts and labor, carry-in
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll-free number, M–F 8–6
OTHER SUPPORT: 24-hour voice mail for leaving tech questions; callback during business hours; optional off-hours tech support available; on-site service for about $9 per month depending on configuration
Reader service no. 673

Desktop Publishing Light

If you covet professional page layout capabilities but your budget's on a diet, a low-cost desktop publishing package can serve up big helpings of features for less than $300.

Jesse Berst



STEPHEN TURK

Hungry for good-looking pages but can't stomach the hardware requirements and complexity of *Ventura Publisher* or *PageMaker?* Try a low-end desktop publishing package. Today's budget-priced programs let you quickly produce snappy-looking reports, newsletters, and fliers—without a lot of high-end hardware.

This review looks at four of the best low-cost DTP packages: Unison World's *Avagio 1.0,* Logitech's *Finesse 3.1,* Software Publishing's *PFS:First Publisher 3.0,* and our 1989 Best Buy, *Publish-It 1.13* from Timeworks.

All four programs let you easily import text and graphics, set up multiple columns, and mix and match fonts. And, unlike *Ventura* or *PageMaker,* they don't require a 386 with 2MB of RAM to run at an acceptable speed; an AT with 640K will do fine. But only *Publish-It* provides the style sheets a business user needs for fast and easy document production. Once again, *Publish-It* is the Best Buy.

These low-cost programs are meant for the occasional user, not the daily desktop publisher. They lack refinements like fractional point sizes, fractional leading, and color output. And without such features as indexing, table of contents generation, or footnoting, they're impractical for documents of more than a 12 pages.

Given these limitations, are you better off using a high-end word processor like *Microsoft Word* or *WordPerfect?* The answer is no. While such programs let you lay out pages with multiple columns, fonts, and graphics, you can't edit their tiny page previews—and that means a lot of trial and error. A low-end DTP package lets you design pages without all the hassle.

Graphical word processors such as *Ami* and *Word for Windows* perform most DTP tasks as easily as low-end packages. However, they cost a lot more and need at least a 386 to run acceptably fast. They also lack basic drawing tools, clip art, and extra fonts—items included in the $150 to $300 packages reviewed. If you're on a budget, a bargain DTP package is for you.

The Basic Feature Groups

A good low-end DTP program gives you everything you need to produce attractive documents *and* is easy to use. Here's what to look for:

Layout Demand master pages, frame linking, a snap-to grid, and style sheets. All the programs except *First Publisher* let you create true master pages containing elements such as margins, headers, and graphics that repeat on each page. And all but *First Publisher* let you manually link frames, so text can jump from one document page to another. But only *Avagio* provides both manual links and an automatic text-flow feature that creates frames and pages as needed. And *Avagio* offers the best snap-to guides—horizontal and vertical lines that let you snap page elements into place as if they were magnetically attracted. More important, however, only *Publish-It* offers style sheets, which let you make global style changes, insert style tags into word processed files for instant formatting on import, and save the formats you've defined for use with other documents.

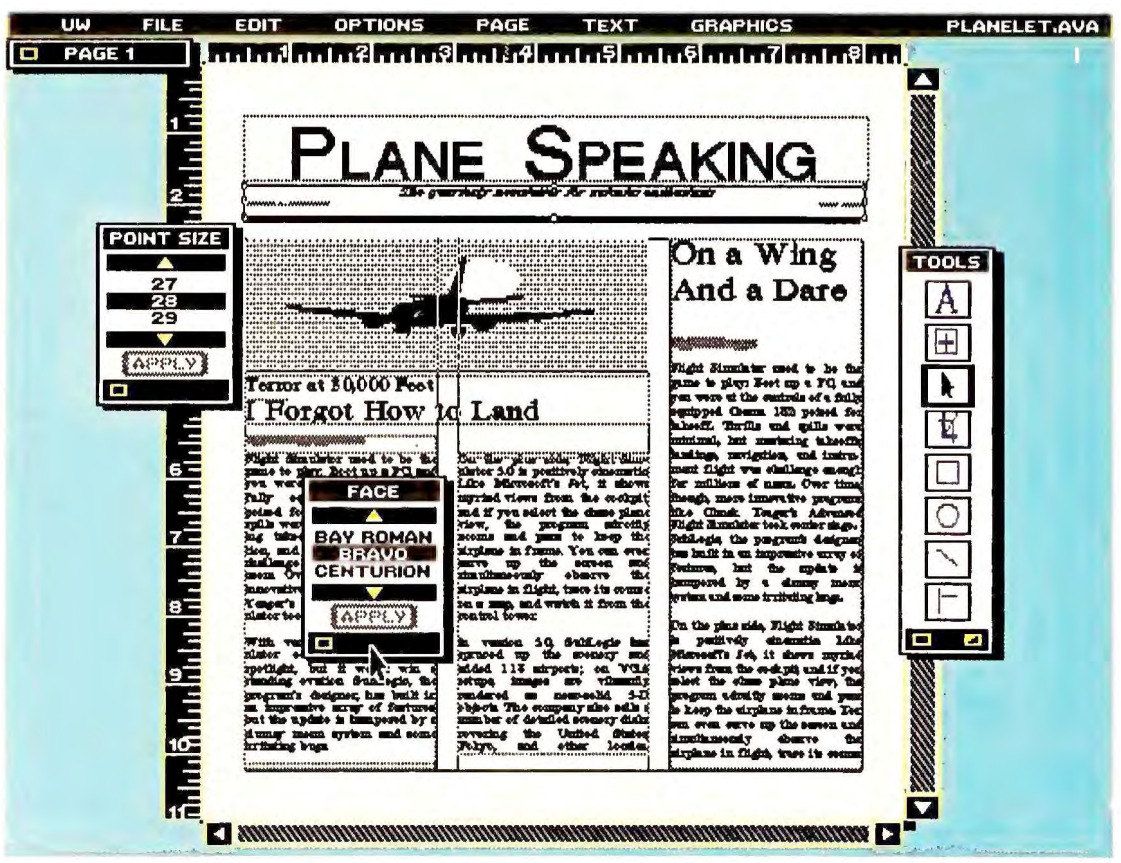
Text Handling Insist on full hyphenation and tab functions, plus control over type style, type size, and leading (line spacing). Also, look for functions like cut, copy, paste, and search and replace. *Publish-It* has the best typography, thanks to its complete letterspacing and word-spacing controls.

Graphics Tools You'll want the basic drawing tools—lines, squares, and circles—plus a variety of line styles and weights. *Avagio* is tops here, offering high-resolution vector output, line patterns, and a feature that lets you control the look of overlapping graphics.

Output All four programs provide a starter set of fonts and support a range of dot matrix, ink jet, and laser printers. But when it comes to high-end printing, these programs are limited. *Avagio, First Publisher,* and *Finesse* give you access to scalable fonts, but only *Publish-It* supports all resident fonts on laser and PostScript printers. And while *Avagio* wins kudos for its condensed, expanded, and outline font effects, it won't let you add third-party fonts.

File Support At the minimum, a program should support the big four text formats—*WordPerfect, Word, WordStar,* and ASCII—plus PCX (*PC Paintbrush*) and PIC (*1-2-3*) graphics files. A big plus is support for TIFF, the popular file format for scanned images, and EPS, a common format for high-quality clip art. All programs reviewed support the essential text formats, though *Publish-It 1.13* won't work with *WordPerfect 5.0* files. But only *Avagio* imports the full range of text and graphics files.

Ease of Use Finally, a package must make it easy to get started and easy to repeat the results. *Avagio, Finesse,* and *Publish-It* offer intuitive frame-based interfaces: Simply set up a master page, and draw frames in which to pour text or graphics. *Publish-It*'s style sheets make it the only practical choice for producing multipage documents or creating reusable designs.



Avagio's convenient dialog boxes let you keep important options—like type style and point size—close at hand.

Avagio 1.0

Unison World's $300 *Avagio* is a bit schizophrenic. It pushes dot matrix printers to the max but doesn't support a laser's resident fonts. It offers font effects and graphics tools you won't find in *PageMaker* or *Ventura* yet lacks such essentials as style sheets. *Avagio* lets you create visually impressive documents, but to repeat the effect, you have to start from scratch.

Like the other programs, *Avagio* of-

FEATURES EVALUATION

Publish-It: Powerful Publishing at a Bargain Price

Avagio offers flashy fonts and glitzy graphics, but Publish-It has the layout tools and style sheets that even part-time desktop publishers need.

● Yes
○ No
◒ Deficient
▼ Limited only by available disk space

	Avagio 1.0	Finesse 3.1	PFS:First Publisher 3.0	Publish-It 1.13
Standard features				
List price	$299.95	$179	$149	$199.95
Cantext-sensitive help	○	○	●	●
Mause suppart	●	●	●	●
Pulldown menu interface	●	●	●	●
Page design and layout				
Maximum pages per dacument	▼	99	99	▼
Shows focing pages	●	●	○	●
Multiple-page views	●	●	○	●
Snop-ta column guides	●	●	○	●
Pull-out, snop-to ruler guides	●	○	○	●
Master pages	●	●	◒[1]	●
Style sheets	○	○	○	●
Text wrap	●	●	●	●
Autamotic text flow	●	◒[2]	●	◒[2]
Headers/faaters	●	●	○	●
Text handling				
Automatic hyphenatian	●	●	○	●
Autamatic kerning	○	○	○	●
Monuol kerning	●	●	○	●
Ward spacing contral	○	○	○	●
Candensed/expanded type	●	○	○	●
Ratates text	○	○	●	●
Globol search and replace	●	●	○	●
Left/right/center tabs	●	◒[3]	○	●
Autamatic page numbering	●	●	○	●
Exparts ASCII	●	○	●	●
Text file import				
Ward/WardPerfect/ WardStar/ASCII	●	●	●	●
DisployWrite	○	○	●	●
				BEST BUY

	Avagio 1.0	Finesse 3.1	PFS:First Publisher 3.0	Publish-It 1.13
Graphics				
Multiple ruler units	○	◒[4]	●	●
Lines/squares/rectangles	●	●	●	●
Ovals/circles	●	○	●	●
Freehand drawing taal	○	○	●	●
Groups/ungroups abjects	●	○	○	●
Line styles ond patterns	38	14	4	9
Fill potterns	25	9	0	36
Grodients	●	○	○	●
Flaps/inverts graphics	●	○	●	●
Clip-art imoges included	150	70	175	200
Screen-capture utility	○	●	●	●
Graphics file impart				
EPS	◒[5]	○	○	●
PCX	●	●	●	●
TIFF	●	●	●	●
PIC	●	○	●	●
Output				
Dat motrix	●	●	●	●
Ink jet	●	●	●	●
LoserJet ond compotibles	●	●	●	●
Supparts resident fants an laser printers	○	○	◒[6]	●
Typefaces supplied	4	5	7[7]	7
Includes scalable fants	●	◒[8]	●	●
Fant size ronge (points)	6–500	6–99	9–70	6–72[9]
Supparts HP-campatible downloadoble fants	●[5]	○	●	●
Supparts Bitstream Fantware	○	●	●	◒[10]
				BEST BUY

[1] Master pages can't contain headers ar graphics.
[2] Yau must create the pages and the text frames first.
[3] Na center ar right tabs.
[4] Na pica ar paint measurements.
[5] Must be canverted with included utility.
[6] Supparts anly 4 af 35 fants far PastScript printers.
[7] Pragram includes 35 additianal law-resalutian fants for dat matrix printers.
[8] Via Bitstream Fantware.
[9] Up ta 99 paints an PastScript printers.
[10] Fantware installatian kit nat included.

fers a simple pulldown-menu interface. Handy dialog boxes stay on screen for as long as you want, making it easy to, say, try different fonts till you find the right one. Still, the interface has rough edges: Screen redraw is slow, screen fonts are a bit crude, and dialog boxes force you to scroll through lists a line at a time.

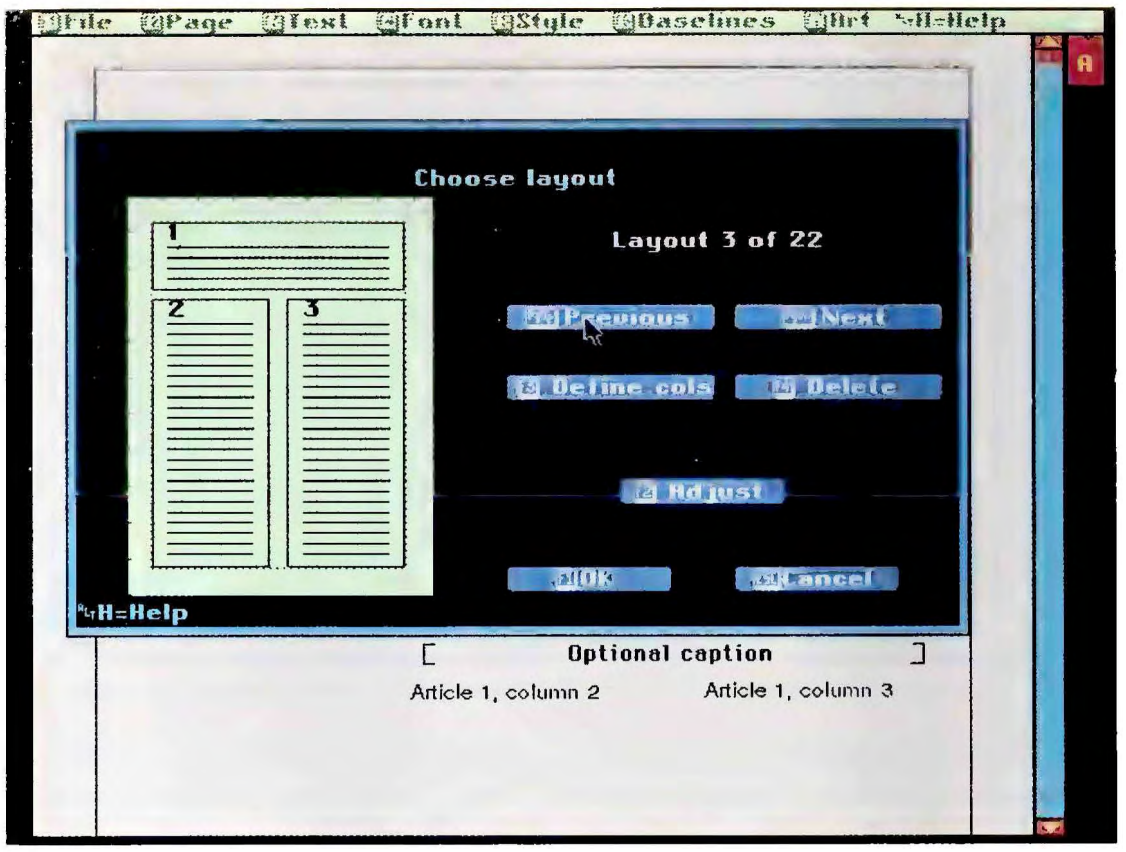
Avagio offers solid layout tools with

multiple page views and seven levels of magnification. You can pull out its ruler guides and extend them like cross hairs over any part of the page, making it easy to align objects. An automatic text-flow feature frees you from drawing frames on every page. But while you can define paragraph style tags inside documents, you can't save groups of tags as style sheets, nor can you pretag paragraphs in a word processor.

Avagio's graphics tools are impressive but inconsistent. You can choose from a variety of line styles and patterns, fill objects with patterns and gray shades, and group objects so they behave as a single unit. Yet *Avagio* lacks curves, polygons, and freehand drawing tools. However, you can use one of 150 clip-art images, or import graphics in PCX, TIFF, and PIC formats. You can also import simple EPS files via an included conversion utility.

Avagio's text handling is first-rate. Its four typefaces are scalable in 1-point increments from 6 to 500 points, and it offers unique effects such as condensed, expanded, and extra-bold fonts. *Avagio* scales fonts on the fly, then downloads them as bit maps—a great way to get top-notch output from a dot matrix or ink jet printer but slow with a laser or PostScript printer. Although *Avagio* converts Hewlett-Packard Soft Fonts to its format, it doesn't support resident LaserJet fonts.

Avagio is promising, with flashy graphics effects and a knack for handling type. But for basic business documents, *Publish-It* is easier and cheaper.



PFS:First Publisher provides a gallery of basic page templates you can customize to fit your document's needs.

Finesse 3.1

Logitech's $179 *Finesse* is a bare-bones program suitable only for short documents. It includes a separate program for running a scanner, but this doesn't make up for its deficiencies in layout and text handling. For an extra $20, *Publish-It* provides much more.

Like *Publish-It*, *Finesse* offers a friendly, GEM-based interface. A chain tool links frames to accommodate longer files, but it's not automatic—you must create the frames and pages in advance. You can view the file names and links, enabling you to assemble complex, multifile documents easily.

Building anything longer than a two- or three-page document can be torturously slow. To create headings in 24-point italic, for example, you go to each heading, select it, and change it. If you later decide you want them all in 30-point bold instead, you must change each one individually.

When it comes to layout, text, and graphics tools, *Finesse* has the basics and little else. You get only left and decimal tabs, not centered or right-justified. And its graphics tools are minimal: You can draw lines and boxes, but not polygons, freehand lines, or even circles.

Finesse will accept graphics files in a variety of formats, including GEM and IMG, but not PIC. To capture spreadsheet graphs and charts, you must use a supplied screen-capture program. And its clip-art library is the slimmest of the bunch, though a built-in scanner interface lets you add images using Logitech's $339 hand-held ScanMan.

Finesse offers five starter fonts and bundles in the Bitstream installation kit, giving you access to Fontware's scalable font outlines. But LaserJet owners will be frustrated by its failure to support the printer's resident fonts or HP Soft Fonts.

With minimal layout and graphics tools and no style sheets, *Finesse* is clearly an also-ran. It may look like *Publish-It*, but that's where the similarity ends.

PFS:First Publisher 3.0

Software Publishing's $149 *PFS:First Publisher* is not for serious business users. Its good graphics and font support are offset by deficient layout and text handling, and its layers-based approach and lack of style sheets make it hard to use.

Novice users may appreciate *First Publisher*'s selection of predesigned formats, which you can customize. But since the program uses layers instead of frames and provides no column guides, positioning text and graphics is a hassle. To import clip art and wrap text around it, you must manipulate the image in the graphics layer, then switch to the text layer and adjust each line individually. Even worse, the program lacks

style sheets, making multipage documents impractical.

First Publisher's layout and typography features are also inadequate, lacking such features as tabs, indents, automatic hyphenation and page numbering, and any form of kerning control. The program's master page support is minimal—you can set up column margins, but you can't add graphics or headers. On the plus side, the program creates as many pages as needed to accommodate long files. But since it won't let you "jump" articles from, say, page 1 to page 8, constructing newsletters with *First Publisher* would be a nightmare.

Graphics is this program's strong suit. *First Publisher* has a good complement of drawing tools, plus the ability to capture screens and edit, crop, flop, and invert bit-mapped graphics. It comes with a big selection of clip art, including high-resolution vector images, and accepts PIC, PCX, and TIFF files.

First Publisher offers good output support, especially for low-end printers. It works with HP Soft Fonts and comes with 35 low-resolution fonts for dot matrix printers. The program incorporates font handling, so you don't have to exit to add new typefaces, and includes two scalable Speedo fonts from Bitstream. At the high end, however, it supports only a handful of PostScript fonts.

First Publisher's dearth of layout tools, style sheets, and frame links makes it impractical for all but the simplest documents. If you need to create newsletters or business reports, stick with *Publish-It*.

Publish-It 1.13

With its industrial-strength style sheets and *Ventura*-like power, Timeworks' $200 *Publish-It* offers all the DTP essentials in an easy-to-use package. Its only serious flaws—no Bitstream font installation kit or support for TIFF or EPS files—aren't enough to tarnish its value. Once again, *Publish-It* wears the Best Buy crown.

Think of *Publish-It* as *Ventura* Lite: It uses the same GEM interface, and its style sheets are nearly as powerful. For instance, to format a headline, you simply highlight the text, pull down a menu to select attributes like alignment, font, and spacing, and name the style tag. Once you define a tag, all text using that tag instantly formats. To make global changes, just redefine the tag. Best of all, you can save style sheets for use with

EXECUTIVE SUMMARY

Publish-It: Painless Page Layout

Inexpensive desktop publishing software

These four products attempt to offer an all-in-one solution—fonts, graphics, and layout and drawing tools—for occasional users who need to produce professional-looking documents quickly and easily.

BEST BUY

With powerful publishing features and an easily mastered interface—topped off by Ventura-like style sheets—**Publish-It** is clearly the best value of the bunch. **Avagio**'s impressive graphics talents make it a contender, but the lack of style sheets means extra work for most users.

	Avagio 1.0	Finesse 3.1	PFS:First Publisher 3.0	Publish-It 1.13
Page design and layout	Good	Fair	Poor	Good
Text handling	Good	Foir	Poor	Excellent
Graphics	Excellent	Fair	Good	Good
Output	Good	Foir	Good	Good
Ease of use	Foir	Good	Poor	Excellent
Overall value	Good	Foir	Fair	Excellent
				BEST BUY
Reader service no.	625	626	627	628

How we rate desktop publishing software
We rate desktop publishing software based on information in the Features Evaluation table combined with our opinions of quality, reliability, ease of use, and user benefit.

Page design and layout evaluates the tools a program gives you for placing text and graphics on a page. For an Excellent rating, a program must provide true master pages, style sheets, automatic text flow, snap-to ruler and column guides, and the ability to jump text from one frame to another.

Text handling measures both typographic capabilities and the ability to import and edit text. To earn an Excellent rating, a program must provide automatic hyphenation, a complete selection of tabs, and full controls over kerning, leading, and line and word spacing. It also must support the major text file formats and provide basic editing tools, plus the ability to search and replace text.

Graphics rates how easy it is to create simple graphic elements and import images. A graphically excellent program will provide basic drawing tools—lines, circles, and boxes—plus multiple fill patterns and line styles. It must support at least the PCX and PIC file formats and provide methods for sizing and cropping images.

Output rates a program's printer and font support. To earn an Excellent rating, a program must support all major dot matrix, ink jet, and laser printers and their resident fonts. It must also provide a starter set of fonts, plus access to third-party downloadable fonts.

Ease of use takes all the above criteria into account. An Excellent rating means that a program offers an intuitive, mouse-driven interface; lets you pour text and graphics into containers (frames); and provides style sheets for creating reusable document designs.

Overall value averages all the above criteria, plus price.

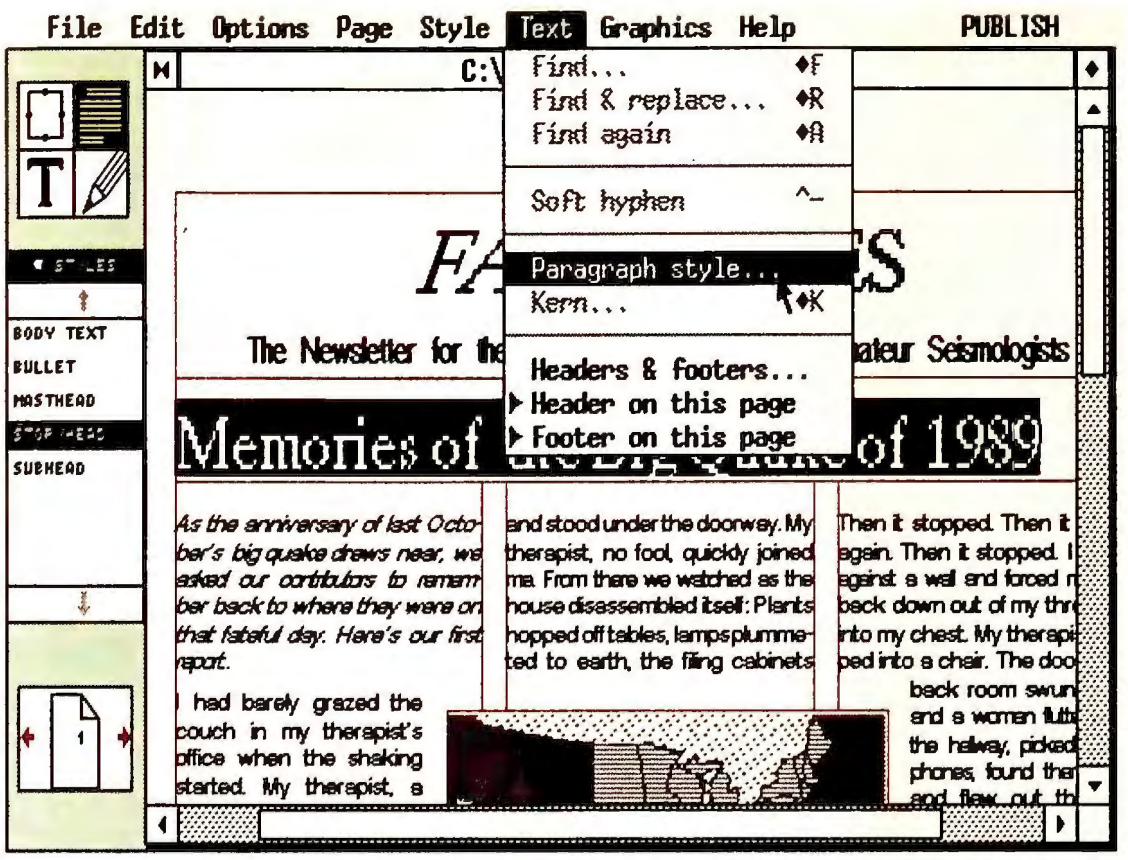
other documents, and insert tag names into files with your word processor for instant formatting inside *Publish-It.*

The program has all the layout essentials: text wrap, multiple views, and rulers in any units you choose. Text handling is also strong, with automatic hyphenation, complete size and leading controls, plus control over letter and word spacing and kerning. However, it lacks an undo command and won't automatically flow text across pages.

Publish-It has the polygon and freehand drawing tools *Avagio* lacks, but it can't match *Avagio's* grouping, patterns, or overlap control. To draw graphics on the master page you must create a separate frame for each item, so creating intercolumn rules is harder than it should be. But cropping graphics is painless: Just draw a square around the desired part of the picture.

Publish-It supports a host of printers and comes with seven built-in typefaces, plus support for resident fonts and Bitstream's *Fontware*—but you must purchase the installation kit separately. And *Publish-It* won't accept *WordPerfect 5.0* text files or TIFF or EPS graphics files; if you want to print complex gray-scale or high-resolution images in your documents, you're out of luck.

Version 1.2, due out at press time, will add an undo function and support for TIFF, EPS, and the latest versions of *WordPerfect.* But even without these features, *Publish-It* is an excellent value for anyone who needs to produce attractive documents in a hurry.



Only Publish-It lets you create style sheets for each document. Once you've set up a style sheet, you can use it again and again.

Place Your Order

To produce short, good-looking documents quickly and easily, a low-end DTP package is fine. But *PFS:First Publisher* and *Finesse* lack layout features business users need. And while flashy graphics and fonts make *Avagio* tempting, its lack of style sheets disqualifies it. Only *Publish-It* has everything in one package.

Soon, graphical word processors may make these packages extinct. In the meantime—or until the day when everyone has a 386 or a 486—*Publish-It* is your best bet for creating fast and easy desktop documents. ●

Jesse Berst is president of CompuThink Inc. and coauthor of Inside Xerox Ventura Publisher *(Micro Publishing, Torrance, California, 1990).*

For more information about all products in this article, circle reader service no. 903.

WHERE TO BUY

Avagio 1.0
Unison World
1321 Harbor Bay Pkwy.
Alameda, CA 94501
800/444-7553,
415/748-6964 (fax)
LIST PRICE: $299.95
REQUIREMENTS: 640K, hard disk, DOS 2.1 or later version, mouse
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 625

Finesse 3.1
Logitech Inc.
6505 Kaiser Dr.
Fremont, CA 94555
800/231-7717,
800/552-8885
California, 415/792-8901 (fax)
LIST PRICE: $179
REQUIREMENTS: 640K, hard disk, DOS 2.1 or later version (3.1 or later version to use Bitstream Fontware), mouse
TECHNICAL SUPPORT: unlimited, toll number, M–Th 8–5, F–Sun 9–4
OTHER SUPPORT: BBS, BIX conference
Reader service no. 626

PFS:First Publisher 3.0
Software Publishing
1901 Landings Dr.
P.O. Box 7210
Mountain View, CA 94039-7210
415/962-8910
LIST PRICE: $149
REQUIREMENTS: 512K, two disk drives, DOS 2.1 or later version; mouse and hard disk recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–5
OTHER SUPPORT: CompuServe forum
Reader service no. 627

Publish-It 1.13
Timeworks
444 Lake Cook Rd.
Deerfield, IL 60015-4919
708/948-9200,
708/948-7626 (fax)
LIST PRICE: $199.95
REQUIREMENTS: 640K, two disk drives, DOS 3.0 or later version; mouse recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–5
OTHER SUPPORT: one-year support contract $100
Reader service no. 628

ReadRight.
Personal

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The page recognition software that's unmistakably accurate

When it comes to hand scanning, there's no better judge of character than ReadRight Personal.

Now that you're thinking seriously about hand scanners, go one step further and consider the hand scanning software that's serious about text.

Not only does new ReadRight Personal automatically recognize just about every font known to the business world, it reads them with up to 99.5% accuracy. Whether the text is typewritten, typeset, NLQ, draft dot matrix or laser printed.

As for working with ReadRight Personal, it's easy. ReadRight Personal software has a graphical user interface, with pull-down menus and dialog boxes that make hand scanning as second nature as handshaking.

Best of all, ReadRight Personal uses proven omnifont technology. Which means you don't have to take the time to train it every time you scan a new font. ReadRight Personal reads the fonts you need at first sight. Right from the box.

New ReadRight Personal is even smart enough to know what *not* to scan. Thanks to a feature called page decomposition, ReadRight Personal automatically distinguishes text from graphics for more accurate page recognition.

With ReadRight Personal, you can even choose how you want to scan—top to bottom, left to right, or right to left. And you don't have to worry about how wide your page is either. ReadRight Personal will intelligently piece together strips of scanned text to form a whole page for you.

What's more, ReadRight Personal understands layout and text attributes—like boldface and underlining. It also reads columns, lists and tables. Detects paragraphs, indents and tabs. And reads multiple columns and fonts on a single page.

So now you don't have to think twice about the format your text is in. Or how well it will fit in your favorite software application.* ReadRight Personal places the information you need, where you need it, with unmistakable accuracy.

SYSTEM REQUIREMENTS:
- 640K RAM
- Hard disk
- IBM PC or compatible
- DOS 3.0 or higher
- Logitech ScanMan and ScanMan Plus; The Complete PC Half-Page Scanner 400; DFI Handy Scanner 3000 Plus; Marstek 105 and 128 hand-held scanners. (Other hand-held scanners supported by importing image files.)

OCRSYSTEMS

OCR Systems, Inc.
1800 Byberry Road, Suite 1405
Huntingdon Valley, PA 19006
215-938-7460

Dealer and distributor inquiries welcome.

*ReadRight Personal reads and converts text for direct use in most popular software applications, including WordPerfect,® Microsoft® Word, Lotus® 1-2-3, Excel, dBase,® PageMaker® and Ventura Publisher.®

(800) 233-4627

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Circle 199 on reader service card

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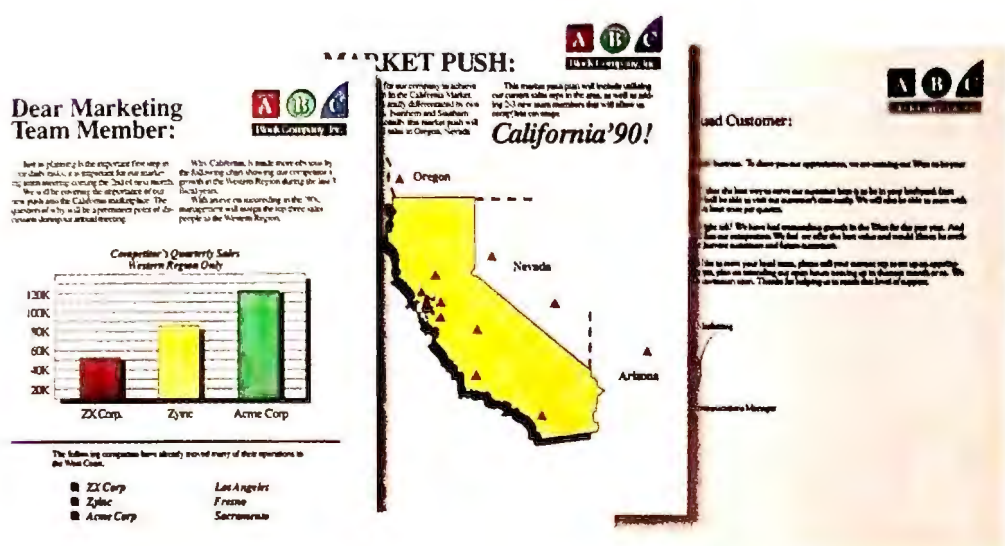
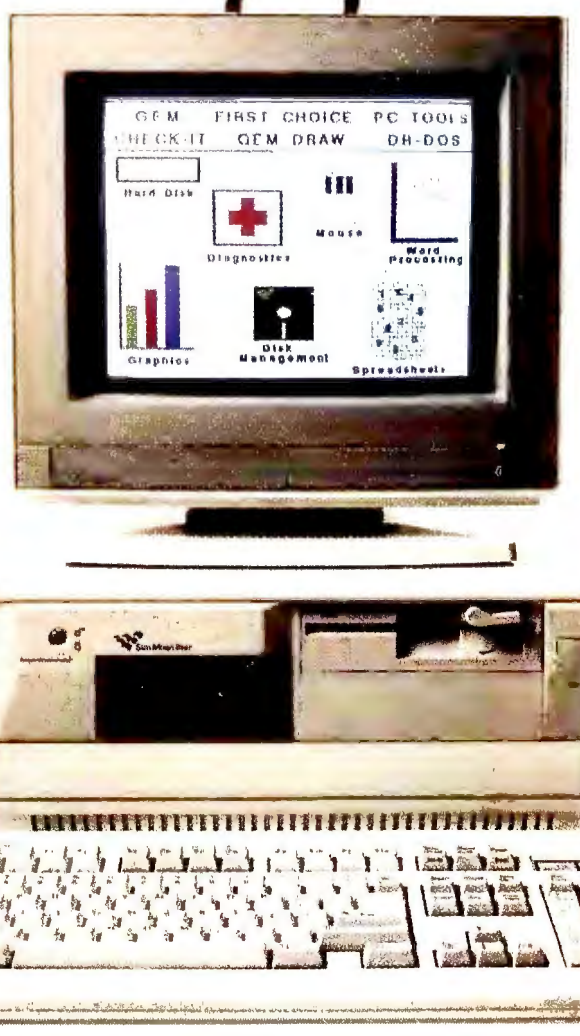


World-Class Quality results, fast

are we getting for being easy?



Maybe it's because we make a powerful 386SX™ that's so easy to *use*. Just turn it on, and you're greeted by a friendly, graphical icon-based interface. No DOS to learn! Click the mouse on any application icon (the software is already loaded and ready-to-run) and you're off to the races. The pull-down menus make productivity quick and easy.

Maybe it's because our fully configured system is so easy to *buy*. You get all the hardware you need, right down to the mouse. You get enough software to run a business, already loaded on the spacious 40MB hard-disk. Including word processing, graphics, a database, spreadsheet, and utilities to manage all those files you'll be generating. To show off this easy-to-use software, you get a big, crisp, 14" paper-white monitor. To make it all run fast, you get 1 MByte of RAM, which you can easily expand to 8. The result? You get a system that will run the 32-bit software of the future, at a price that's easy today. Just $2,495 suggested retail. Complete.

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A Handful of Scanner

A perfect match for entry-level desktop publishers, low-cost hand scanners are great for integrating logos, spot art, and other small elements into your documents.

Phyllis Neumann

Hand scanners offer an inexpensive way to incorporate paper-based images into your PC documents. They also offer OCR (optical character recognition) options for translating printed text into editable electronic form, but with today's limited OCR software, their chief purpose is to help desktop publishers import graphics.

Ranging from $300 to $350, hand scanners are half the cost of entry-level flatbed scanners and a fraction of the price of professional ($2000 to $3000) gray-scale scanners (see "Gray-Scale Scanners Enter the Mainstream," November 1989). Resembling an oversized mouse, a hand scanner takes up very little room. Since you roll the scanner over the image instead of placing the image inside the scanner, it can more easily handle oddly shaped media.

Nonetheless, professional desktop publishers will probably want a flatbed. The hand scanner can't capture images wider than itself—about 4 inches—and image quality is acceptable only for laser printer output. You also need a steady hand—if you wiggle too much, you must clear the screen and start over. Line art especially shows the ill effects of an unsteady hand.

For other users, though, low prices make hand scanners too good to pass up. Top 400-dpi contenders include The Complete PC's Complete Half-Page Scanner/400, Logitech's Logitech ScanMan Plus, and DFI's Handy Scanner 3000 Plus. The following discussion lays out the features to look for and refers to these scanners as examples.

Scanning the Features

When buying a hand scanner, the prime consideration is image quality. You'll also want numerous scanning options and post-scan editing tools to polish images. Other issues include the scanner's ease of use.

Image Quality The quality of the image is largely determined by resolution and number of gray scales. Most hand scanners provide a respectable resolution of 400 dots per inch (dpi), which is more than is required for output to a 300-dpi laser printer. Usually, a higher resolution means a finer, more detailed image; but if the original is large, 400-dpi resolution may result in an image that's too big to fit on screen. Also, a higher resolution reveals flaws from an unsteady hand more readily. For these reasons, a hand scanner should let you shift to lower resolutions.

Image quality is hampered by the limited number of gray scales hand scanners provide: 16 to 32 levels compared to 64 to 256 for flatbed scanners. In theory, the more gray-scale levels a scanner can reproduce, the better photographs and other gray-toned images should look; however, the difference between 16 and 32 is barely noticeable. Gray scales have no impact on line art.

Because of their limited gray-scale capabilities, hand scanners rely on *dithering* patterns to reproduce grays. Dithering is the process of applying a screen pattern that translates a gray

No hand-scanned image can pass for a real photograph. Dithering patterns are less obvious with the DFI Handy Scanner (above left) than they are with the Logitech ScanMan Plus (left), resulting in a more neutral image. The Complete Half-Page Scanner/400 (above) did not reliably scan our test image. All three of the images shown were recorded at 400-dpi resolution. All three of the images used the identical dither pattern, and all three images were output on a 300-dpi Hewlett-Packard LaserJet II.

FRED STIMSON

The Complete Half-Page Scanner/400 is prone to problems that can crop the image. The $299 unit stands out with its ability to merge images and its superior scanning button.

DFI's $359 Handy Scanner HS-3000 Plus provides 32 gray levels at 400-dpi resolution. A speed indicator light warns you if you scan too quickly, and the package includes Z-Soft's PC Paintbrush Plus.

Logitech's $339 Scan-Man Plus is similar to the Handy Scanner, with 400-dpi resolution, 32 gray levels, and a speed indicator light. It comes with PaintShow Plus and an optional Windows scanning utility.

level into a series of dots. Most hand scanners offer a choice of three dithering settings. As the sample output shows, the illusion of true grays is less than convincing, but the output is sufficiently attractive for most newsletters.

Software options also help improve the captured image. Look for features like brightness control and the ability to limit the width of a scan.

Ergonomics A well-built scanner produces smoother scans. In particular, the placement and operation of the scan button affects how easily you can scan in a straight line. Some scanners make you hold down a button while scanning, but the Complete Half-Page Scanner/400 offers a better approach: You click the button when you start and again when you stop. The Half-Page also provides large rollers underneath, making it easier to stay on course. Unlike its rivals, however, the Half-Page lacks a speed indicator light that warns you when you move the scanner faster than it can handle.

Post-Scan Options When you scan an image, you'll invariably get some "garbage" pixels around it, and you'll need a pixel editor to clean them up. In addition, most scanners bundle paint programs such as *PC Paintbrush*, which enable you to flip, stretch, enhance, crop, and otherwise embellish the image.

Since you'll want to incorporate scanned images into your desktop publishing, word processing, or graphics packages, the scanner needs to support the most popular graphics formats. Most desktop publishing programs support PCX and TIFF (Tagged Image File Format) files. Other useful formats include MSP, IMG, and CUT.

Scanners often differentiate themselves by the extra software they include. The Half-Page, for instance, comes with a utility for merging 4-inch scans into a combined image to let you capture graphics larger than 4 inches. The Handy Scanner comes with tools for displaying images in programs written in dBASE, BASIC, Pascal, and C. The Scanman Plus includes a *Windows* version of its scanning utility.

Hand scanners are not designed for professional publishers. But if your budget is tight and you use a laser printer, a hand scanner is a worthwhile addition to your desktop publishing tool kit.

Phyllis Neumann is a freelance writer and edits a newsletter for the PC Users Group of the Redwoods in Santa Rosa, California.

For more information about all products in this article, circle reader service no. 902.

WHERE TO BUY

Complete Half-Page Scanner/400
The Complete PC
1983 Concourse Dr.
San Jose, CA 95131
800/634-5558,
408/434-1048 (fax)
LIST PRICE: $299 (includes SmartScan software)
ACCESSORIES: CAT Reader OCR Software $295
REQUIREMENTS: 512K (640K recommended), DOS 2.1 or later version, half-length slot
WARRANTY: two years
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: BBS
Reader service no. 620

Handy Scanner 3000 Plus
DFI Inc.
2544 Port St.
West Sacramento, CA 95691
916/373-1234,
916/373-0221 (fax)
LIST PRICE: $359 (includes Scan Utility, ImageTools, and PC Paintbrush Plus)
ACCESSORIES: Carets/By Hand OCR Software $249, CAT Reader OCR Software $295, CAT ImageLinks Full Page Scanning Software $199, CAT Image Enhancer $99
REQUIREMENTS: 384K (640K recommended), DOS 2.0 or later version, half-length slot, mouse required to edit pixels
WARRANTY: one year on hardware only
TECHNICAL SUPPORT: unlimited support, toll number, M–F 8–5:30
OTHER SUPPORT: none
Reader service no. 621

Logitech ScanMan Plus
Logitech Inc.
6505 Kaiser Dr.
Fremont, CA 94555
415/795-8500
LIST PRICE: $339 (includes ScanMate and PaintShow Plus)
ACCESSORIES: CatchWord OCR Software $245
REQUIREMENTS: 384K (640K for color), DOS 2.1 or later version, half-length slot, mouse required to run PaintShow Plus
WARRANTY: one year on hardware only
TECHNICAL SUPPORT: unlimited, toll number, M–Th 8–5, F–Sun 9–4
OTHER SUPPORT: BBS, BIX
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DesignCAD 3D ver. 2.0	**$399.00**	**NO expensive options! IGES Free, Shading Free**
MaxxiCAD 1.02	$1,895.00	N/A
Mega Model	$995.00	MegaDraw $195, List $295, MegaShade $395
MicroStation PC 3.0	$3,300.00	Customer Support Libraries $1,000.00
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Source: Byte Magazine

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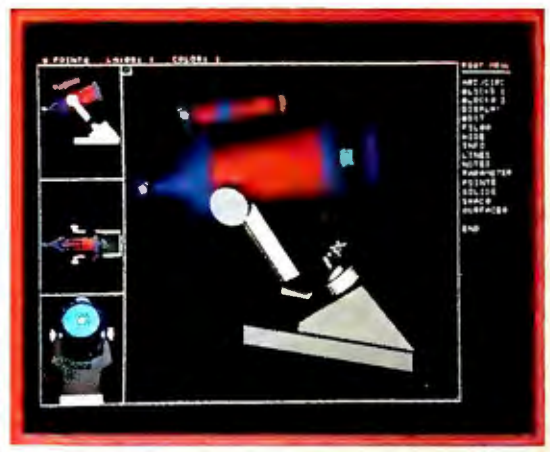

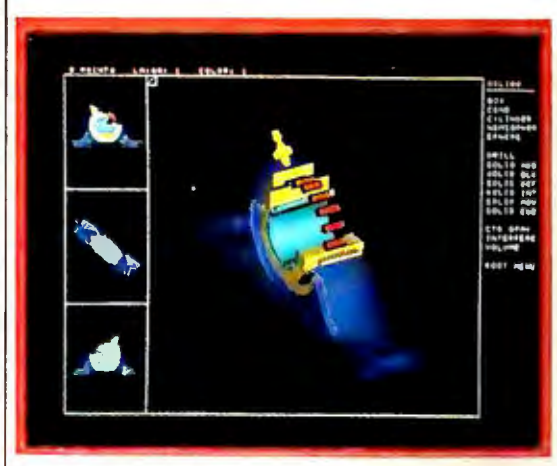

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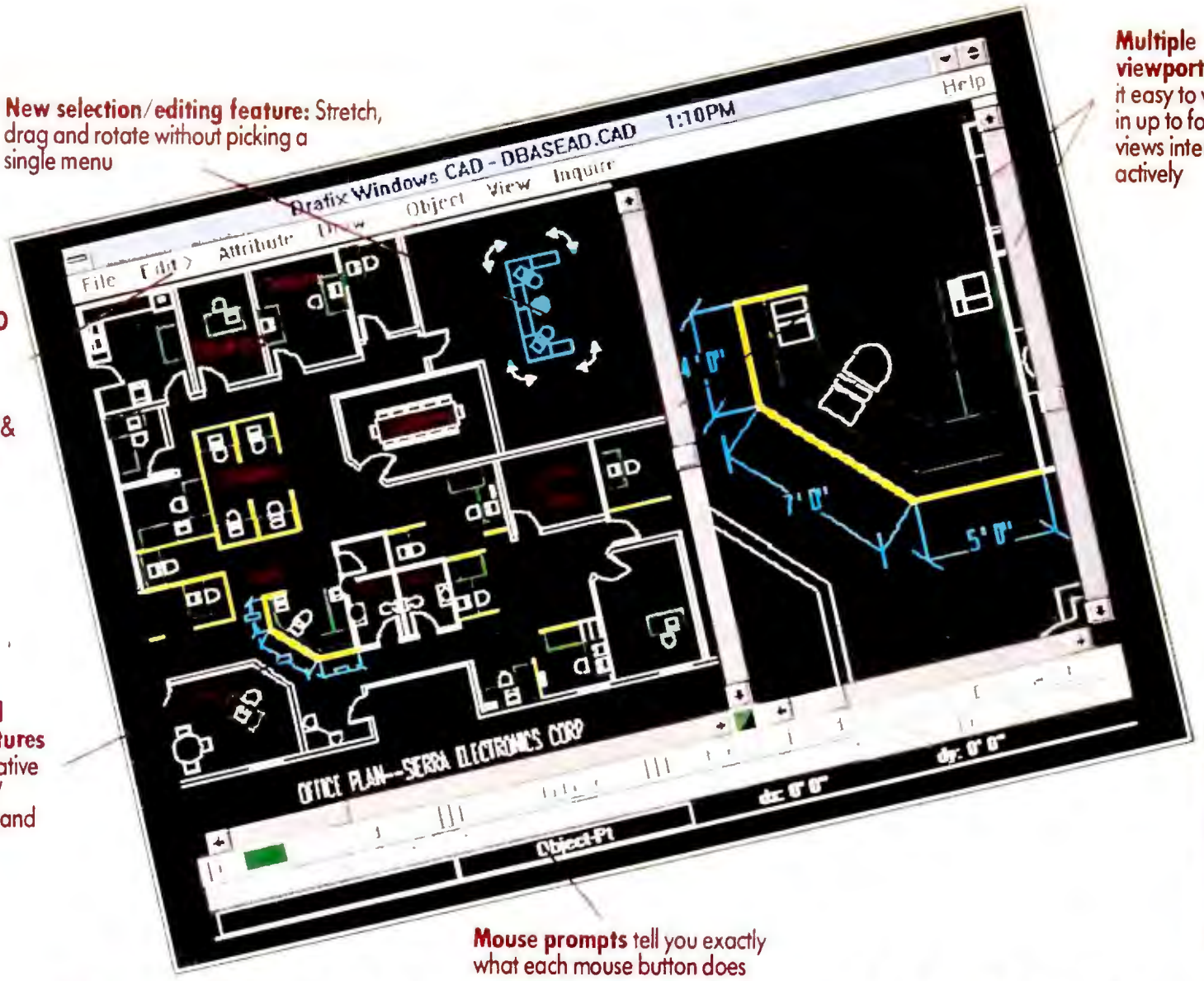

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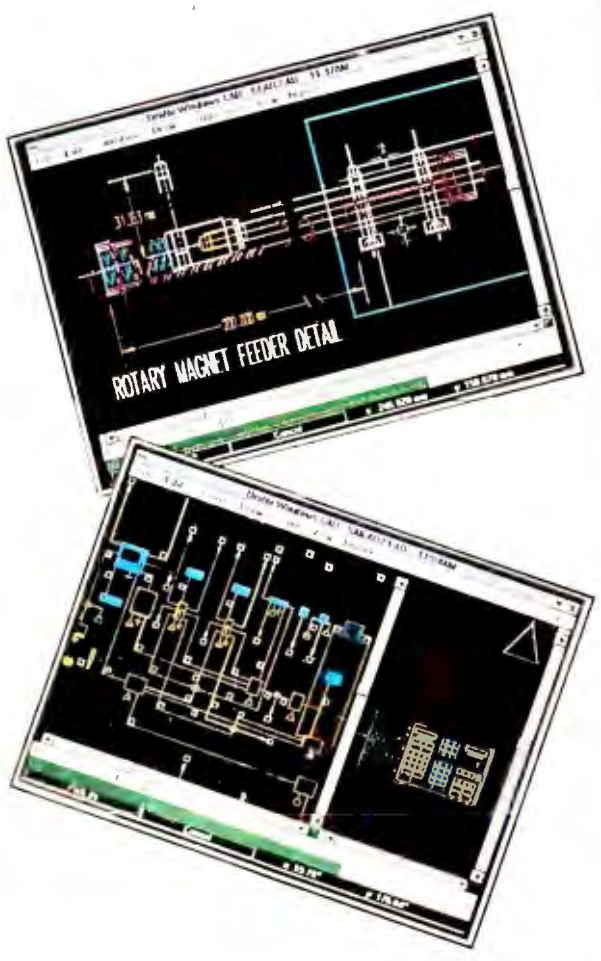

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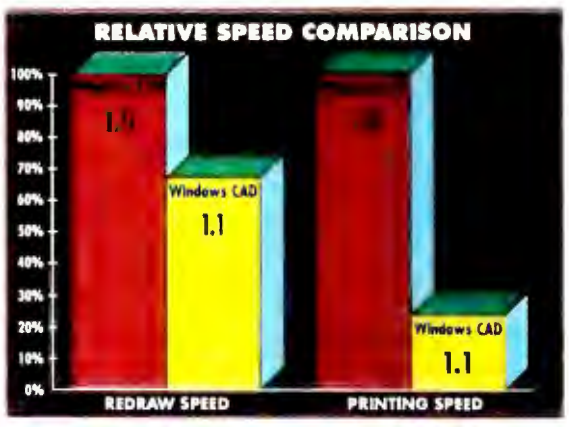

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SPECIAL REPORT

WINDOWS

A PC World Supplement on Windowing Environments and Applications

Edited by Eric Brown

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Windows 3.0 Accelerates Applications

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Ventura gains a bold new look and harnesses *Windows 3.0*'s memory management power.

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The revamped *PubTech File Organizer* delivers icons aplenty, but *Windows 3.0*'s own file manager is a tough act to follow.

ILLUSTRATION CREATED BY JOHN HERSEY WITH COREL DRAW UNDER WINDOWS 3.0

WINDOWS 3.0

Accelerates Applications

Improved memory management and other touches will aid Windows packages of every description.

Roberta Furger

The news is in about *Windows 3.0:* Not only does its enhanced memory management scheme make programs faster, it also lets you effectively run multiple applications together. And the rebuilt interface isn't just better looking: It can speed your work.

What do these changes mean for *your Windows* applications? Plenty. Virtually every product category will benefit both cosmetically and functionally from the improvements in *Windows 3.0* (see "Windows Makes the Grade," July 1990).

The new look will quickly carry over into applications. Most of the latest releases support proportional fonts and the new 3-D look of both windows and buttons. The result is a "nicer-looking screen that's easier to read," says Mark Winter, engineering products manager for Crosstalk Communications of Roswell, Georgia. Applications are also tapping the new on-line help.

Programs Benefit as Windows Opens

What Windows 3.0 will do for your favorite applications:

Improved memory handling

- Speeds up programs
- Allows for new features capabilities
- Improves handling of high-resolution bit-mapped graphics
- Fuller implementation of DDE
- Makes heavy multitasking possible

Interface changes

- More intuitive, icon-based approach
- Friendlier 3-D look to windows and buttons
- Supports proportional screen fonts

Enhanced color support

- Palette Manager allows access to up to 16.8 million colors
- Displays up to 256 colors on screen
- Palette Manager arbitrates color disputes between applications

On-line help

- Consistent help facility among applications

So Long, Memory Barrier

The most dramatic change for all *Windows* applications is removal of the 640K memory barrier that plagued prior versions. Unhampered by memory constraints, applications will be faster because they'll do less swapping to disk. They'll include more features and will take greater advantage of some of the environment's powerful capabilities, such as Dynamic Data Exchange (DDE).

"All developers were bumping up against the memory limitations," says Paul Grayson, chairman of Micrografx Corporation, of Richardson, Texas. "The sky's the limit now."

The story is the same from one developer to the next: Features that would have meant an ugly performance hit now can be included without any drop in speed. Moreover, that change, together with the increased interest in *Windows,* has brought many new PC and Macintosh developers to the *Windows* market, expanding the range of products available.

Boosting the Data Exchange Rate

Memory limitations in prior *Windows* releases made multitasking applications a pipe dream for most users. Not so any longer, say developers. Enhancements to *Windows*, coupled with a simultaneous enhancement to the DDE specification, will improve support for DDE among a variety of applications.

In the past, says Grayson, "you could put [support for] DDE in your application, but if a user tried to run it with *Excel*, there was never enough memory for both to work."

"We'll be looking for ways to improve the way we work with multiple applications," says *Excel* product manager Rich Tong. Tight links already exist between *Excel* and *Word for Windows*, and Microsoft is likely to write similar hooks between its other *Windows* applications.

However, to really enjoy the benefits of multitasking and push DDE, you'll need more than a 286 with 1MB of memory. Most developers agree that with *Windows 3.0*, you can now have three applications loaded and working, but you'll need a 386 and 2MB of memory.

Graphics Come of Age

Users of graphics applications will enjoy some of the greatest benefits under *3.0*, including a host of features that prior releases did not support.

Integration of high-resolution bitmapped images is made feasible under *Windows 3.0*, largely due once again to the additional memory access. Previously, you couldn't manipulate high-resolution color images in memory, Grayson explains, since a single 8½-by-11-inch color image at 640 by 480 VGA resolution takes about 1MB of RAM. Bob Romney, president of Zenographics in Irvine, California, expects the enhanced support for bitmapped images to foster a market for scanning and paint programs that can manipulate highly detailed images.

Presentation graphics products will also profit. Users of charting programs

Overcoming Mac Envy

When it comes to providing an easy-to-use, full-featured graphical environment, the Macintosh has had the PC beat hands down. Until recently, that is.

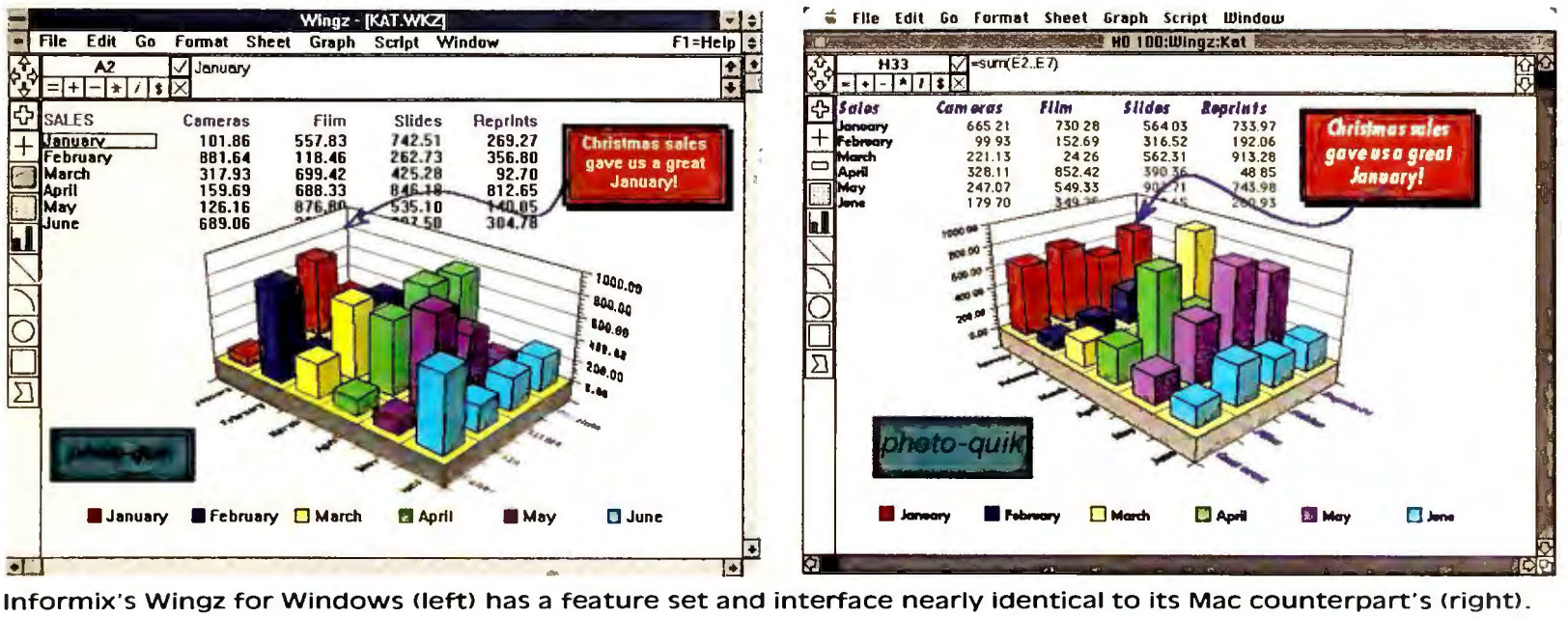
Developers of Macintosh and PC applications alike say *Windows 3.0* will finally give the Mac a run for its money. "The PC will be in direct competition with the Mac now that the 640K memory barrier is removed," says Bob Romney, president of Zenographics.

And it's not just the interface improvements that give rise to such claims. By year's end, most leading Macintosh business applications will also be running under *Windows*. These include desktop presentation packages such as *PowerPoint* from Microsoft and *Persuasion* from Aldus, as well as *Wingz*, the snazzy Macintosh spreadsheet from Informix in Lenexa, Kansas. In most cases the *Windows* and Macintosh products will offer a nearly identical interface and feature set.

Will the changes to *Windows* make die-hard Macintosh fans switch to a PC? Probably not. Even though the environments will be roughly equal on the surface, the Mac still has some clear advantages. It does a better job of masking from the user the complexity of the operating system, says Doug Edwards, executive director of software marketing at Informix. "And you never have to exit to DOS on a Mac." He adds that the PC still doesn't have the characteristic "plug and play" of the Macintosh. "With an Intel PC running *Windows*, there's still a lot of configuring and customization to do," he says.

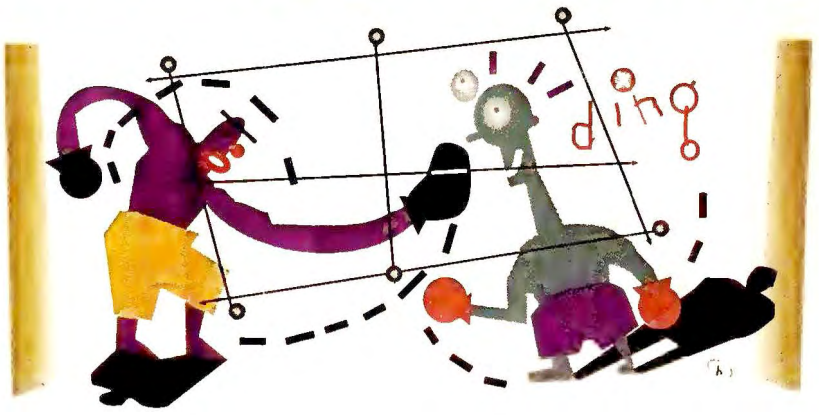
Nonetheless, the PC has one great advantage: cost. PC users can outfit themselves with a 386SX, 2MB of memory, and an HP LaserJet IIP for half the price of a comparable Macintosh system, says Zenographics' Romney.

So while you may not see many Macintosh converts running *Windows* applications, *Windows*' powerful features and comparatively low price may eliminate some of the Mac envy suffered by PC users who've longed for a truly workable graphical environment. When it comes to new sales, there's little doubt that the PC's low price, together with corporate America's skeptical view of the Mac, will make it the graphical system of choice for many businesses. —*R. F.*



Informix's Wingz for Windows (left) has a feature set and interface nearly identical to its Mac counterpart's (right).

DTP Products to Battle It Out



What *Windows 3.0* means to desktop publishing can be summarized in one word: *competition.*

Were it not for the improvements in *Windows 3.0*—particularly in memory management—*Ventura Publisher* might never have found its way to the environment, says John Meyer, developer of the program now owned and marketed by Xerox subsidiary Ventura Software Inc. Now desktop publishing enthusiasts can sit back and watch the two top packages, *Ventura* and *PageMaker,* battle it out.

Ventura Publisher Windows Edition, due this spring, will require *Windows 3.0,* says Meyer, adding that a robust DTP package would be hampered in prior versions (see the preview "Ventura Publisher Joins the Windows Club" in this issue).

Archrival Aldus has introduced an upgrade to *PageMaker* (version 3.1) that leverages the new memory management scheme but lacks the new storybook editor, search and replace, and index feature included in *PageMaker 4.0* for the Macintosh, announced earlier this year.

"The memory improvements shouldn't be underplayed," says Mike Sherwood, *PageMaker* product manager. "Desktop publishing applications require several applications, ideally running at the same time," Sherwood says, noting that wasn't possible under prior versions of *Windows.* "Running *PageMaker, Excel,* and *Designer* or *Corel Draw* would bring the system to its knees," he says.

The first difference *Ventura* and *PageMaker* users will notice under *Windows 3.0* is a snappier response. In *PageMaker,* Sherwood estimates that screen redraw will be 40 percent faster and the system more responsive to typed commands. Importing text and printing will also be significantly faster, he says.

DTP users on a net will see great improvement when running *PageMaker,* says Sherwood. In earlier releases, Aldus recommended that *PageMaker* run off local workstations, with the server used only to store common documents. Users can now run *PageMaker* off the server without suffering a significant loss in performance.

Users of the *GEM* version of *Ventura* will be struck by the interface change—a complete make-over in line with the upcoming OS/2 Presentation Manager version. The *Windows* version has features not possible in *GEM* including the ability to move styles between style sheets. It's also less mode oriented. A toolbox, similar to *PageMaker*'s, has been added, with all editing and page layout functions always available.

The battle won't begin in earnest until the major upgrade to *PageMaker* ships later this year, but the first glimpse of DTP under *Windows 3.0* speaks well of what's to come. —*R. F.*

like Micrografx's *Graph Plus* or desktop presentation programs like Microsoft's *PowerPoint* now can pick from 16.8 million colors and display 256 colors simultaneously. That means that with a high-end VGA board, *PowerPoint* users can create slides with smooth shaded backgrounds without dithering, says Connie Clark, *PowerPoint* product manager. The results, she says, are truer colors and more professional-looking slides.

Other Categorical Improvements

Communications packages now can support comm ports 3 and 4—earlier versions of *Windows* supported only ports 1 and 2. The boosted capability has already been added to *Crosstalk for Windows.*

In spreadsheets, says Tong, the biggest limitation under prior *Windows* releases has been the inability to bring in large worksheets because of memory constraints. Because that barrier is eliminated with *Windows 3.0,* Microsoft can incorporate new features into *Excel* without worrying about performance. Tong adds, however, that the emphasis is likely to be on offering a more robust spreadsheet rather than an all-in-one application. "We can now expect that there's a word processor around, rather than having to rely on a complete text processor in *Excel,*" he explains.

In data base management, *Windows 3.0* is spurring product debuts, one prominent example being Borland's *Paradox.* It's also helping existing applications. *Superbase 4,* from Precision of Irving, Texas, for example, supports Dynamic Link Libraries in its *3.0*-compatible release. Users will gain access to DLL add-ons that will provide access to SQL data bases and greater functionality in areas like charting and graphing.

Even interface developers such as hDC Computer and Publishing Technologies, which have made a living by improving the now-extinct MS-DOS Executive, are finding opportunities. "We look a lot better under *Windows 3.0,*" says Marshall Spires, president of Publishing Technologies of Austin, Texas. The company has introduced *CBM Desktop Office,* a superset of its earlier *File Organizer* (see the preview "CBM: Icons and More Icons" in this issue).

Only the Beginning

While users will be impressed by the many enhancements made to their favorite *Windows* applications, all indications are that the best is yet to come. *Windows 3.0,* developers declare, opens up a world of new possibilities. Says Rick Parsons, manager of engineering for Corel Systems, of Ottawa, Ontario, "It will allow our imagination to run wild." ●

Roberta Furger is an associate editor for PC World.

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Ventura Publisher Joins the Windows Club

Ventura steps onto PageMaker turf and spruces up with Windows 3.0's memory management and interface enhancements.

Richard Jantz

SCREEN 1: Share and share alike. Thanks to Windows 3.0's better memory management, you needn't close down Ventura to use a text or graphics editor. Here, Ventura Publisher Windows Edition works side by side with Corel Draw and Ami Professional.

Ventura Publisher gained its reputation and success by delivering no-nonsense document publishing tools for corporate America. If you wanted to finesse a newsletter, you were usually better off with Aldus's artsy *PageMaker*, but for churning out long, complex reports and catalogs, *Ventura* was the answer.

Many users avoided the program, though, because it had hitched itself to the fading star of the *GEM* graphical environment. Now, with the arrival of Xerox's *Ventura Publisher Windows Edition*, the critics should give *Ventura* another look. Thanks in large part to *Windows 3.0*, *Ventura Publisher Windows Edition* is faster, more powerful, and easier to use. It's still more of a document publishing package than a graphic arts tool, but it's picked up a few artful steps from *Windows* (and *PageMaker*) that make it a better-balanced desktop publishing program.

Like the new *Ventura 3.0 GEM* version and an upcoming OS/2 *Presentation Manager* edition, *Ventura Publisher Windows Edition* combines the base product, Professional Extension, and Network Server into a single $895 package. An upgrade from *Ventura 2.0* is a hefty $250. All three editions—which together are called the *Gold Series*—add longer footnotes and new import filters for HPGL (a plotter standard), *Microsoft Word 5.0*, and Macintosh PICT II files. The *Windows* and OS/2 editions go beyond the *GEM* version, providing better scrolling, new color schemes, more predefined styles for ruling lines, a faster hyphenation dictionary, and support for more printers and displays.

But new features aren't the big story. The real benefit of *Ventura Publisher Windows Edition* is its improved memory management. Thanks to *Windows 3.0*, you can now run *Ventura* with other applications and quickly switch among the programs. In a 4MB system, for example, *Ami Professional* and *Corel Draw* can run alongside *Ventura*, allowing you to quickly edit text and graphics without exiting *Ventura*. This type of integrated environment is just what users have long sought.

Ventura is still mode oriented, but its improved RAM management begins to break down the walls between modes. Unlike with *PageMaker*, you still must select a paragraph icon before you can tag a paragraph with a style, and click on the frame icon before resizing a frame. However, you no longer select a graphic icon before drawing: You can now create squares, circles, and lines at any time.

Bye-Bye Sidebar

Ventura Publisher Windows Edition fully incorporates the new colors, push-button icons, and menus of *Windows 3.0* and supports *Windows'* long list of printers and displays. Other welcome *3.0*-spe-

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.

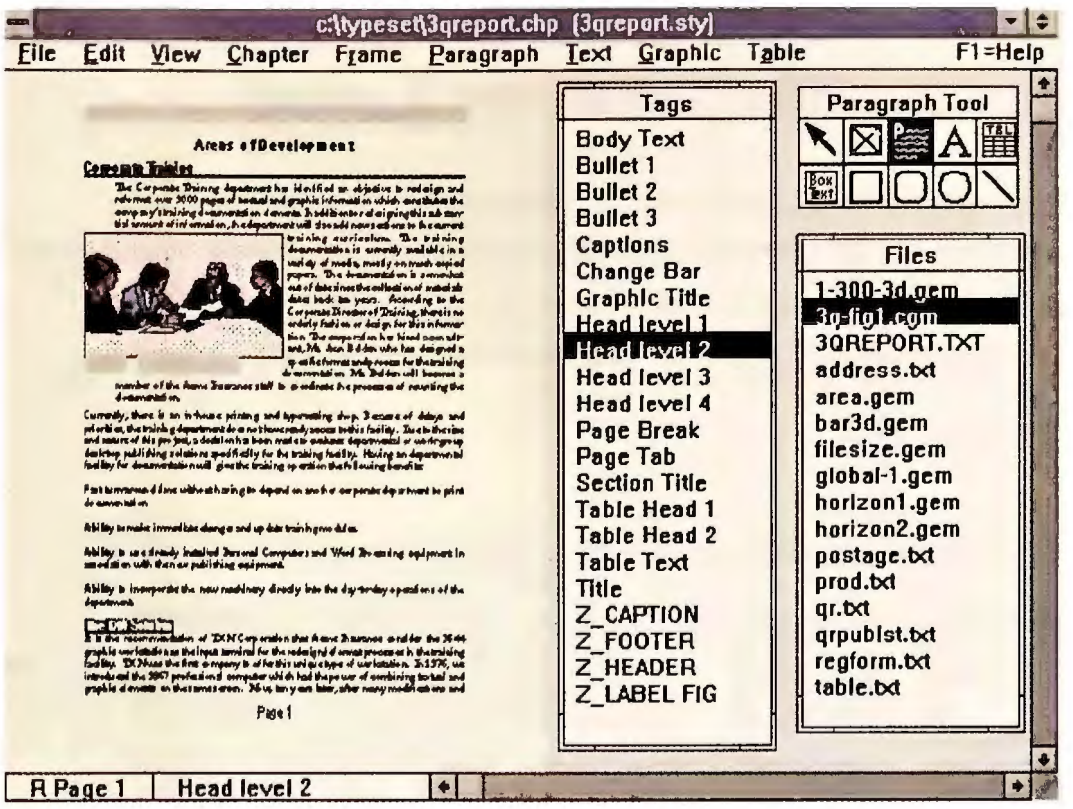
cific improvements include easier on-line help (just press <F1>) and the addition of <Alt> hot keys for commonly used functions.

Ventura has yet to achieve full *Windows* citizenship, however. You can't open two document windows at once, and because the program lacks support for Dynamic Data Exchange, you can't, for example, create a hot link between *Ventura* and *Excel* files. Another limitation: Although *Ventura* supports *Windows'* Clipboard for text and vector graphics, you can't import bit-mapped graphics via the Clipboard. (You can, of course, still use the file menu to import bit maps.) In addition, you must save vector graphics as *Windows* metafiles when importing them via the Clipboard. On the plus side, you can use the Clipboard to copy and paste tags between style sheets.

In the old *Ventura*, a sidebar on the left side of the screen displayed icons for switching between modes (such as Paragraph and Frame) and provided other information. No longer. Replacing it are three windows that jut out from the right. Because they overlap the work area, the new windows are sometimes more intrusive than the sidebar, but you can always move, resize, or hide them. At the upper right, a *PageMaker*-style window called the Toolbox lets you click on the frame, paragraph, text, and table mode icons and select various drawing tools. Under that, a Tag List window shows a scrollable list of style sheet tags, and below that the File List displays associated text and graphics files. All this information was available on the old sidebar, but only if you first selected the proper mode. Now it's always visible, letting you change modes less often and decreasing the time lost redrawing the screen.

Ventura's top-line menus are largely the same, but a few have been revamped to good effect. The old Options menu is banished, for example, and its contents have been distributed among other menus. There are also two new menus: Text harbors formatting attributes, and Table contains table-editing functions.

Most of the dialog boxes have been retooled to conform to *Windows 3.0*'s 3-D–style buttons, scroll bars, and drop-down lists. They're much easier to use than the old *GEM* screens, but the design isn't perfect. In some dialog boxes, *Ventura* stacks the new scrollable list menus one on top of another, making the list items difficult to distinguish from the options they overlap. Although some functions let you hold down a scroll arrow until the right number appears, too many force you to enter numbers.



SCREEN 2: Ventura Publisher Windows Edition begins to break down the walls between the various Ventura modes. Now you can view tags and related files at any time, and the graphics tools are always available. Here, selection boxes are expanded and moved from the default locations shown in SCREEN 1.

Ventura borrows a few helpful tricks from *PageMaker*—it now offers automatic screen scrolling, which causes the screen to shift over as you type. Also, you can now define any color using RGB (red, green, blue) and HLS (hue, lightness, saturation) color schemes for more precise control of color output devices. In addition, a new set of predefined style choices for lines, circles, and boxes goes beyond the options offered in *PageMaker*.

Moving Up on PageMaker

Whether these improvements are enough to make *PageMaker* users switch is unclear. Most will await the *Windows 3.0*–specific *PageMaker 4.0*, due out later this year.

Ventura gains ground on *PageMaker 3.0*, but it fails to deliver a knockout punch. Only *Ventura* offers table and equation editors, vertical justification, and the ability to anchor graphics. It also stands out with long-document features such as cross-referencing, section numbering, and table of contents and index generation. However, only *PageMaker* wraps text around irregular shapes automatically and can import bit-mapped graphics via the Clipboard. *PageMaker*'s image controls for changing lightness and contrast are also notable.

Although *PageMaker* users and new buyers should sit tight until version 4.0 arrives, it's hard to see why *Ventura* users would stick with the *GEM* version once the popular *Ventura* utilities move to *Windows*. *Ventura Publisher Windows Edition*'s improved interface and performance make it hard to resist.

Contributing Editor Richard Jantz is the author of Ventura for Windows 3.0 *(John Wiley & Sons, New York, 1990).*

Ventura Publisher Windows Edition
Ventura Software Inc.
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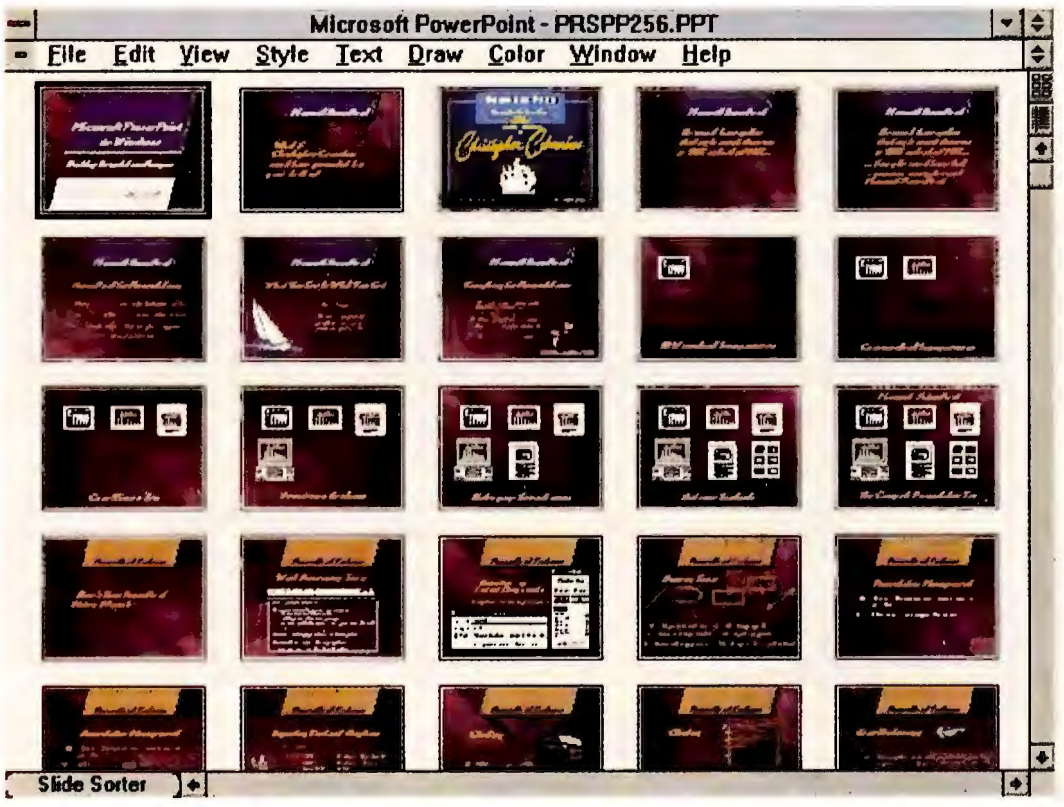
Desktop Presentations Reach the PC at Last

PC graphics packages usually emphasize charting. Microsoft's PowerPoint encourages you to work with the entire presentation, from concept to slides to handouts.

Eric Knorr



PowerPoint's slide sorter provides an overview of an entire presentation. Reordering images is a matter of clicking and dragging; double-clicking on an image brings it up for a full-screen edit.

Whether a presentation is made up of color slides, overhead transparencies, or ordinary handouts, its images should be as consistent as the pages of a well-designed newsletter. Each image should contain the same fonts, a standard layout, and repeating graphic motifs. Unfortunately, most PC graphics packages make it tough to apply all of these principles throughout an entire presentation.

Microsoft PowerPoint has all the usual PC data-charting features, but its real purpose is to help you create unified presentations quickly—without graphic arts expertise. Global control over fonts, colors, and backgrounds ensures graphical consistency, while the ability to produce speaker notes, generate handouts, and easily shuffle images meets presentation needs that most PC packages ignore. This constellation of features pegs *PowerPoint* as a typical "desktop presentation" package—typical for Macintosh users, that is.

Until now, *CA Cricket Presents* (formerly *Xerox Presents*) was the only PC program to offer a full set of desktop presentation features; like *PowerPoint*, it debuted on the Mac. But a late beta version of *PowerPoint* appeared to avoid *Cricket Presents'* major pitfalls: poor performance and weak data charting. Moreover, the $495 package, due to ship by the time you read this, offers better control over color than any other business graphics package for the PC.

PowerPoint works with *Windows 3.0* only, and it clearly benefits from the environment's enhanced look, performance, and device support. It employs *3.0*'s attractive push-button icons and scrollable menus, and separate charting and presentation modules use the new, richer Dynamic Data Exchange (DDE) spec to keep data charts tied to data, no matter how you modify them. Double click on a chart you've copied to a slide, and up pops the charting module. According to Microsoft, new versions of *Excel* and *Word for Windows* will incorporate the new DDE spec; drop a chart into a *Word for Windows* document, for example, and you'll get the same integration.

Painless Productions

The key concept behind *PowerPoint* is one that originated with desktop publishing: the master page. *PowerPoint* calls this the *master slide*, a background layer that holds the elements to be repeated throughout a presentation. Once you've created the master slide, you switch to the individual slide layer and begin working image by image, while the master slide stays visible but uneditable. Creating the same show with most other packages would require copying backgrounds from slide to slide—and you couldn't make global changes.

PowerPoint comes with a dozen black-and-white templates for overhead transparencies and two dozen color ones for 35mm slides. Each template includes a master slide—with placeholders for the company name plus rules and other background graphics—and seven suggested formats for individual slides.

Type over text in any of these samples, and your input immediately matches the supplied font; word processing features like word wrap, search and replace, and a spelling checker further ease text handling. You can click and drag, delete, or size text and graphic objects easily.

The templates are so well designed, most users will probably stick with them and perform only minor edits. A library of over 400 high-quality clip-art images makes additional enhancement easy, and a Bitstream *Fontware Starter Kit* and

support for PostScript and Hewlett-Packard's PCL 5 page-description language add up to excellent control over fonts. However, skilled users accustomed to the strong drawing features of *Freelance Plus* or *Windows Graph* will be disappointed: You can't draw freehand or flip or rotate objects, and there are no Bézier curves.

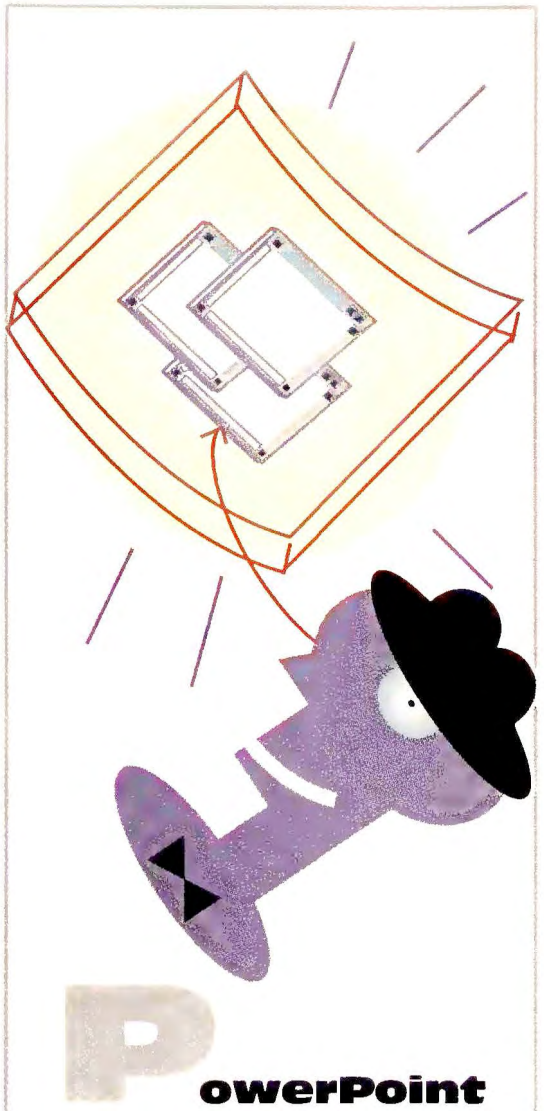
As partial compensation, *PowerPoint* imports graphics in nine formats, including Encapsulated PostScript, which is exported by such high-end drawing packages as *Corel Draw.* You can also import TIFF files to spice up output with scanned images.

Consummate Color Control

When you want to view final output, market leaders *Harvard Graphics* and *Freelance Plus* serve up an uneditable display in preview mode. But *PowerPoint* gives you a dynamic view as you work, showing the effect each change you make will have on your final output. And if you have a super-VGA board specifically supported by *Windows 3.0* (such as Headland's Video Seven V-RAM VGA), you can display 256 true, simultaneous colors on a VGA monitor.

This multiplicity of colors enables you to create shaded backgrounds that approximate the continuous tone of color slides. Best of all, each of *PowerPoint*'s 5000 or so recommended color schemes uses the background color as the starting point—and then supplies a complementary foreground color and six suggested accent colors. You can edit a color scheme or select a new one and apply it to an entire presentation with just a few mouse clicks. If none of the default colors appeals, you can mix your own.

Once you've fine-tuned color slides, you can use *PowerPoint*'s built-in communications module to send them directly to Genigraphics, a leading slide service with which Microsoft has a special arrangement. Genigraphics designed *PowerPoint*'s color schemes, clip art, and many of the templates, which should ensure good color matches. Most of the log-on parameters are preset to make transmission a one-button affair.



Load the same presentation file and select other output options, and you can print black-and-white handouts and speaker's notes that include facsimiles of the slides. Creating handouts is pretty much automatic (you can fit two, four, or six slides on a page), and speaker's notes benefit from word processing features and room for half a page of text.

Capable Charting

Anyone who's used *Excel* will find *PowerPoint*'s data-charting module familiar. Not only is the spreadsheetlike data entry form reminiscent of *Excel,* but the menus for selecting chart types, colors, line styles, and so on are quite similar. This interface is exceptionally easy to use, and the selection of charting options is a cut above average.

You can import entire *1-2-3, Symphony,* and (naturally) *Excel* worksheets, or import cell ranges by address or range name. *PowerPoint*'s data sheet stretches to a capacious 128 rows by 128 columns, but you won't find number-crunching functions of the kind offered by *Harvard Graphics* or *Windows Graph.*

Once the data's in place, you pull down the chart menu, select a scatterplot or an area, bar, column, line, or pie chart, and choose from a subsidiary screenful of miniature chart variations. *PowerPoint* offers more permutations, and you get 3-D effects and a few more editing options, but otherwise the program thoroughly mimics *Excel*'s charting module.

PowerPoint's charting module includes such all-important formatting controls as the abilities to skip labels and to set minimum and maximum axis values. Oddly, the charting module limits color options to 8 and patterns to 16; you must copy the chart to a slide to exploit *PowerPoint*'s superb color control and full set of 22 patterns.

Getting charts and slide backgrounds to match is one of the few obstacles to creating a presentation quickly and easily. Otherwise, global settings for shaded backgrounds, fonts, and color schemes—plus an on-screen light table for reshuffling slides—should have you cranking out shows in a hurry. Add the ability to generate handouts and speaker notes, and a screen display that's closer than ever to final output, and *PowerPoint* should ensure that more PC users discover the joys of desktop presentations. ◆

Eric Knorr is a senior editor for PC World.

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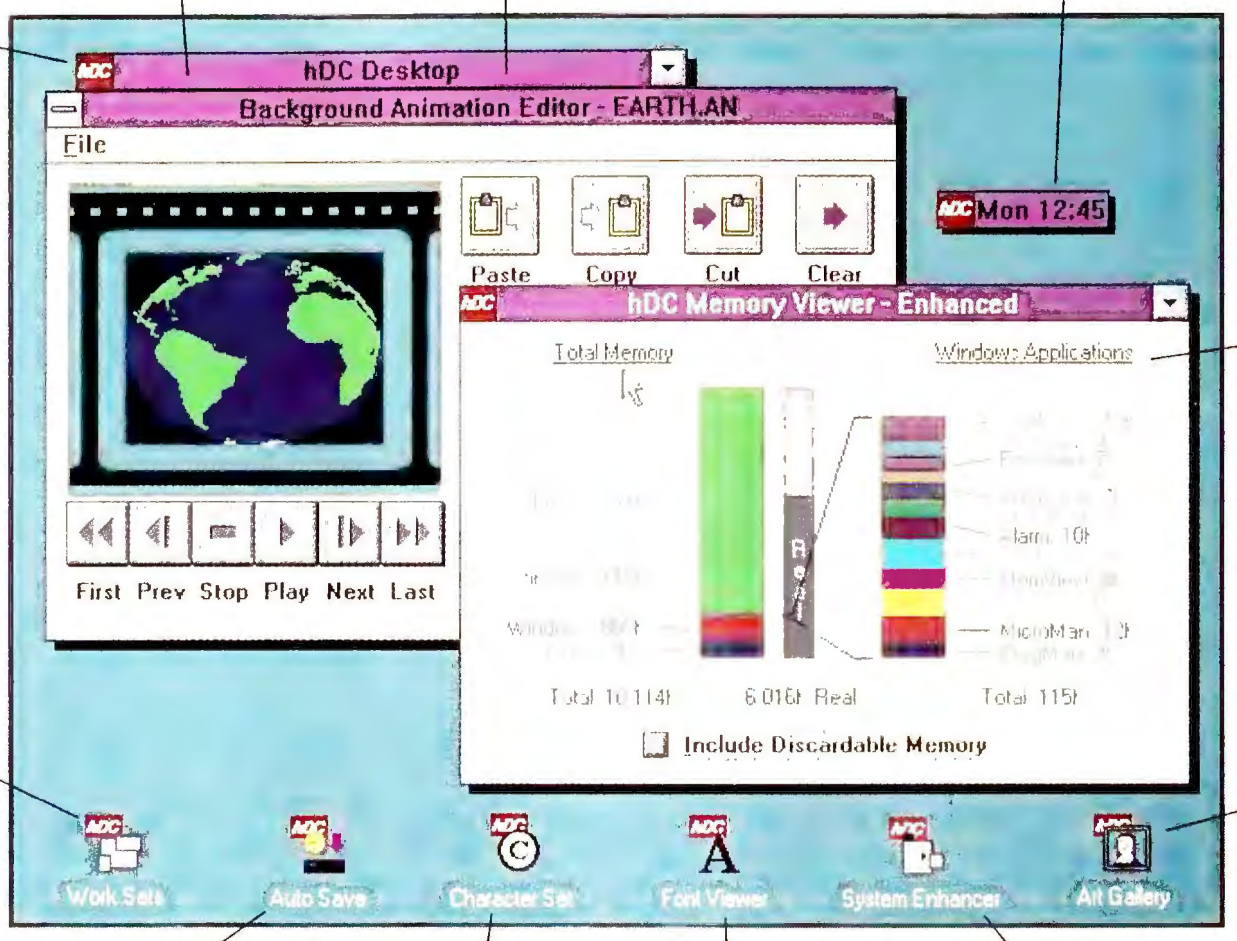

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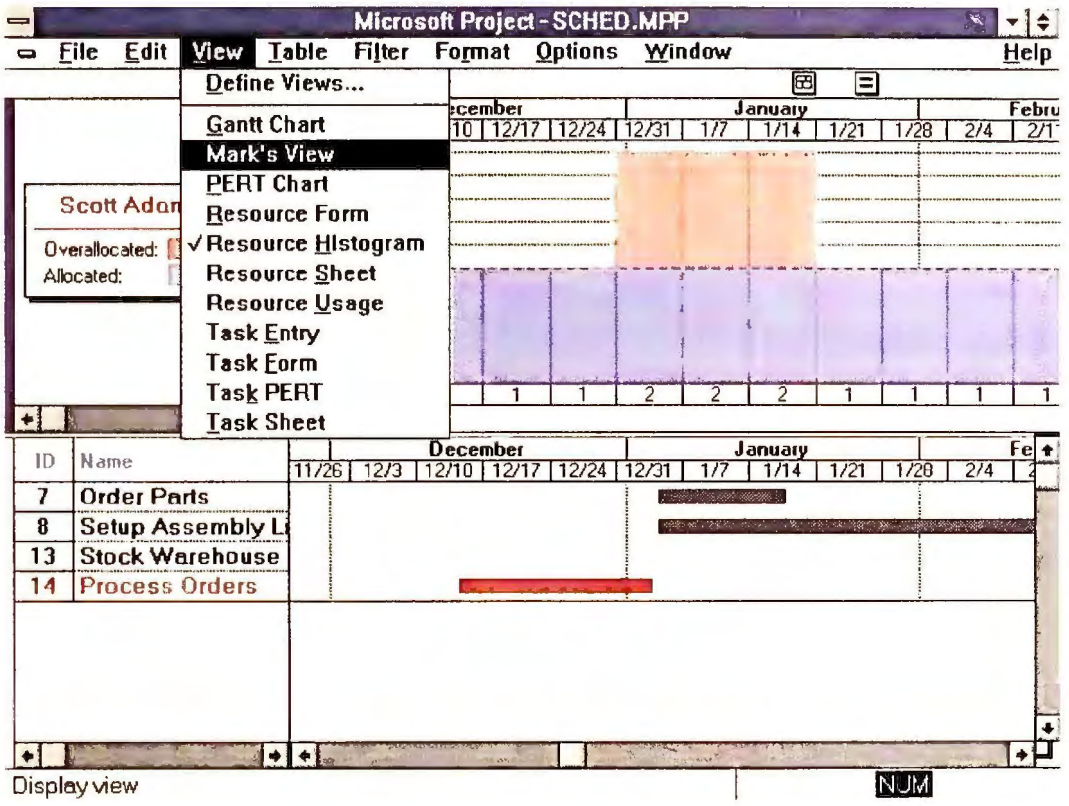
Project for Windows: A Manager's Tool

The interactive, customizable Microsoft Project for Windows promises to put project management into the hands of everyday users.

Mark S. Burgess



Microsoft Project for Windows lets you build and save your own custom views of a project. This view shows the resource histogram for one person's schedule, together with a Gantt chart that shows the person's activities in the same time period.

Following a trend toward more graphical interfaces in project management packages, *Microsoft Project for Windows* goes further than either Symantec's *TimeLine 4.0* or Scitor's *Project Scheduler 4.2.0* in the realm of graphics-based project management. Like those rivals, *Project for Windows* is aimed at the average business user more than the professional project manager. If you're a business manager wrestling with a small project—say you're relocating your company or coordinating a PR event—*Project*'s prompted, point-and-click approach could be the answer.

Designed for *Windows 3.0*, *Project for Windows* takes full advantage of that environment's new colors, push buttons, and drop-down lists. More important, it uses *Windows*' memory management tricks to improve performance. Two products provide *Project*'s *Windows* competition: Kidasa Software's *Milestones, Etc.*, which was recently updated to a *3.0* version, and *Project Outlook* from Strategic Software Planning. But both *Milestones, Etc.*, and *Project Outlook* are primarily scheduling and Gantt chart programs, whereas *Project for Windows* is a full-fledged project manager on a par with Microsoft's character-based *Microsoft Project 4.0* and other midrange programs such as *TimeLine*.

Working with project management in a graphical environment has clear advantages. Instead of forcing you to flip through menus to enter task data in a generic form, *Project for Windows* lets you click directly on a task in a network logic diagram or a Gantt chart and add or change information on the spot. For example, to assign a resource to a series of tasks, you highlight each task in the Gantt chart and enter the resource in an on-screen form. If the resource doesn't exist, you're asked if you want to define it. Need to create another, similar project? Just highlight the tasks from an existing project and copy them into the new one—all of the interdependencies are maintained.

This interactive approach makes it simple to update a project, and novices can easily grasp the logic of resource assignment and connections between tasks. Another bonus: The user manual and context-sensitive on-line help are clear, precise, and especially helpful to neophytes.

At the same time, *Project* offers

Project aims at the average business user.

enough analytical sophistication and flexibility to satisfy most project veterans. *Project* is not a true PERT system like *Primavera* and other heavyweights—it doesn't calculate the probability of completing a task. Unlike such high-end packages, it can't handle thousands of activities or meet all of the U.S. government's Cost/Schedule Control Systems Criteria (C/SCSC).

But *Project* is a complete Critical Path

Method (CPM) program for analyzing resources and costs. You can assign a cost to a resource, assign that resource to several tasks, and then arrive at labor expenditures versus budget. The program accommodates everything from overtime labor rates to multiple resource leveling strategies, and it even deals with advanced concepts such as earned value.

All the connectivity logic that the market leaders support is here, such as lead/lag relationships (delayed and parallel start and finish), selective resource leveling, leveling across multiple projects, filtering, and more. And unlike the DOS version, this *Project* automatically updates subprojects whenever you change the master project.

One Project, Many Views

But *Project*'s main appeal will likely be its interactive, graphical approach to project building, maintenance, and analysis. You can enter task data directly or port it over from *Excel;* point, click, and drag to create and connect interdependent tasks; and add resources or new "percent complete" information to a group of tasks with a sweep of the mouse. Best of all, you can display and save different side-by-side views of project data.

This last feature gives *Project* an edge over all project management competitors because it lets you easily monitor the critical relationships between a project's elements. Make a few quick menu selections, and you can split the screen and display any two project views at once—a Cost Table next to a Gantt Chart, for example, or a resource histogram next to a network diagram. Change a task duration on the Gantt chart, and the impact on any other view is automatically calculated. Once you build a custom view, you can save it as a menu option, in effect creating your own ad hoc screen writer. Since you're working in *Windows*, you can even run several copies of *Project* to view a number of custom views at the same time.

As you might expect, *Project* can save these custom views as reports and print them out on any *Windows*-supported printer. First-time users, of course, can also choose from a number of prefab reports ranging from project summaries to periodic resource analysis. Anyone familiar with *Excel* can enhance a report in minutes. To add fonts, colors, shading, and so on, just highlight an area and pick what you need off a menu. To add footers, page numbers, and the like, fill in the on-screen page setup form. Since you can manipulate the position of activities pixel by pixel, you can squeeze more readable activities onto a page than with any other project management package.

Two Steps Forward, One Step Back

For all its charms, *Project* misses some obvious opportunities. According to Microsoft, this first release won't support Dynamic Data Exchange (DDE) links for automatically swapping data between supporting *Windows* programs. This is a keen disappointment when you consider what a natural pairing *Project* and *Excel* would be. For example, changing actual labor hours in *Project* could instantly update a cost versus budget graph in *Excel*. For the present, you can either pull in data via the Clipboard (an unsatisfactory solution) or import *1-2-3, dBASE, Excel,* MPX, and ASCII files directly.

Project's network support will probably be limited to file locking and read-only options. Note, too, that *Project* lacks a macro facility.

Scheduled for May release, *Project* will list for $695, making it competitive with leaders such as *TimeLine* and *Harvard Total Project Manager*. Given its innovative approach to a dreary job, *Microsoft Project* just might win over frustrated professionals—and give amateur project managers a more intuitive, visual way to plan and monitor projects.

Mark S. Burgess is a certified project management professional and president of the San Diego Chapter of the Project Management Institute.

Microsoft Project for Windows
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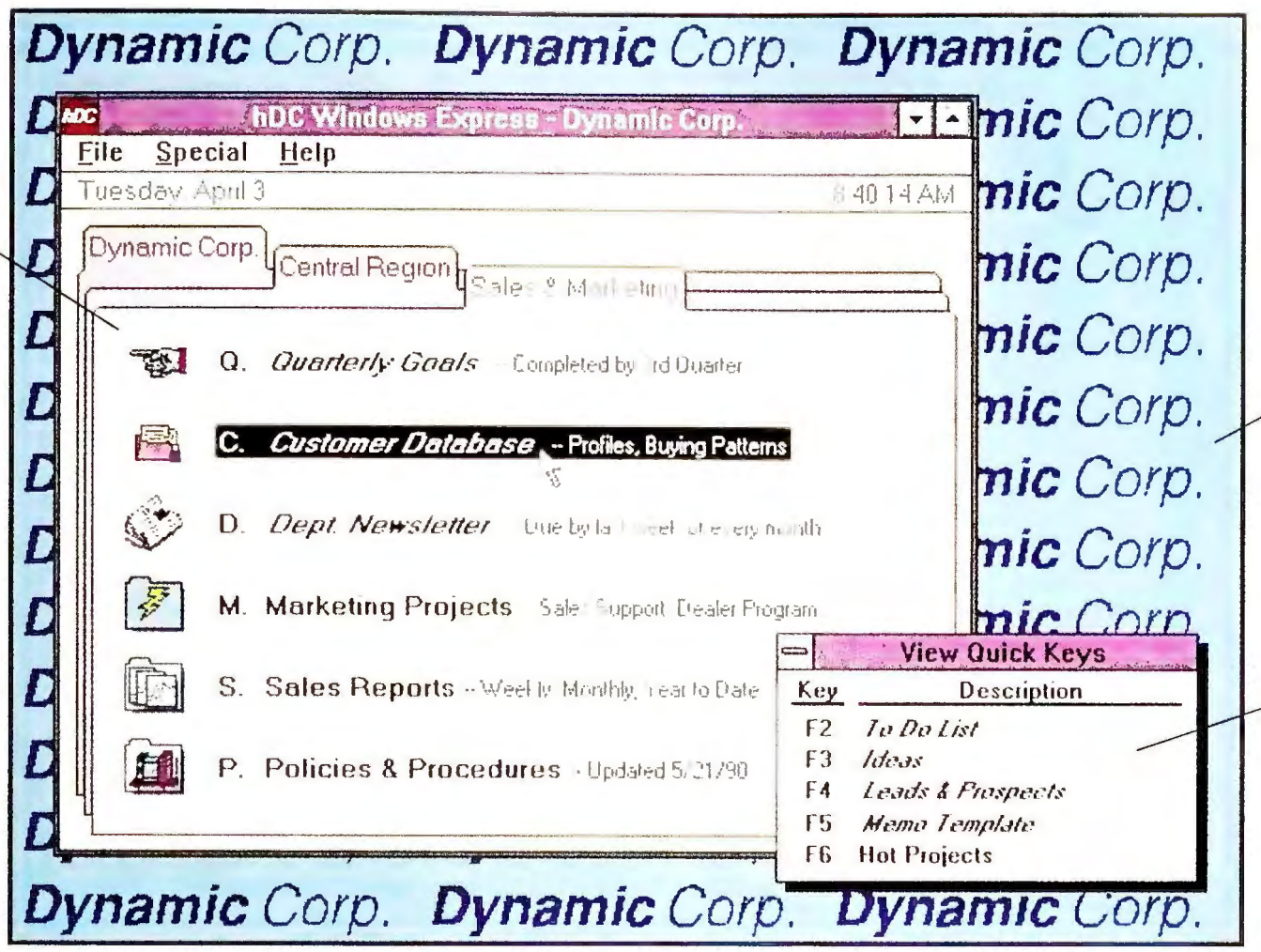
Douglas J. Halbert
San Diego, California

Turn Microsoft Windows into your Windows.



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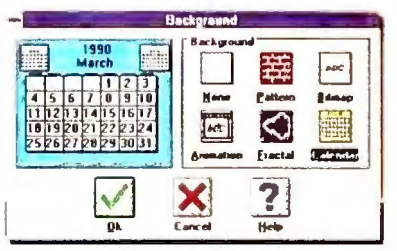

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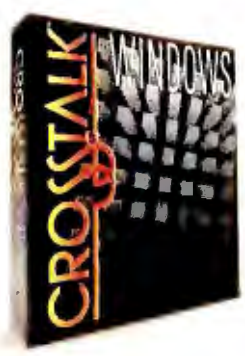

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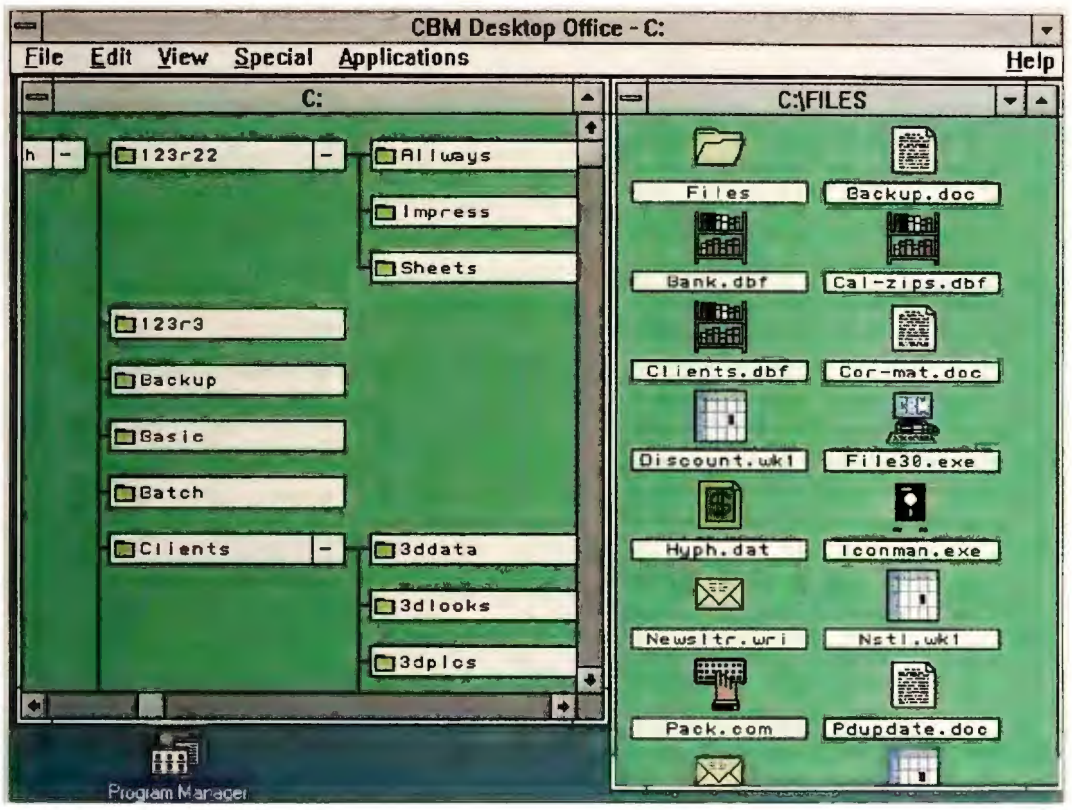
CBM: Icons and More Icons

Does Windows really need another front end? Can CBM Desktop Office (aka PubTech File Organizer) survive in the Windows 3.0 era?

John Walkenbach



Desktop Office can display folders (directories) in a tree diagram. File names appear with icons attached, but because you can't display the file names without the icons, large directories make for a cluttered screen.

In the pre-*Windows 3.0* era, many *Windows* users considered *PubTech File Organizer* a godsend. Compared to the much-maligned MS-DOS Executive file system, *PubTech* was a knight in shining icons. Recently upgraded and renamed *CBM Desktop Office*, the product still offers an appealing icon-based interface, capable file management features, and a host of other helpful tools, including a top-notch text editor.

But the MS-DOS Executive has been supplanted by *Windows 3.0*'s impressive Program Manager and File Manager, and *CBM* has lost some luster. Although it still outshines *Windows 3.0* in some areas, it can't justify its $199.95 price or $75 upgrade cost.

Like *Windows 3.0*, the latest update of *CBM* is visually more appealing. You can edit the multicolored icons, move them around, and link them to files. They're more Macintosh-like—even down to the trash can icon.

The latest version also makes it easier to set up multiple desktop configurations and switch among them. For example, if you like to have a particular suite of utilities open when working with your spreadsheet, you can configure the applications as a desktop (DSK) file and load them all with a few mouse clicks. However, you can't assign each application a size and location on the screen, as you can with hDC's *FirstApps*.

CBM's file manager adds some new twists to the typical tree list of files and folders—every file is represented by an icon. If you drag an *Excel* worksheet file icon and drop it on the *Excel* application icon, the worksheet will load along with *Excel*. To print a file, simply drag it to a printer icon. Similarly, you can "lasso" a group of icons and move them to another directory folder.

Although the icon system has its pluses, the icons themselves take up valuable screen space. Each one appears above its file name, and there's no command to turn them off. Another limitation: To display details such as size or date, you must open a separate view-only window.

Advanced users will prefer the *Windows 3.0* File Manager. You give up the fancy icons, but you get more in return: a file list that lets you select the desired detail level; a better help system; and a more concise file listing. For example, File Manager saves space by placing icons on the same line as file names. And *CBM*'s "drag and drop" techniques are available, as long as you don't mind dragging file names instead of icons.

CBM's main benefit is no longer its file manager but its utilities. You get a simple but capable backup-and-restore utility and a text-search utility that lets you search for text strings, locate file names that match a specified wild card, and even restore erased files. *Windows 3.0* has none of this.

You also get a text editor that greatly improves upon *Windows'* Notepad. It works with files of any size and offers remappable keys, an appendable clipboard, multilevel undo, and macros. It won't double as a word processor, however, as it lacks formatting features like the ability to handle multiple fonts.

CBM Desktop Office still has a lot going for it, even considering *Windows 3.0*'s improved file management. *CBM* needs to add some new tricks, however, before users will agree to make the added investment.

John Walkenbach is market research manager for a leading savings and loan association based in Southern California.

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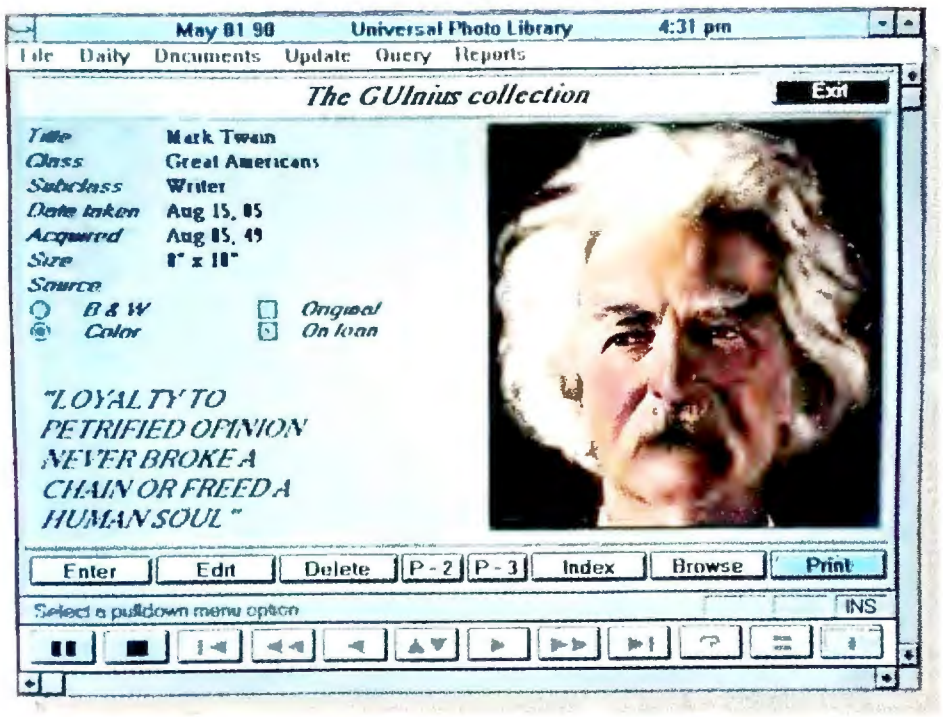

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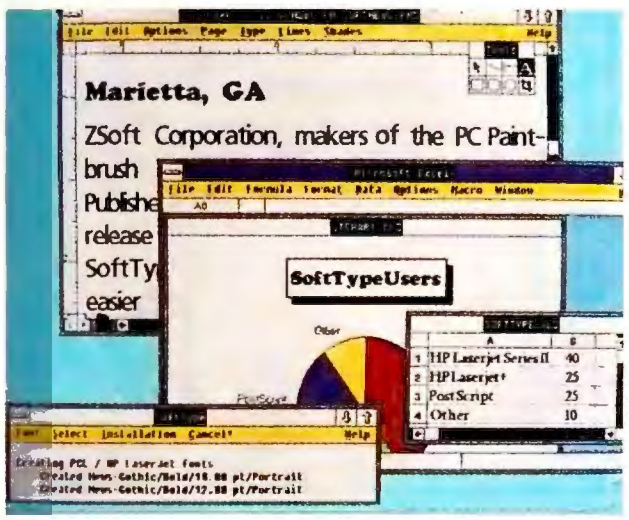

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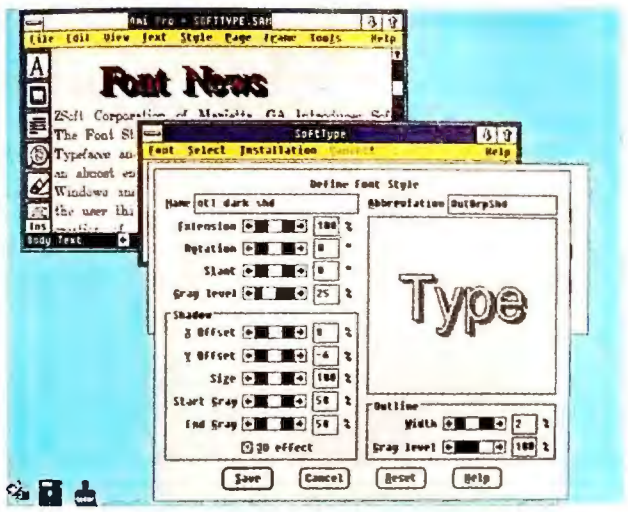

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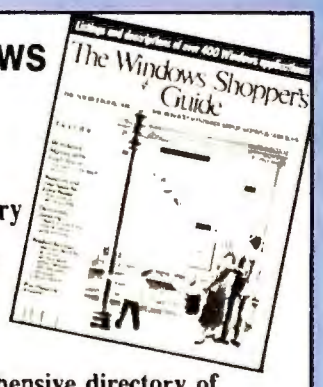

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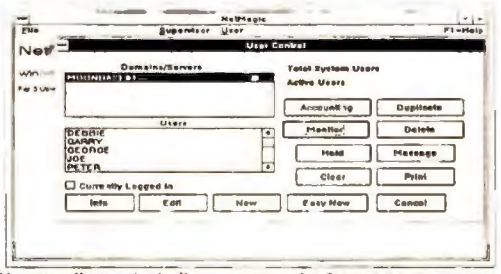

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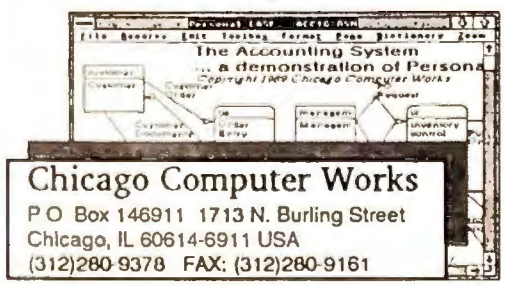

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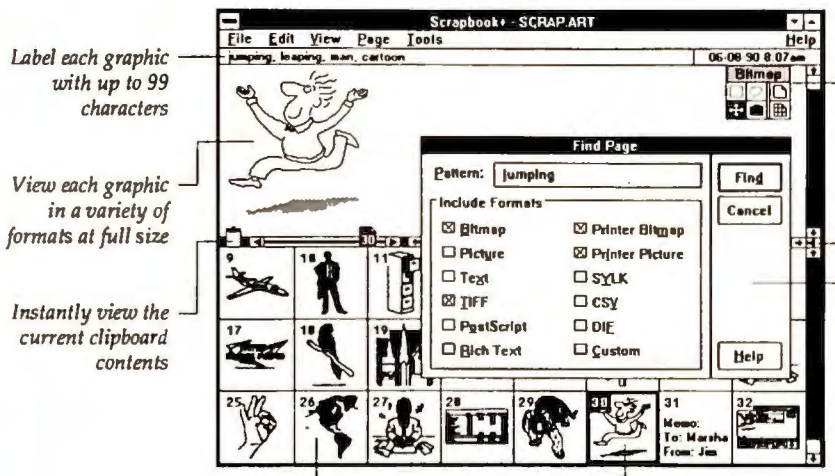

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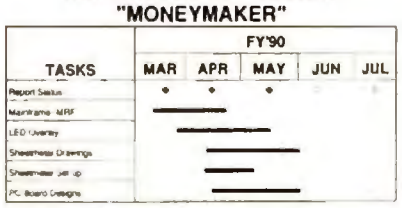

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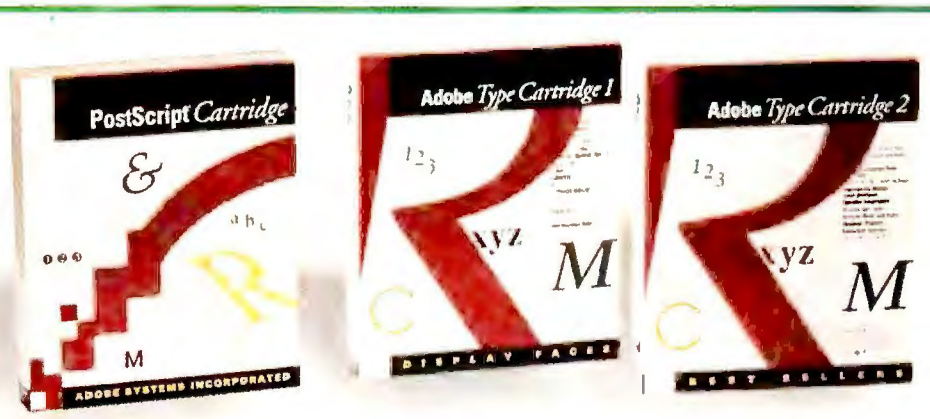

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4387 ⊙Who•What•When 2.0 . . . . . 179.
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Corel Systems ... NCP
5506 □CorelDRAW! 1.2 . . . . . 329.
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2908 □Crosstalk XVI 3.71 . . . . . 119.
5611 □Crosstalk for Windows 1.0 . . . . . 129.
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5494 ⊙News/Retrieval Membership Pkg. 24.
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6188 ℞FoxPro 1.02. . . . . 489.
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Funk Software ... NCP
2228 □Sideways 3.21 . . . . . 42.
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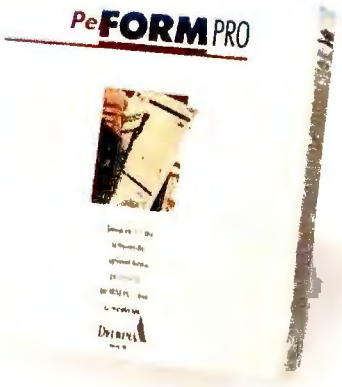

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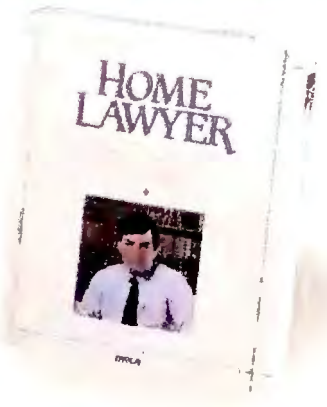

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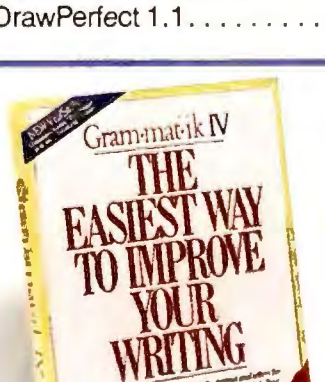

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5286	2400 Baud Int. MNP Modem *(Lev. 5)*	175.
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1676	CompuServe Information Service	23.

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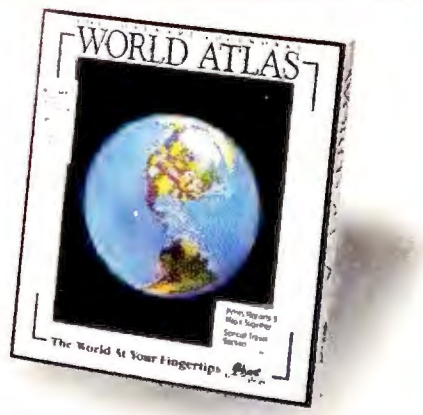

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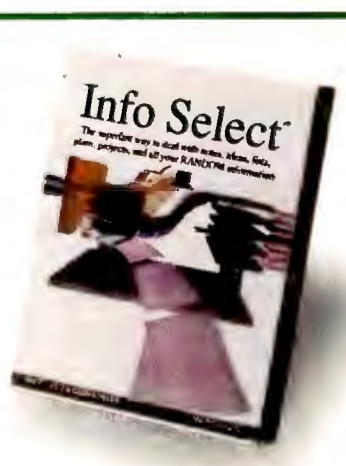
6556	256k DRAMs *(100 nanosecond)*	call
3248	256k DRAMs *(120 nanosecond)*	call
4366	1 Meg x 9 SIMMs *(100 nanosecond)*	call
5510	1 Meg x 9 SIMMs *(80 nanosecond)*	call
5746	1 Meg Chips *(80 nanosecond)*	call

OUR POLICY

- We accept VISA and MASTERCARD only.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $250 minimum.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- COD max. $1000. Cash, cashier's check, or money order.
- 120 day limited warranty on all products.*
- To order, call us Monday through Friday 8:00 AM to 1:00 AM, or Saturday 9:00 AM to 5:30 PM. You can call our business offices at 603/446-3383 Monday through Friday 9:00 AM to 5:30 PM.



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6787 ◙ *Info Select 1.1*–The fastest most exciting new way to deal with notes, ideas, plans, contacts, and all your RANDOM information. Easy yet powerful. Endless uses . $55.

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For heavy hardware items such as printers, monitors, Bernoulli Boxes, etc. pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoulli Boxes, computers, hard drives, and power backups, actual UPS Blue charge will be added. For all other items, add $3 per order.

Alaska and outside Continental US:

- Call 603/446-7721 for information.

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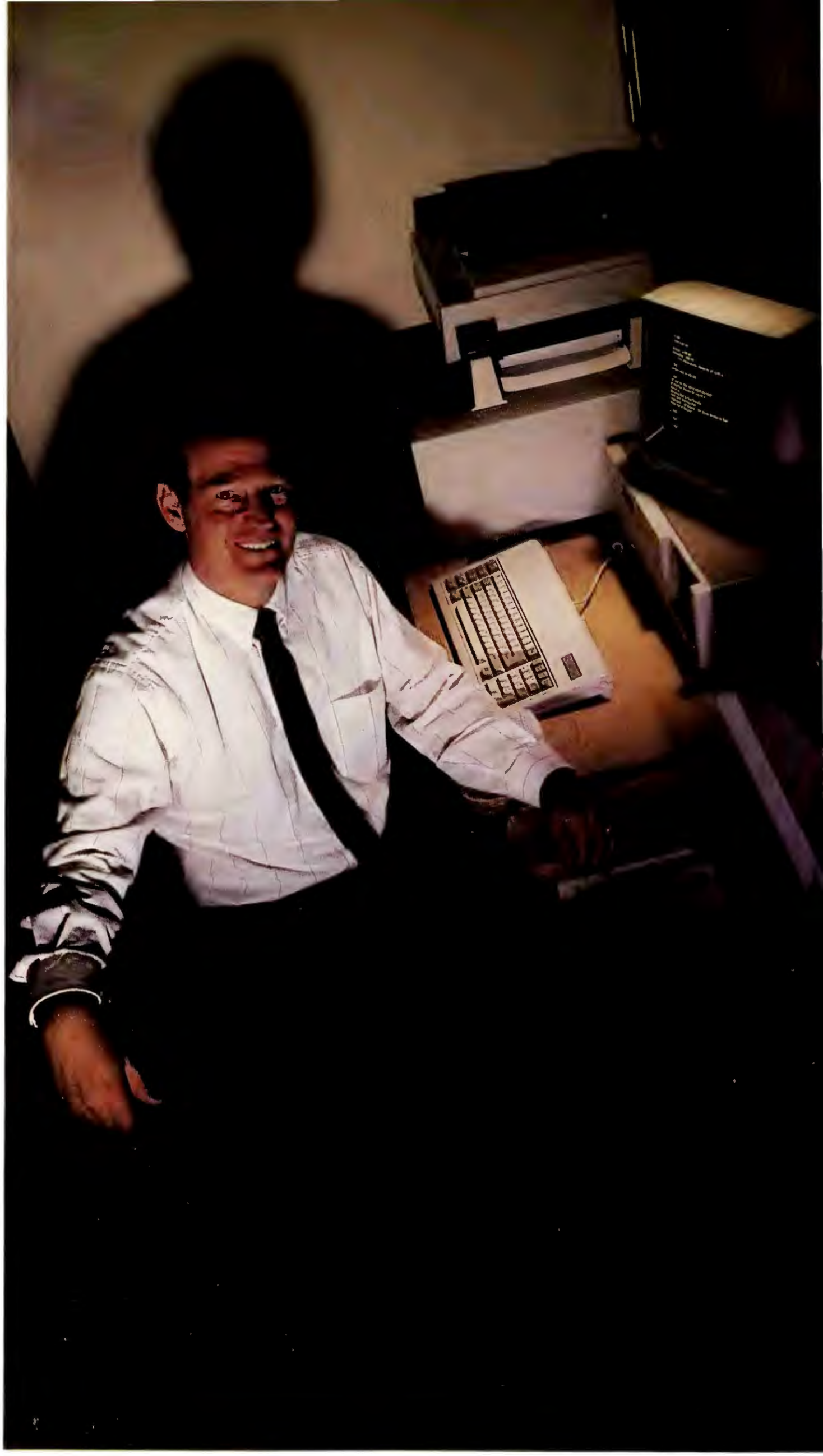
You never know how a PC is going to work until you get it into your own environment, says Eric Boutwell, manager of applications development for the San Francisco Unified School District.



ROBERT CARDIN

CAN YOU AFFORD A NO-NAME CLONE?

Choose a Brand X system over its big-name competition, and you can save thousands of dollars. But take it from buyers who've been there—clone country is no place for the fainthearted.

SETH RESNICK

MARINA HIRSCH

Everybody knows the benefits of buying PCs from a top manufacturer. Compatibility is almost a given. If something goes wrong, you can be confident there'll be a dealer nearby who can fix the problem. When you buy a system from IBM, Compaq, or any of the dozen or so second-tier PC manufacturers, you get security. And, of course, you pay for it.

Therein lies the lure of no-name clones. You save money on the purchase price—in some cases lots of it—when you select a brand that isn't nationally known.

For us, it was a choice between paying $4000 for a no-name or $10,000 for a 33-MHz Compaq 386," says Rob Tagg, vice president of Herbert Engineering, a San Francisco marine software development company. After weighing its options, the company chose the clone, buying both 286s and 386s from HIMS (Hardware Information Management Systems), a Milpitas, California, manufacturer.

No-name clones are available from hundreds of manufacturers and resellers, both retail and mail order. Prices run the gamut from slightly below the cost of their brand-name counterparts to rock-bottom. "I get two clones for the price of one [IBM] system," says Charles Holt, owner of Holt Auto Sales in Kissimmee, Florida. "You pay a premium when you buy IBM. Every time they add something new, they

Brian Camenker, former executive director of the Boston Computer Society, believes purchasing a no-name clone calls for a caveat emptor policy.

The no-name clone market isn't as risky as people think, says John McHugh, a value added reseller in Hudson, New Hampshire.

charge you an arm and a leg." But system cost isn't the only factor to consider. As does Holt, some business buyers think the brand name price differential isn't justifiable. Others, though, say buying from clone makers can be risky: The potential for incompatibilities can be high, and support isn't always a given.

NO-NAME VERSUS BRAND NAME

When deciding whether to buy no-name equipment, "you have to ask yourself, do I need basic technical advice?" says John McHugh, a systems consultant and value-added reseller of clones based in Hudson, New Hampshire. "How much do I need to lean on a vendor? At one end of the spectrum, there's a brand name dealer with DOS classes and a technical support staff. At the other end, there's the guy operating out of a second-story room, with three guys in the garage putting his equipment together." The point you choose on the spectrum depends on what you'll be using the system for, and on how technically inclined you are.

Charlie Clavadetscher, a motion-control cameraman with a special-effects studio in Northern California, says he wouldn't consider buying a brand name PC. He'd rather save the money.

Clavadetscher sets some guidelines as to which clone makers he'll buy from, however. "The smaller the ad and the more gimmicky, the less trust I'll put in a company." Moreover, he says, "I simply won't buy a product that hasn't been reviewed."

Earlier this year, Clavadetscher bought a no-name PC from a mail-order company whose price included a 30-day money-back guarantee. A one-year parts-and-labor contract was available at extra cost, says Clavadetscher, but he didn't buy it. "I figured computers don't fail that regularly."

As it happened, there was a problem with his computer (the case covered up the ports at the back of the advertised expansion slots), but Clavadetscher didn't discover it until after the 30-day trial period was up. He fixed the prob-

A CLONE BUYER'S CHECKLIST

Following a few guidelines can help eliminate some of the uncertainty of buying a no-name PC.

BEFORE BUYING A NO-NAME CLONE

- request references from corporate customers
- if buying for business, ask whether evaluation units are available
- deal only with companies that have been operating under the same name and from the same location for at least one year
- buy only systems using industry-standard components, particularly with the motherboard, BIOS, video card, and hard disk
- shop around for companies that offer comprehensive after-sales support such as third-party maintenance contracts, a one-year warranty, and a technical support line
- buy from companies that offer an unconditional 30-day money-back guarantee
- check with the local Better Business Bureau for a record of any complaints filed about the company
- get a written explanation of all warranty information and service policies *before* paying for anything
- check that the power supply has been tested and approved by either the Underwriters Laboratory (UL) or the Canadian Standards Association (CSA)

THEN, IF BUYING FROM A LOCAL DEALER

- visit the store several times before purchasing a system. The busier the store, the more likely that it's doing a good job servicing customers
- talk with staff. Will they be able to assist you if you encounter problems down the road?
- check with the local PC user group for references
- test any equipment before leaving the store

MAIL ORDER SHOPPERS SHOULD

- confirm all phone orders in a follow-up letter or fax
- find out when and how products will be shipped
- ask to be notified if items are out of stock
- pay only with a credit card or a company purchase order (see *Consumer Watch,* May 1990)

ROLLIN McGRAIL

lem himself by rewiring the PC, but he lost an expansion slot in the process.

Clavadetscher's biggest complaint, however, concerned the documentation. His computer came with generic documentation that dealt with the company's entire product line in one booklet. Clavadetscher was unfazed, however. "I can slog through anything," he says.

Clavadetscher's experiences point to an important consideration when buying a no-name clone: Will you be able to roll up your sleeves and fix the system yourself? If not, make sure that your vendor is among those who offer comprehensive service and support plans.

Service options are just one element to think about. Although a clone's basic components may rival those in its brand name counterparts, no-name clones may lack certain extras—such as the proprietary memory architecture built into a Compaq or AST Research machine—that can boost their overall performance.

There's always the issue of compatibility to consider. Given the wide variety

HOUSE CALLS: ON-SITE SERVICE CONTRACTS PROMISE FAST RELIEF

When Rab Tagg bought a clane fram Milpitas-based HIMS, he gat the stondard 30-day money-back guarantee. Far na extra charge, he received a ane-year on-site repair and service cantract with Autamated Internatianal, a maintenance arganizatian with 414 service centers acrass the United States and Canada.

Increasingly, no-nome clane manufacturers are bundling in such repair cantracts supparted by third-party service organizatians. If the equipment breoks dawn, sameone cames ta yaur hame ar business (usually within 24 hours of yaur call), diagnases the problem, and repairs the system. Farget having ta send the PC back to the monufocturer. Farget days ar weeks af dawntime.

Needless ta soy, service quality varies by campany. Consider the case af Charles Halt, awner af Halt Auta Sales in Kissimmee, Flarida. Halt baught a 386 system fram Prateus Technalagy af Cliftan, New Jersey, in large part because of the campany's pledge of 15 manths af free an-site service and support. When he experienced prablems with the system, he telephaned Prateus far help. But when telephone technicol suppart foiled to solve the prablem, Halt waited twa weeks far the pramised an-site visit. Once o technician fram a lacol service campony (contracted far on-site service by Prateus) did shaw up, he was unable ta fix the system. "We hod to send the PC back ta Prateus," says Halt. The system was down far five months and still hasn't been satisfactarily repaired.

Halt had relied on the company's advertisement, rather than an a written cantract. Far yaur awn pratectian, get the detoils af ony support plan in writing, including the name and a cantact person at the local repoir center, before yau place an arder.

Same clane makers cantract with nationwide maintenonce companies such as Bull HN Infarmatian Systems' (farmerly Honeywell) Custamer Services Organizatian in Newtan, Massochusetts, and General Electric in Narcrass, Geargia. Others ga with smoller regionol firms. In either case, technicians shauld knaw haw ta service your system and, barring unusuol circumstances, be able ta carrect a prablem an-site.

If your PC vendar daesn't offer on an-site repair plon, you con purchase ane directly from either a lacal ar a notianal arganization. Ellen Ferrata, account monager of service cantracts with Serviceware, af San Jose, California, says the lure of repair cantracts is clearly canvenience. "We come on-site and da the repair, as well as preventive maintenonce. All ports ond labor are included; it's a fixed budget cost with na surprises."

If yaur campony is smoll or you want ta caver the PC yau use at hame, yau may hove na choice but to sign up with a lacol firm, since nationwide service argonizotions tend ta restrict direct service controcts to lorge corporotions. "We cansider a custamer wha spends $50,000 o yeor ar less on maintenonce a smoll custamer," says General Electric computer services representative Harry Willioms.

GE will service "just about any brand af PC," accarding ta Williams—if o custamer has enaugh af the brand to justify any additianal training that GE technicians may require. After oll, soys Williams, "PCs all have the same integral parts."

Befare signing up with a particular company, ask far referrals, particularly fram custamers whose maintenonce needs are similar ta thase af yaur argonizotion.

of hardware components and software packages on the market, glitches are inevitable. Although most peripherals companies test their products with the best-selling PCs, few guarantee that those products will also run on a no-name clone. And if a problem does arise, neither vendor may be much help.

MAIL ORDER VERSUS RETAIL

Once considered a mine field for unsuspecting PC shoppers, mail-order PC purchasing is gaining more respect. In the "old days" (five to ten years ago), mail-order houses offered 30-day warranties, or, at best, a whopping 90-day warranty. Today, one-year parts-and-labor warranties are the norm, and some companies offer repair contracts with local vendors. Toll-free technical support lines aren't uncommon; some operate around the clock. Although each increment of service is likely to be reflected in a no-name clone's price, many buyers find the extras well worth the added cost.

Still, everyone's heard stories about incorrect systems being shipped, computers showing up dead on arrival, and PCs never arriving at all. Such reports prompt some buyers to shy away from the mail-order channel, opting instead for the feeling of security that can go with face-to-face contact.

The main advantage of buying a clone from a local dealer is that you can see the system and the company you're dealing with before committing any funds. And if something goes wrong

You'll want to ask the company a few basic questions: Is there a guaranteed response time? How many technicians are on call? Where's the nearest service center (in case a problem can't be resolved on-site)? Does the company have a toll-free number for technical support? How about a 24-hour answering service for emergencies? Can the contract be renewed annually?

And then there's the most important question of all: Is the service contract cost-effective for your business, your budget, and your time constraints? The security of third-party maintenance isn't cheap: Expect to pay about 10 percent of the PC's original price, each year.

"If you're considering a long-term service contract, compare the cost of the contract with that of simply replacing components," advises systems consultant John McHugh. "If you have a 286 PC with something less than an 80MB hard drive, for example, the most expensive component—the drive—will cost you less than $500 to replace," he cautions. "If you're spending that amount within two years for a service contract, you may not be coming out ahead." —*M. H.*

WALT JOHNSON

Charles Holt, owner of Holt Auto Sales in Kissimmee, Florida, says he waited two weeks before he received on-site service for his no-name clone.

WHERE TO BUY

Bell Atlantic Business Systems Service
50 E. Swedesford Rd.
Frazer, PA 19355
215/296-6000

Bull HN Information Systems
Customer Services Organization
151 Needham St.
Newton, MA 02161
800/624-8728

GE Computer Service
6875 Jimmy Carter Blvd. #3200
Norcross, GA 30071
404/246-6200

NCR Customer Service Division
1334 South Patterson Blvd.
Dayton, OH 45479
Call 513/445-5000 for local NCR number

TRW Customer Service Division
Direct Marketing Group
810 Greenview
Grand Prairie, TX 75050
800/922-0897

(and you aren't able to fix it yourself), taking a computer back to a local dealer is typically easier and less expensive than making a series of calls to a distant mail-order house and perhaps ultimately packing up the computer and sending it back.

Another big difference between mail order and retail: With mail order, it can be difficult to determine a company's size and resources. Recommendations from satisfied customers can help alleviate concerns, but for some buyers nothing replaces the chance to walk into a store and see what you're dealing with.

Then there's the issue of price to consider. Mail-order firms don't require as much overhead as retail stores, and prices usually reflect that savings. For Herbert Engineering's Tagg, however, choosing a local vendor over a mail-order one wasn't a matter of price so much as getting fast repair. "I want somebody to yell at if my PC breaks down," he says.

Whether buying retail or mail order, purchasing a no-name clone calls for a caveat emptor policy, says Brian Camenker, recently retired as executive director of the Boston Computer Society. "A lot of these little companies go to COMDEX, make deals to get bulk parts, and then literally assemble the parts in a garage." He says he has a rule for purchasing no-names: "Have the retailer assemble it for you in the store and show it to you working."

There's one drawback to Camenker's rule, though, says Eric Boutwell, man-

SCOTT GOLDSMITH

After buying his first clone, Dennis Clark, data processing manager for CMS East in Greensburg, Pennsylvania, says he's learned the meaning of "you can't go wrong with IBM."

ager of applications development with the San Francisco Unified School District. "You never know how a PC is going to operate until you get it into your own working environment."

BUSINESS VERSUS HOME USE

Boutwell flat-out advises against buying no-name clones for business. "If you're buying a PC for business, you can't afford to have it not work. You can't justify saving several hundred dollars on a device that will cost you thousands in lost productivity if it goes down."

Boutwell speaks from bitter experience. In 1988 the school district bought three AT clones from a local store that has since gone out of business. "We needed to get the PCs on budget for a project," says Boutwell. The systems worked fine at first, but compatibility problems started popping up when it came time to install tape drives and hook the PCs up to the network. "The units also lost their setup information about once a month, so you'd have to reconfigure them," says Boutwell.

That wasn't all. One of the PCs worked erratically, showing repeated disk error messages. By swapping components with a machine that did work, Boutwell's staff discovered the problem was a faulty power supply. Boutwell believes small manufacturers are likely to scrimp on quality components. "Small places buy the cheapest power supplies they can," he says. "Brand names deliver much cleaner power to the rest of the system. But unless you're an electrical engineer, you're not going to know what to look out for.

"You end up with more for your money when you buy a brand name," asserts Boutwell. "You go to the top of the scale to a reputable dealer who will service the PC in your area, because when you need something fixed or replaced, you can't afford to wait."

Camenker echoes that sentiment. But for personal use, he bought a 386 system from "a little place run out of a garage in an industrial park—a real back-door operation," he says. "If you have company funds at your disposal, buy from a retail store and buy a brand name. But if you're buying it yourself and you need to save money, buy from a

local place that has a storefront, so you know they'll be there. That way, if anything breaks—and it always does, brand name or otherwise—you can take it right back."

Tagg, a veteran clone buyer for business, sees a remarkable difference between the attitudes of big corporations and small companies toward no-name clones. In the corporate world, he says, "you only get in trouble when things go wrong—it's not as important to save a little money. Corporate buyers are put in a position of not being able to try anything with any amount of risk. Big companies don't recognize the amount of money they can save."

George Sandoval, vice president of L & W Microcomputing, a no-name clone manufacturer in Nashua, New Hampshire, agrees. "Popular wisdom says if you buy IBM you'll never get fired," he says. "But as users become more technically knowledgeable, that theory becomes less relevant."

Dennis Clark, the data processing manager for CMS East, a cemetery management company in Greensburg, Pennsylvania, says his experience buying mail order soured him on no-name equipment entirely. Clark purchased four PCs via mail order from Wells American of Columbia, South Carolina. He put one-third down and placed a rush order in March of last year but didn't receive the machines until early June. "That's a long time to wait when you're a business," says Clark.

His problems weren't over when the PCs arrived. One of the machines didn't work, thanks to a bad CPU board. Wells American had a 30-day money-back guarantee and a one-year parts-and-labor contract, says Clark, but "we didn't know you'd have to send the machines back when you needed them fixed." Pressed for time, Clark returned an 80-pound machine to its manufacturer by Federal Express, an experience he doesn't recommend duplicating.

More headaches lay in wait. Clark needed to add memory to the systems and ordered and paid for memory modules from Wells American—which went out of business shortly thereafter. "I'd never before bought non-IBM equipment," says a chastened Clark. "This experience underscores the theory that you can't go wrong with IBM."

PICKING A VENDOR

There are ways to minimize the risk of buying no-name clones—whether through the mail or from a local dealer. The guidelines aren't that different for the two channels, according to consultant McHugh.

BEFORE BUYING, LOOK FOR A COMPANY WHOSE SERVICES MATCH YOUR NEEDS.

How long has the company been in business? Is a client list available? "If they've been selling PCs for the past three years and have 200 clients who are pretty satisfied, that's a good sign, especially if they're selling to larger buyers," suggests McHugh.

If you're considering a local retailer, check for references with the local PC user group. "No-name dealers don't have the budget for national advertisements, necessarily," says McHugh, "but they'll put an ad in the local PC user group newsletter. If the dealers are good, most of the techies in the group will know about them."

Look for a company whose services match your needs. If your PC were to break down, how fast would you need it back up and running? Are there other PCs to fill the gap while this one is being repaired? Some retailers and mail-order companies have a guaranteed turnaround time for repairs (usually ranging from 24 to 72 hours after the company determines what's wrong). Some will also provide replacement units while PCs are being repaired.

Do you need an on-site service contract? Would it cost less in the long run to have a service contract with a local third-party provider, or even to retain a systems consultant?

Most clone makers offer technical support, but how easily can you reach the company? Fifteen minutes of Muzak on the line before your call is answered, or calls that aren't returned within a day, could portend frustrations to come (not to mention hours of lost productivity). "They always answered the phone when I wanted to buy something," Clark recalls about the now-defunct Wells American. "But technical support would take two or three days to get back to me."

To minimize potential compatibility problems, look for systems that are built with brand name components, preferably components that are included in systems that have gotten good reviews. If you're planning on using the clone as a network server, remember that networks breed incompatibility problems. For your protection, make sure compatibility with your network system software is guaranteed.

KNOW YOUR VENDOR

Above all, say clone buyers, go with a company you trust. Recommendations from other business users are the best guarantee of getting quality systems from a company that will be there for you after the sale.

Fortunately, says McHugh, clone makers are realizing the importance of repeat business. And that means better systems and better service. "The no-name clone market isn't as risky as people think," he suggests. "It tends to be a market where cost savings outweigh risk." As long as you know what you're getting, and who you're getting it from.

Marina Hirsch is a freelance writer living in Berkeley, California.

BACKUP BARGAINS

Take your pick of 32 affordable internal tape drives today, and start a safe, no-hassles backup routine tomorrow.

Backing up with tape is almost effortless compared to using floppies: Since you don't have to change disks every 2 minutes, your entire hard disk can be saved while you're fighting commuter traffic or having a leisurely dinner. And because it's more likely to get done, an easier backup means more secure data.

At first used primarily with file servers, tape backup drives have become practical for individual use, thanks to smaller sizes and lower prices. This Buyers' Guide surveys internal tape drives that list for less than $1000 and range from 40MB to 152MB in capacity. Not included here are external drives, which you might consider if all of your drive bays are occupied or if you need to move a tape drive from one PC to another easily. However, because external tape drives cost between $100 and $200 more and clutter up your desktop, most users prefer internal models.

Lincoln Spector

PHIL ANDERSON

In deciding which tape drive to buy, you need to evaluate both the drive itself and the software that comes with it. Because the backup doesn't require your presence once it's set in motion and can therefore be run during your lunch break or at night, speed isn't as important as with floppy-based backup. However, when you need to archive a few files before getting them off your hard disk, or when you need to restore an overwritten file, performance counts. Price and warranty are also important; the drives here range from $399 to $995, and most of them come with one-year warranties.

INSIDE THE DRIVE

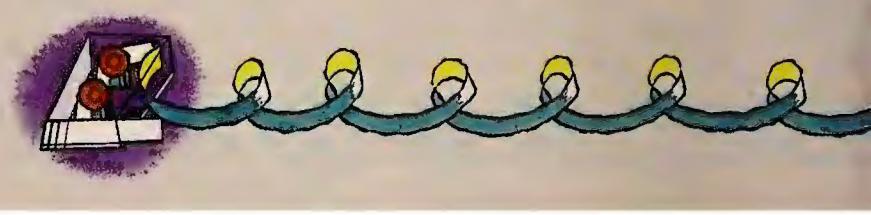
One of the first things to consider when buying a tape backup system is how much you can put on a tape. If you want to start a full backup and walk away, a tape drive that holds the contents of your hard disk is the bare minimum you'll require. If the drive holds more, you can put multiple backups on a single tape and keep a large archive of past work without wasting cartridges. Many drives advertise a "compressed" capacity of twice their standard volume, but these figures should be regarded with skepticism. The capacities listed here are without compression.

You'll probably want your drive to be compatible with a variety of cartridges and other drives. Almost all low-cost tape drives use 3M's DC (Data Cartridge) line of ¼-inch cartridges, formatted in one or more of the QIC (Quar-

TAPE BACKUP FOR $1000 OR LESS

VENDOR Model	TAPE DRIVE SPECIFICATIONS Formatted capacity (megabytes)	List price	Warranty (months)	Cartridge media	QIC formats supported	Fits in 3½-inch drive	Works with floppy controller	Controller included: AT-style	MCA	Mean time between failures[1] (thousands of hours)
CMS ENHANCEMENTS										
T260	40/60[2]	$495[3]	12	DC2000/ DC2000XL	40	yes	yes	no	no	12
COLORADO MEMORY SYSTEMS										
Jumbo + DJ-10	40/60[2]	$399	12	DC2000/ DC2000XL	40	yes	yes	no	no	10
Jumbo + DJ-10 (PS/2)	40/60[2]	$469	12	DC2000/ DC2000XL	40	yes	yes	no	no	10
CORE INT'L										
Coretope Light	80/120[2]	$545	18	DC2080/2120	80	yes	yes	yes[4]	yes[4]	25
EVEREX										
Excel 40AT	40	$399	12	DC2000	40	yes	yes	no	no	10
Excel II 40 PS/2	40	$449	12	DC2000	40	yes	yes	no	no	10
Excel Streom 40T	40	$899	12	CT600H	none	no	no	yes	no	10
Excel Streom 60T	60	$999	12	CT600H	none	no	no	yes	yes	10
GENOA SYSTEMS										
Goloxy 3160	60	$995[3]	12	DC600H	24	no	no	yes	yes	15
Goloxy 3150-60T	60	$895[3]	12	CT600H	none	no	no	yes	no	15
IDENTICA										
IDT 60	60	$950	36	DC600	36, 24	no	no	yes	no	20
IRWIN PRODUCTS GROUP										
2040	40/60	$699[6]	12	DC2000/DC2120	none	yes	yes	yes[4]	yes[4]	50
2080	80/120	$849[6]	12	DC2000/DC2120	none	yes	yes	yes[4]	yes[4]	50
MAYNARD ELECTRONICS										
FosTape FT60i	60	$975	12	DC600A	24	no	no	yes	no	15
Archive XL5580i	80/124	$699	12	DC2080/DC2120	80	yes	yes	no	no	20
MOUNTAIN COMPUTER										
FileSafe 4000	40/60	$595	12	DC2000/DC2120	40	yes	yes	no	no	12
FileSafe 8000 Plus	83/102	$795	12	DC2080/DC2120	80	yes	yes	no	no	12
FileSafe Plus w/proprietary controller	124/152	$995	12	DC2080/DC2120	80[7]	yes	no	yes	yes	12
PALINDROME										
Personal Archivist Model 101 (XT), 121 (AT)	40	$795	3	DC2000	40	no	yes	no	no	20
Personal Archivist Model 201 (AT), 251 (PS/2)	80/120	$995	3	DC2080/DC2120	80	no	yes	no	no	20
SYSGEN										
Reliant 310	60	$995	12	DC600A	24	no	no	yes	no	10
Reliant 310 (PS/2)	60	$1050	12	DC600A	24	yes	no	yes	yes	10
Reliant 510	72	$795	12	DC2000	24	yes	no	yes	no	10
Reliant 510 (PS/2)	72	$850	12	DC2000	24	yes	no	no	yes	10
TECMAR										
QT-40i	40[2]	$595	24	DC2000	40	no	yes	no	no	12
QT-40i/PS (PS/2)	40[2]	$595	24	DC2000	40	yes	yes	no	no	12
MiniVoult 120i	80/120[2]	$795	24	DC2080/DC2120	80	no	yes	yes[4]	no	12
MiniVoult 120i/PS	80/120[2]	$795	24	DC2080/DC2120	80	yes	yes	no	no	12
WANGTEK										
5099EK	45/60	$925	12	DC300XL/P, DC600A	24	no	no	yes	no	20
3040F/P	40	$480	12	DC2000	40	yes	yes	no	no	12
3080F/P	80,120	$795	12	DC2080/DC2120	80	yes	yes	no	no	12

[1] Vendor's figure.
[2] Vendor claims capacity up to twice listed amount when data compression utility is used.
[3] For PS/2 versions, add $100.
[4] Optional controller available at additional cost.



ter-Inch Committee) standards. 3M licenses DC technology to other manufacturers, so cartridges are available from more than one vendor. The most common formats are QIC-40, which has a capacity of 40MB with some cartridges and 60MB with others, and the QIC-80, with capacities of 80MB and 120MB. In theory, any backup done on a QIC-40–formatted DC2000 should be restorable from any drive that supports DC2000s and QIC-40, even if the drive is from another vendor. In practice, however, few vendors guarantee that a backup tape made by one of their drives can be read by another drive of the exact same model. The older QIC formats, such as QIC-24 and QIC-36, are even less compatible. Note also that compressing data will make the tape incompatible with other ven-

BUNDLED SOFTWARE							SOFTWARE COMPATIBILITY										
Error correction	Overwrite warning	Data compression	Password protection	Security erase	Backup/restore by archive bit	Image backup	Compaq	FastBack	HP	IBM	PC Tools 6.0	Sytos	DOS device	Works with OS/2	OS/2 software available	Supports HPFS	Reader service no.
yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	no	no	no	no	no	605
yes	yes	yes	yes	yes	yes	no	no	yes	no	no	yes	no	no	no	no	no	606
yes	yes	yes	yes	yes	yes	no	no	yes	no	no	yes	no	no	no	no	no	606
yes	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	yes	yes	no	yes	607
yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	no	yes	no	no	no	608
yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	no	yes	no	no	no	608
yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	no	no	no	no	no	608
yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	no	no	no	no	no	608
yes	yes	no	no	yes	no	yes	no	no	no	no	no	no	no	no	no	no	609
yes	yes	no	no	yes	no	yes	no	no	no	no	no	no	no	no	no	no	609
yes	yes	no	yes	yes	no	yes	no	no	no	no	no	yes[5]	no	yes	yes	yes	610
yes	yes	no	yes	yes	yes	no	yes	no	yes	yes	yes	no	no	yes	yes	yes	611
yes	yes	no	yes	yes	yes	no	yes	no	yes	yes	yes	no	no	yes	yes	yes	611
yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	yes	no	no	no	no	612
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yes	yes	yes	no	yes	yes	no	yes	no	no	no	no	yes	no	no	yes[8]	yes	616
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yes	yes	yes	yes	yes	yes	no	yes	no	no	no	no	yes	no	no	yes[8]	yes	616
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yes	yes	no	yes	yes	yes	yes	no	no	no	no	no	yes[5]	no	yes	yes[8]	no	617
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yes	yes	yes	yes	yes	yes	yes	no	no	no	no	no	yes[5]	no	yes	yes[8]	no	617

[5] Sytos included.
[6] Includes $100 for installation kit.
[7] Supports QIC-80, but factory default is a proprietary format.
[8] Sytos Plus OS/2 available at additional cost.

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

dors' products.

Some drives use Teac's CT cassettes rather than DC cartridges. Similar in design to audio cassettes, CTs lack the complex inner workings of DCs, making them less likely to be physically damaged and therefore more reliable. But CTs aren't as widely accepted as DCs, nor do they have a standard format. If your CT tape drive and hard disk go up in flames but your cartridge is safely stored elsewhere, you'd better make sure the replacement drive is from the same company.

About half of these drives fit in a 3½-inch drive bay, and all of them will go into a standard half-height, 5¼-inch bay; 3½-inch drives require a special mounting brace to go into a larger bay, but these braces either come with the drives or are available at nominal cost.

QIC-40 and QIC-80 drives can work off a standard floppy controller; unless your controller has reached its limit—most can handle two floppy drives, some up to four—you won't need to give up a slot. Tape drives using earlier QIC versions or proprietary formats usually require you to install their own interface cards. The card may increase speed but requires an extra slot. Even if you're using the floppy controller, because of hardware differences, you should specify whether you have a standard AT or Micro Channel bus when you buy a drive.

You'll want a dependable drive, of course. A drive's mean time between failures (MTBF) is the average number of hours the drive can run before breaking down. The MTBFs listed in the accompanying table are based on the manufacturers' claims and have not been tested by a third party.

SOFTWARE: THE DRIVE BEHIND THE DRIVE

A tape drive is useless without backup software. Every listed drive comes with a menu-driven program for backing up selected files or your entire hard disk. Some basic features to look for are error correction and an alarm to warn you if you're about to overwrite a previous backup. Data compression may be desirable if you want to increase your cartridge's capacity, but it slows down tape backups even more than it does floppy ones. Furthermore, compressed data can be restored only by the program that compressed it. You may also want security features such as password protection and the ability to erase data so that it cannot be restored.

The more options you have for choosing files to back up or restore, the better. All of these drives can back up and restore by directory, file name, and date, and all are capable of restoring a specific file that you just wrote over. Most can also back up by archive bit, which will be on if a file's been changed since it was last backed up.

Most packages provide image backup—the ability to copy a disk drive sector by sector rather than file by file. This feature is useful if you have copy-protected software or other files that must occupy a particular sector, but it prohibits you from doing incremental backups or restoring a particular file.

You may not be limited to the software that comes with your drive. Some commercial backup programs support some tape drives, including recent Best Buy *PC Tools Deluxe* (see "No-Excuses Backup Software," July 1990). The selection isn't wide, however. A word of caution: Several commercial backup programs, intended mostly for floppy use, claim to be compatible with tape drives. When you read the fine print, however, you'll discover they work only with the very few tape drives that can act as DOS devices (appearing to DOS as disk drives).

If your tape drive acts as a DOS device, you can back up with any floppy-based backup program or even a simple XCOPY. But because tape lacks the random access abilities of disk, tape access is excruciatingly slow.

If you're using OS/2 or plan to switch to it in the near future, you'll want your drive and its software to work with that operating system. If you're going to be using OS/2 1.2's optional High Performance File System (HPFS), you'll need a drive that can support that as well.

A good tape drive can save you the trouble of shuffling floppies through a backup. Without that nuisance, your data stands a better chance of survival.

Lincoln Spector is an assistant editor for PC World. *Research was provided by Art Wilcox.*

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Tustin, CA 92680
714/259-9555,
714/549-4004 (fax)

Colorado Memory Systems, Inc.
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Loveland, CO 80527
800/346-9881,
303/669-8000,
303/667-0921 (fax)

Core Int'l
6500 E. Rogers Circle Rd.
Boca Raton, FL 33487
407/997-6033,
407/997-6202 (fax)

Everex Systems
48431 Milmont Dr.
Fremont, CA 94538
800/821-0806,
415/683-2400 (fax)

Genoa Systems Corp.
75 E. Trimble Rd.
San Jose, CA 95131
800/423-6211,
408/434-0997 (fax)

Identica
3350 Scott Blvd., Bldg. 7
Santa Clara, CA 95054
408/727-2600,
408/727-2435 (fax)

Irwin Magnetic Systems, Inc.
2101 Commonwealth Blvd.
Ann Arbor, MI 48105
800/421-1879

Maynard Electronics, Inc.
460 E. Semoran Blvd.
Casselberry, FL 32707
800/821-8782,
407/263-3555 (fax)

Mountain Computer Inc.
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Campbell, CA 95008-6687
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Palindrome Corp.
850 E. Diehl Rd.
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708/505-7917 (fax)

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800/821-2151,
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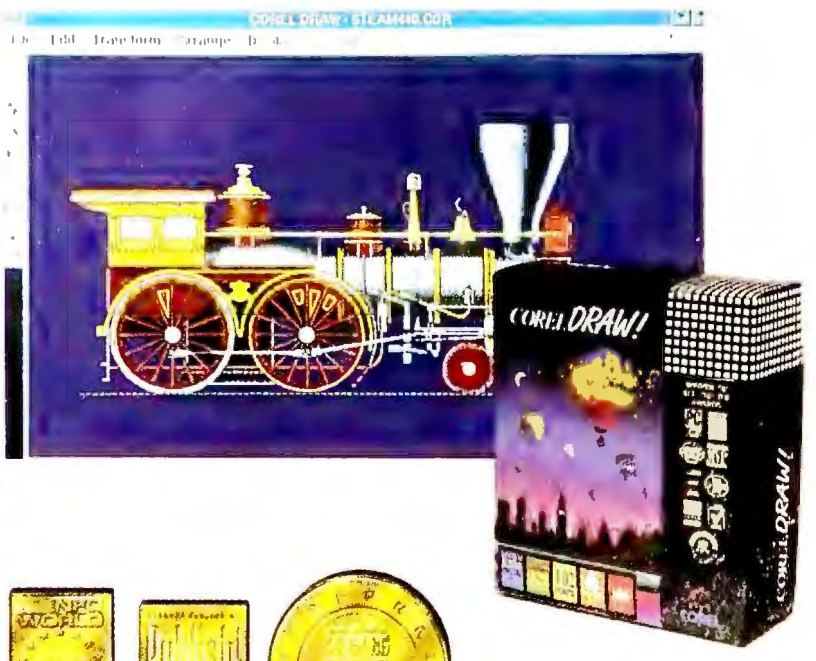

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Working Under the Hood

When it's time to upgrade your PC, you can save a bundle by doing it yourself. Learn the tricks of the trade as we walk you through four of the most common hardware upgrades.

TJ Byers

INSIDE HOW TO

191 **Word Processing**
Words Into Print
No-limit *Word* macros, plus an improved *WordPerfect* calculator.

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207 **User Group Tips**
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- Document your *Paradox* tables
- Sharp-looking *WordPerfect* boxes

Upgrades

When your underpowered PC chokes on sophisticated new software, you're likely to find performing basic hardware upgrades much more cost-effective than replacing your system. It doesn't take an expert to do most upgrades. Not only will you save money, you won't be without your PC while it's in the shop.

But be aware that safety hazards abound for both you and your computer anytime you pop the hood, and small mistakes can spell big trouble for delicate electronic parts. Read on for insiders' tips on how to perform four typical under-the-hood tasks: adding an expansion board, upgrading RAM, adding a math coprocessor, and installing either an internal floppy or a tape drive.

Getting Off to a Safe Start

Don't unplug the system or remove the cover yet—first you must discharge yourself of static electricity, because a spark from your hand can damage sensitive chips. The power cord has the necessary ground line, provided it's in a grounded outlet, for static discharge. Touch an unpainted metal part of the PC's chassis, such as the fan grill. Now you're ready to pop the lid, which brings us to the number one safety rule: *Always* unplug the machine before removing the cover. This eliminates your risk of electrical shock and protects your computer from power arcs and short circuits.

To reduce static buildup while working, don't wear polyester clothes, avoid opening your PC on very dry days, and don't wear rubber-soled shoes if you have wool carpets. Hold expansion boards by their edges, and don't touch the gold-plated connectors—even clean, uncharged hands can leave a film that may spoil the connection (if you do notice any tarnish, you can remove it with a pencil eraser).

Any of the four upgrades covered in

Surveying Motherboard Territory

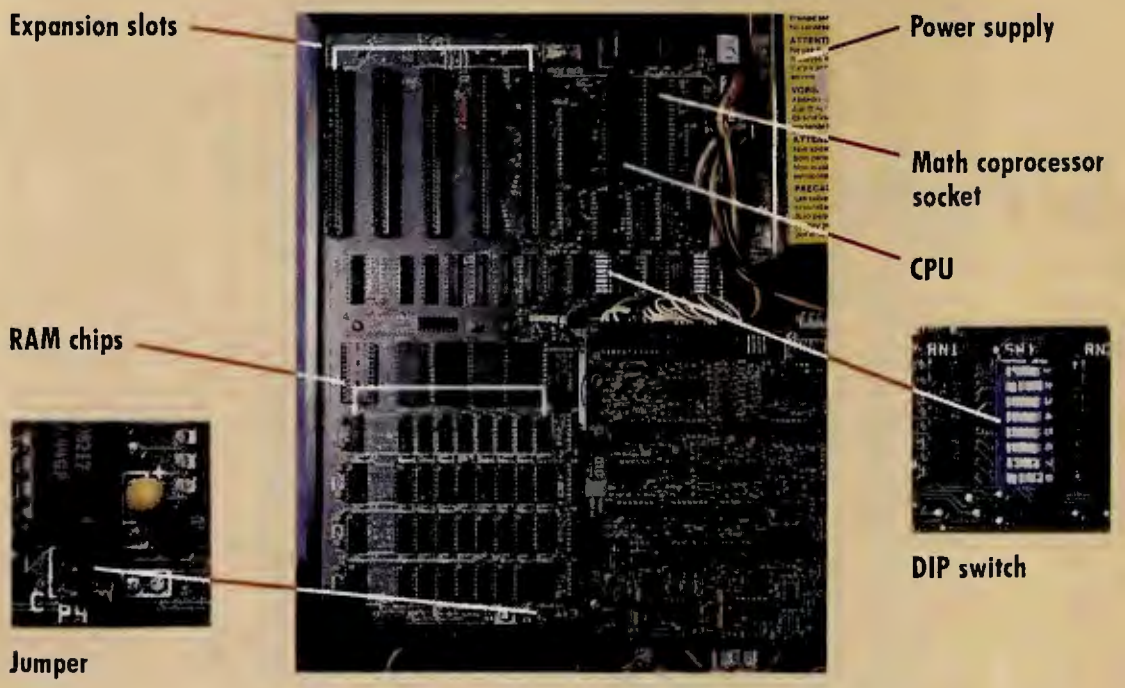

FIGURE 1: The motherboard, which is mounted at the bottom of your system's chassis, is the PC's main circuit board. Typically, you must set motherboard DIP switches or jumpers to change graphics or memory, or to install such devices as a math coprocessor.

this article may involve setting jumpers or DIP switches on the motherboard (see **FIGURE 1**). Always write down the original settings before making changes to ensure you can back out of an unsuccessful installation. Some standard PC-, XT-, and AT-compatible systems—and all Micro Channel and Extended Industry Standard Architecture (EISA) systems—let you use menu-driven configuration software instead.

Your PC's user manual should detail upgrade procedures, but some manuals are confusing. If you're not sure of which switch to switch, call the manufacturer's technical support line (or your dealer) first; if you don't get results, contact the person who sold you the upgrade product.

Adding an Expansion Board

Whether you're upgrading monitors, adding RAM, or hooking your PC to a LAN, most upgrades mean installing a new expansion board. The procedure seems easy enough: You just remove the PC's cover, locate an empty expansion slot, and plug in the board. But there's a little more to it than that.

First you need to make sure the slot and the board match (consult **FIGURE 2** for examples of slot types). Note that PC- and XT-compatible computers contain standard 8-bit slots, while AT compatibles (a category that includes all standard 286, 386, and 486 systems) usually contain both 8-bit and 8/16-bit slots.

Ideally, you would install an 8-bit board in an 8-bit slot and a 16-bit board in an 8/16-bit slot, but scarce slots, hand-me-down boards, and such sometimes make this match impossible. An 8-bit board will work in an 8/16-bit slot, provided the bottom of the board is designed to clear the remainder of the slot connector. Even though an increasing number of 16-bit boards work in 8-bit slots, you should avoid this situation if you can: You'll pay extra for the 16-bit

An Expansion-Slot Lineup

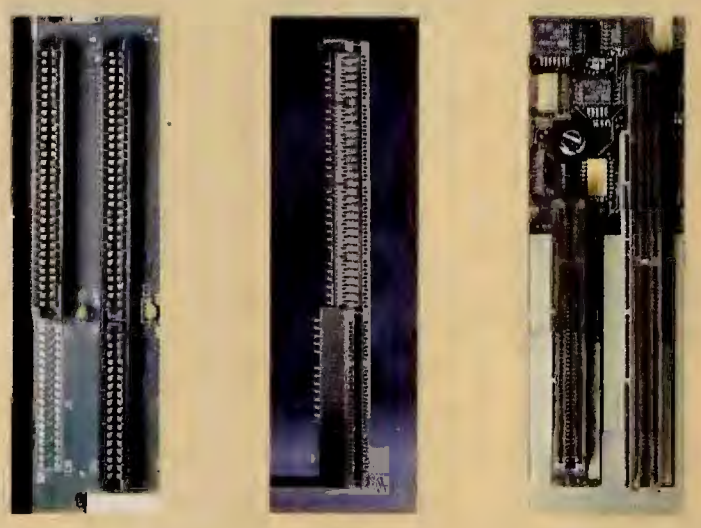

FIGURE 2: Common slots, from left to right: 8-bit standard, 8/16-bit standard, EISA, 16-bit Micro Channel, and 32-bit Micro Channel.

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Systems with Micro Channel slots—that is, IBM PS/2s (Model 50 and up) and compatibles—accept only Micro Channel boards. EISA systems, on the other hand, contain 32-bit EISA slots, which accept both EISA boards *and* standard 8-bit and 16-bit boards. The same rule that applies to standard boards goes for Micro Channel and EISA boards: If you must install a board in a slot connector of a different size, it's best to choose a connector that's too large rather than too small, even if the board works in either case.

Like motherboards, expansion boards usually have DIP switches or jumpers that may require adjustment. All boards come with specific configuration instructions, but when motherboard adjustments are required, you'll have to consult your PC's owner manual. Be sure you have the necessary manuals and utilities before you start swapping boards, and write down all current switch and jumper settings before making changes.

Micro Channel and EISA boards are self-configuring; with a standard board, though, you may follow the instructions exactly and still find that the device doesn't work. If the manufacturer's technical support can't help, you may be able to resolve the problem yourself.

First, remove all memory-resident software from memory; if the board works, add the programs back one at a time to identify the culprit. If the board still doesn't work, the problem is probably a conflict over one of three parameters, in descending order of likelihood: the interrupt, the I/O address, or the ROM address. You don't really need to know what these system-level assignments mean. But you may need to know the interrupt, I/O address, and ROM address of the board you just installed and to change settings if two devices have the same assignment(s). These specifications should appear in the documentation for both your board and your system.

SIMMs Are a Snap

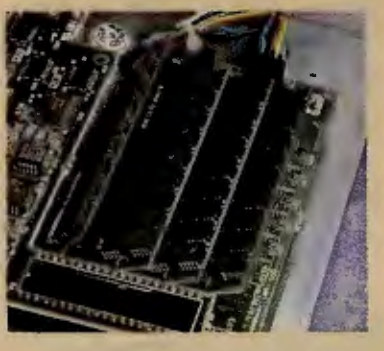


FIGURE 3: SIMMs, which are used by most high-end systems, provide a much easier way to add memory than chips. To install a SIMM, insert it at a 45-degree angle completely into the connector and push it down until it snaps into place.

To help you ensure that each board's assignment is unique, on-board DIP switches, jumpers, or utilities generally provide a wide range of settings. Simply changing the interrupt on the board you just installed often solves the problem.

Boards without such flexibility, however, can be a pain. You may have to dig up the manuals for all the other boards in your system and change their settings instead. First write down the current and alternative interrupts, I/O addresses, and ROM addresses for all boards in your system. Then find the conflict-free group of settings that requires the fewest changes.

In PC-, XT-, and AT-compatible systems with many expansion boards, resolving such conflicts is not always possible. If that's the case, return the incompatible board for a refund and try another board that offers different settings.

Upgrading Memory

RAM comes in two basic types: single chips and multichip single in-line memory modules (SIMMs). Each is available in various speeds and capacities, which must match your PC's processing speed and memory specs. Your user's manual should tell you which chips or SIMMs to use, where they fit, and whether you need to set any jumpers or DIP switches on the expansion board or the motherboard.

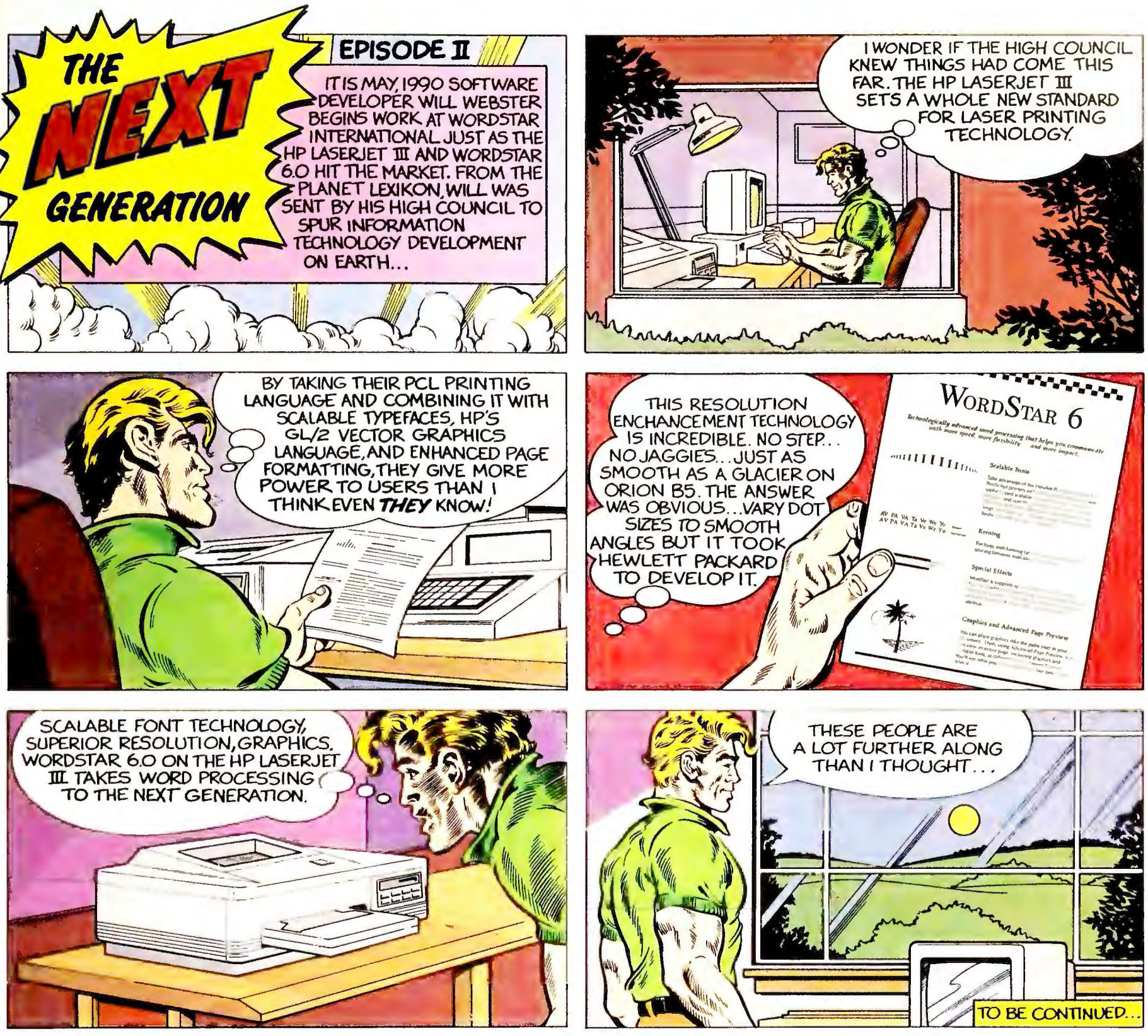
When adding memory, always fill any open SIMM or memory-chip sockets on the motherboard first. If your system runs at 10 MHz or faster, it may also have a dedicated memory slot—the second-best place to add memory, using a special high-speed memory board (usually available only from the system manufacturer). The third choice is to add a memory board to the expansion bus, where (depending on the type of system) standard, Micro Channel, or EISA slots are located.

As you can gather from **FIGURE 3**, popping in a SIMM is a breeze, whether you install it on the motherboard or on an expansion board. But chips can be tricky: A chip installed backward will fry on power-up, and bent pins break easily, rendering a chip useless. A chip insertion tool (available for around $5 from any supply house) can protect against bent pins. If you're without one, carefully follow the instructions in **FIGURE 4** for installing an 8087 or 80287 math coprocessor.

Adding a Math Coprocessor

Spreadsheets and CAD packages are the most common applications written to take advantage of a math coprocessor, a chip that plugs into a special socket on the motherboard. Once it is installed, the coprocessor can speed up these programs' numeric-intensive operations dramatically.

Which type of math coprocessor you install depends on both the type of CPU that is in your system and the type of coprocessor that your software supports; **FIGURE 5** provides a general guide. In the majority of cases, the math copro-



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Circle 312 on reader service card

cessor's speed matches the CPU's (a 12-MHz 286 uses an 80287-12 coprocessor chip, and so on). As usual, you should consult your system's documentation to make sure.

The 8087 and 80287 chips are the most difficult to install, and there's no economical insertion tool available. To straighten the pins, lay the chip on its side on a hard, flat surface, and gently tilt and press until the leads are perpendicular to the body. If you press them too far, gently bend them back with a pencil or ruler. Then follow **FIGURE 4** closely.

The 80387SX, 80387, and Weitek chips are square devices with pin-filled underbellies that look like beds of nails. These chips are easier to install than 8087s or 80287s, but four possible orientations—only one of which is correct—triple the chance of error. One corner of the chip is beveled. Point the beveled corner at the white dot or raised corner of the math coprocessor socket, align the pins, and press into place.

After the chip is plugged in, you must set a DIP switch (or run your system's setup utility) and reinstall your application for a math coprocessor in order to reap the benefits.

Installing Chips Step-by-Step

FIGURE 4: To install an 8087 or 80287 math coprocessor (or a RAM chip, if you don't have an insertion tool), (1) align the notch on the chip with the notch on the socket; (2) tilt one row of pins slightly higher than the other, partially insert that lower row of pins in the socket, pull the chip back slightly, and lower the other row of pins until (3) they're partially inserted; ensure that all pins are correctly positioned, and press the chip down until it's seated firmly.

Coprocessor for Each CPU

CPU	Math Coprocessor
8088	8087
8086	8087
80286	80287
80386SX	80387SX
80386	80387, 80287, Weitek 1167, 3167
80486	Weitek 4167

FIGURE 5: Weitek math coprocessors are mainly supported by high-end CAD software; you'll find a socket for either the 1167 or the 3167 in most 386 systems. Less than half of 486 systems have 4167 coprocessor sockets.

TONY CARLSON

Installing Floppy and Tape Drives

Adding a 3½-inch floppy disk drive to your PC makes exchanging data with laptops or PS/2s quick and easy. Tape drives that run off floppy controllers are an inexpensive and convenient backup method. You follow the identical procedure to install either one.

Most PCs support only two floppy drives, so if your system already has two 5¼-inch floppies, remove the B: drive before proceeding. Most disk drives are held in place by two screws on the front of the chassis and one on either side of the drive. Once the screws are removed, slide the drive forward and disconnect the four-wire power plug and 34-pin ribbon cable. Owners of IBM PCs and XTs must remove two screws on either side of the bay.

If your PC has never before had a second, externally accessible drive, you'll have to remove the drive bay's cover plate before you do anything. In addition, check your system manual to see if you need to reset motherboard jumpers or DIP switches or to run your system's setup software.

Slide the new drive into the empty bay and secure it with the supplied hardware. Then plug the power cable into a socket on the rear of the drive (the plug is keyed to fit only one way). On the ribbon cable attached to the A: drive, find the unused 34-pin connector (the one you just removed, if you took out the B: drive), and attach it to the matching tab at the rear of the new drive. Some connectors are keyed and will fit only one way; otherwise, match pin 1 of the cable (marked with a red stripe on the cable or a mark on the socket) to pin 1 on the drive's tab (labeled or marked by a notch).

If you can't fit your hand in to attach the connectors, reverse the preceding steps: Attach the connectors first, and mount the drive afterward. If you're adding a tape drive, remember that you'll probably have to install the software provided with the unit before you can get it up and running.

Money in the Bank

You can save a lot by installing a hardware upgrade yourself, but you may lose money if you do it wrong. It's safest to buy your upgrade from a reputable firm with good technical support. If you have any problems or doubts during installation, someone knowledgeable will be only a phone call away.

TJ Byers is a contributing editor for PC World.

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PC MAGAZINE
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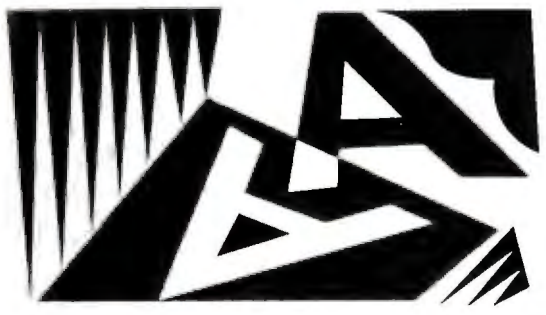
Words Into Print



Word Processing

Tips for getting the most out of your word processor

This month: Accelerate word processing chores with Word's glossary files, change the case of Word text, and turn WordPerfect into a calculator.

George Campbell

Microsoft Word's glossary feature lets you set up hot keys to summon macros and boilerplate text, saving countless keystrokes. You can even create a custom glossary file for each directory, so you load only those entries you need for a particular type of document.

When *Word* runs, it loads a glossary file, NORMAL.GLY, that lets you insert page numbers, dates, times, and footnotes. For example, to insert the date at the cursor, type **date** and then press **<F3>**. But glossaries are most useful when you add your own entries. These can be macros or text of any length, and they can include formatting and graphics. Likely candidates include memo forms, logos, letterheads, address blocks, and boilerplate text. This column explains how to create *Word 5.0* glossary entries and how to set up a customized glossary for each type of document you create.

Create a Closing Signature

First, let's create a typical glossary entry. To create a signature block shortcut, follow these steps:

1. On any *Word* screen, type the signature block you normally use.
2. Highlight the block, and press **<Esc>c**.
3. At the 'Copy to:' prompt, type an abbreviation such as **yrs**, and then press **<Enter>**.
4. To save the abbreviation in NORMAL.GLY, press **<Esc>tgs<Enter>**.
5. To insert the block at the end of a letter, type **yrs** and press **<F3>**.

When naming a glossary entry, consider how often you'll use it. Frequently used entries should have short, mnemonic names. Give macros a MAC extension to avoid confusion. To summon a glossary entry, type its name and press **<F3>**, or press **<Esc>i<F1>** and pick an entry from a list.

Managing Multiple Glossaries

Many users wisely set up separate directories for each document type. If you do this, you may want some universal macros and abbreviations to be available in every directory and others available only in certain directories. **FIGURE 1** shows a typical system of *Word* directories and related glossaries. No matter what directory you're in, *Word* automatically loads NORMAL.GLY. As a default, it loads this file from the main *Word* directory, but if you have saved

WORDPERFECT SHORTCUT

Instant Calculator

George Beinhorn

WordPerfect 5.1 includes a pop-up calculator macro, but you can build a better one using *5.1*'s new Table feature. Follow the steps below:

1. Press **<Ctrl>-<F10>** to begin macro recording.
2. Press **<Alt>-c**, type **calculator**, and press **<Enter>** to name and describe the macro.
3. Press **<Alt>-<F7>tcl <Enter><Enter>mf** to create a one-cell table.
4. Press **<Ctrl>-<PageUp>p <Enter><Enter>** to insert a pause and simulate a calculation.
5. Press **<F7><Home><Home><Cursor Left><Backspace>y** to remove the table's box.
6. Press **<Ctrl>-<F10>** to end macro recording.

To do a simple calculation, press **<Alt>-c**. (If you're working with Reveal Codes on, press **<Alt>-<F3>** before running the macro to turn this mode off.) A box will appear on the screen. Enter a formula, using +, -, *, and / as operators. You can also include parentheses for complex calculations. Press **<Enter>** to paste the result into the text.

George Beinhorn is a freelance writer based in Nevada City, California.

Merging Word Glossaries

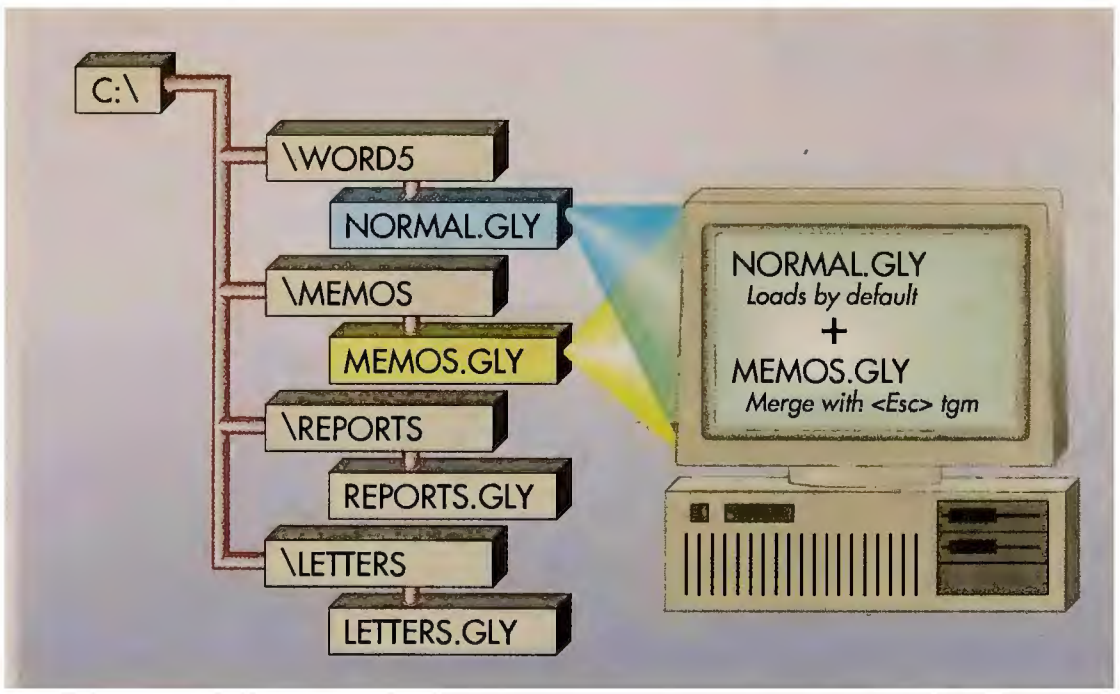


FIGURE 1: Here's a typical Microsoft Word directory system. You can set up glossaries full of custom macros and boilerplate text for each directory. Keep macros that you want to use in all directories in the NORMAL.GLY glossary and keep specialized glossaries in each directory.

copies of NORMAL.GLY in other directories, *Word* loads the copy saved in the current directory, which can lead to confusion. To make this system work, delete all copies, leaving only the master NORMAL.GLY file in the main *Word* directory.

When you have just one NORMAL.GLY, you're ready to set up specialized glossaries. If you have a \LETTERS directory and want to set up a special glossary for it, for example, do the following:

1. Start *Word*, then use the Transfer Options command to change to your \LETTERS directory.

2. To save a copy of NORMAL.GLY under a new name, press **<Esc>tgs**, type **letters**, and press **<Enter>**.

3. Press **<Esc>tgc<F1>** to begin deleting any unwanted entries one by one. Highlight an entry, then press **<Enter>y** to delete it. Repeat as necessary to clean up the new glossary.

You can now add entries designed for writing letters, without affecting the default NORMAL.GLY glossary. Save your additions by pressing **<Esc>tgs <Enter>**. If you forget, *Word* prompts you when you exit.

The new glossary remains active only until you quit *Word*. The next time you start the program, it will again load NORMAL.GLY. To load LETTERS.GLY instead, press **<Esc>tgl**, type **letters**, and press **<Enter>**.

Merging Glossaries

Now you have universal entries in NORMAL.GLY and individual entries in LETTERS.GLY. How can you access both? *Word*'s Transfer Glossary Merge command lets you temporarily merge another glossary into NORMAL.GLY.

If you use the Glossary Merge command instead of the Glossary Load command, you'll have access to the entries of both glossary files. For example, when you enter the \LETTERS directory, you would press **<Esc>tgm**, type **letters**, and then press **<Enter>**.

If you adopt this system, however, keep these points in mind: If you merge two glossaries, then change directories and want to merge a separate glossary with NORMAL.GLY, use Transfer Glossary Load to reload a fresh copy of NORMAL.GLY. Otherwise, all three glossaries will merge. Also, when you quit *Word* after merging glossaries, answer no when prompted to save glossary changes. Otherwise, the LETTER.GLY entries will be saved permanently in NORMAL.GLY.

Don't create new macros or text entries while glossaries are merged. If you want to create a universal entry, load NORMAL.GLY on its own. To create an entry just for letters, load LETTERS.GLY by itself. Finally, remember that an entry in a merged glossary that has the same name as one in NORMAL.GLY temporarily replaces NORMAL.GLY's version.

Despite complexities, this system is the best way to handle multiple glossaries. You can even partially automate the process: While *Word* macros can't include Glossary Load commands, Glossary Merge commands work fine, so you can record macros to merge glossaries with NORMAL.GLY.

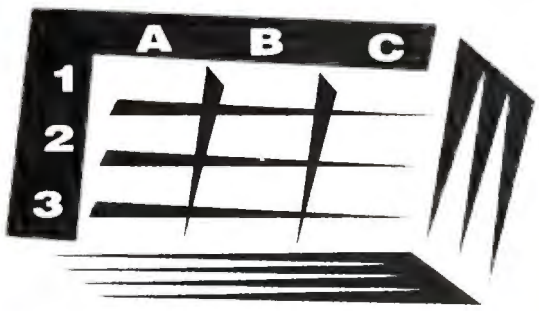
George Campbell is a contributing editor for PC World.

WORD SHORTCUT

Changing Case

One of *Word 5.0*'s little-known shortcuts lets you alter capitalization. To use this shortcut, highlight a block of text and then press **<Ctrl>-<F4>**. This switches the text between three styles in sequence: all uppercase, mixed case (with each word's first letter capitalized), and all lowercase. Press **<Ctrl>-<F4>** until the desired format appears. —*G. C.*

Spreadsheets (A..Z)



Spreadsheets

Practical tips for building better worksheets

This month: Name that range!

Richard Scoville

In large spreadsheets it's easy to forget where you put things, and deciphering complex formulas can be tough. One reason is that people don't naturally think in terms of cell addresses, but in terms like "data for 1987." Using range names, you can replace cumbersome addresses with easy-to-remember nicknames.

In this month's column, I'll show you how to replace addresses with range names of your own choosing and use them in formulas and commands and for quick navigation of spreadsheets. We'll also generate a table of all named ranges in a worksheet, which is handy for debugging and general reference.

Range Name Basics

Naming ranges is a snap. We'll use the simple *1-2-3* spreadsheet in **FIGURE 1** for this exercise. First, enter all of the labels and data in the area from A1 through E18. To create the first range name, position the cell pointer at A6 and execute */Range Name Create,* type **months**, and press <**Enter**>. Then highlight the range A6..A17, and press <**Enter**> again. Use this method to create the other range names, shown in **FIGURE 1** starting at cell H6.

Follow these basic range name rules: Names can have up to 15 characters, but it's better to keep them short. Don't in-

```
B19: @SUM(YEAR87)                                                    NAMES
Enter address to go to:
:HOURS          :MACROS          MONTHS          YEAR87          YEAR88
      A       B       C       D       E       F       G       H       I
1
2           Dive-Bombers Skydiving Club
3           Flight Hours
4
5             1987    1988    1989    1990              Range Names:
6   Jan         312     234     122     139             :HOURS    A1
7   Feb         265     239     119     122             :MACROS   J21
8   Mar         289     230     135     123             MONTHS    A6..A17
9   Apr         212     248     137      34             YEAR87    B6..B17
10  May         152     277     153      17             YEAR88    C6..C17
11  Jun         135     263     139       9             YEAR89    D6..D17
12  Jul         238     192     171       4             YEAR90    E6..E17
13  Aug         184     148     133                     YEARS     B5..E5
14  Sep         192     170     143
15  Oct         161     123     109
16  Nov         153     141      73
17  Dec         127     117      57
18          ----------------------------
19  Total      2420    2382    1491     448
20  Average  201.66   198.5   124.3    64.0
```

FIGURE 1: The Range Name Table command created the list of range names at H6..I13. :MACROS is a landmark to help you jump quickly to that section of the worksheet via the Range Name menu.

EXCEL SHORTCUT

Speed Up Your Macros With ECHO

Ralph Soucie

By default, *Excel* continuously displays a macro's progress on screen. Lengthy macros operate much faster when you use the ECHO(FALSE) function to stop these time-wasting screen updates.

Don't use ECHO(FALSE) while debugging a long macro, or you won't know when it hits a snag. When you know a major section of the macro or subroutine is reliable, however, you can surround that section with ECHO(FALSE) at the start and ECHO(TRUE) at the end. When you're through debugging, use *Formula Replace* to strip out the scattered ECHO statements.

Ralph Soucie is a contributing editor for PC World.

SPREADSHEET TOOLBOX

Get the Big Picture With Flash-In

What can you do when you're confronted with a disorganized spreadsheet and have to make sense of it? *Flash-In*, a $99.95 add-in, can help.

Flash-In's bird's-eye view displays your whole worksheet at once, automatically reducing the used portion to fit your screen. With each cell reduced, you can spot your major work areas at a glance. A movable pointer indicates the current cell, whose contents are shown at the top of the screen. To revert to normal view, press <**Enter**>.

Flash-In also lets you search WK1 files on disk for text or range names. If it finds what you ask for, it pops up a window showing an excerpt of the file. You can copy the found data into the current worksheet or retrieve the whole file into memory. —*Richard Scoville*

Flash-In 1.12 $99.95; PC Publishing, 1801 Avenue of the Stars #815, Los Angeles, CA 90067; 800/634-4555, 213/556-7987 (fax)
Reader service no. 693

clude spaces or the characters + * - / > < ; , & { @ or # because *1-2-3* may interpret the name as a formula. Don't use a number for a range name (formulas will see it as a value, not a range) or create names that match a cell address (commands and formulas will act on the cell address, not on the range). For example, YEAR90 is a safe name, but 1990 (a number) and FY1990 (a valid cell address) are not.

Working With Range Names

Every time you assign a range name, *1-2-3* adds it to a menu. When you're entering a command and need to indicate a range, pressing <F3> displays the menu (pressing it twice gives you up to a full screen of names). In *1-2-3 2.2* and later versions, you can also use this menu when building formulas.

Formulas Range names make formulas clearer and easier to build. @SUM(YEAR87) is more understandable than @SUM(B6..B17), especially if B6..B17 is off the screen. To construct the formula displayed at the top of **FIGURE 1**, position the cell pointer at B19, type **@sum(**, press <**F3**>, select *YEAR87* (in version 2.01, type **YEAR87**), type **)**, and press <**Enter**>.

Commands Range names make commands quick and accurate, especially when you perform a series of commands on a range. To format the values in column C to fixed format with one decimal, select */Range Format Fixed*, type **1**, and press <**Enter**>. Then, instead of painting the range, just press <**F3**> and select *YEAR87*.

Moving Around the Worksheet Using range names simplifies navigating large worksheets. Assign a special "landmark" range name to the upper left corner cell of each important worksheet area. Begin landmark names with a colon, as in :MACROS, and *1-2-3* will sort them to appear conveniently at the beginning of the range name menu (as in **FIGURE 1**). To move around the worksheet, press <**F5**><**F3**>, select a range name, and press <**Enter**>.

Troubleshooting With Range Name Tables Errors result when ranges are damaged by careless use of Move or Worksheet Delete. To see how this happens, */Move* the blank cell B4 to B6. Since Move deletes target cells from the worksheet, and since B6 is the top left cell of the range YEAR87, YEAR87 is now an invalid range. Formula references to an invalid range are replaced with ERR, so the formula in cell B19 changes from @SUM(YEAR87) to @SUM(ERR).

When such an error cascades down a chain of formula references, pinpointing the original source can be difficult. Building a range name table like the one shown at H6..I13 will expose the culprit. Here, position the cell pointer on H6 and execute */Range Name Table*. The damaged YEAR87 range will display ERR. To fix the problem, redefine the range, and rebuild the formula in B19. (In releases 2.2 and 3, you can also search for ERR in formulas with */Range Search*.)

Good spreadsheet layout and systematic range names will ensure that you never go hunting for a lost formula again. Get in the range name habit, and get ready for a real boost in your *1-2-3* productivity.

Richard Scoville is a contributing editor for PC World.

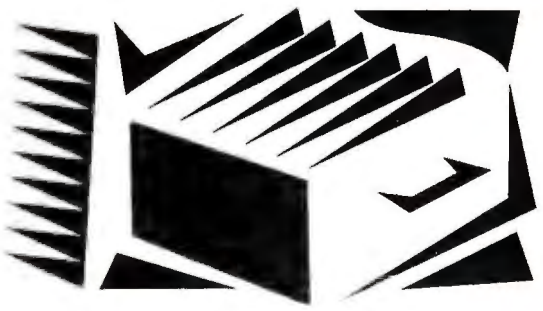
POWER TIP NO. 119

One Step to PageMaker and File

You can bring up *Windows*, *PageMaker*, and a *PageMaker* document in one step from the DOS prompt. If your WIN.EXE and PM.EXE files are in directories on your DOS path, and your *PageMaker* document file is in the current directory, the command **win pm** *filename* will load both *Windows* and *PageMaker* and open your document. If your document isn't in the current directory, you can add its path name to the file name.

Tej P. Singh
New Delhi, India

Data Basics



Data Management

Tips and techniques for managing your data

This month: Data validation is a valid concern—make sure the data you get is the data you want.

Alan Schwartz

Data entry is tedious work, and mistakes often creep in. If misspelled names, wrong dates, or invalid codes aren't caught on the spot, they will gnaw at your data foundation like termites.

The art of catching entry errors is called validation. This month I'll cover general methods for validating data as well as validation tools found in—and missing from—*dBASE III Plus*.

Before you invest time entering data, consider the reports and summaries you'll need later. Now is the time to identify and protect against incorrect dates and inappropriate text.

Numeric and date fields frequently have implicit boundaries, and entries beyond those limits can be readily identified. For instance, you could designate all invoice dates more than a year old or in the future as incorrect. As the data base designer, you must decide where the boundaries are and prohibit users from crossing them.

Text fields may have only a few correct answers. A data base for Acme Home and Garden Tool Rental might limit tool types to Garden, Construction, and Woodworking. If your data manager allows, let users pick valid choices by pointing and clicking. Otherwise, have your application check user input against a list.

Your program can check entries for errors field by field or one screen at a time. Field-by-field validation is quicker and usually more efficient, allowing the user to correct a mistake immediately. However, some types of validation require data from multiple fields and can't be performed until an entire data entry screen is completed.

Entries that violate the rules should trigger clear error messages and let users type new answers immediately. Be firm but friendly. 'Invoices dated before today are not correct: please reenter' is better than 'Invalid input' or some other curt or impolite message.

dBASE Validation

Unfortunately, *dBASE III Plus* is weak in field-by-field validation. One technique is to use a RANGE clause in the @...SAY...GET command that accepts specified upper and lower boundaries for dates and numbers. But RANGE won't let you define an error message: When a user violates a range, *dBASE* beeps and displays something like

DATA BASE TOOLBOX

dGE 3.0

If you have numeric data, someone's going to want you to make a chart out of it. That's when a program like *dGE* comes in handy. *dGE* is a graphics library that produces many kinds of graphs and charts from data in your DBF files.

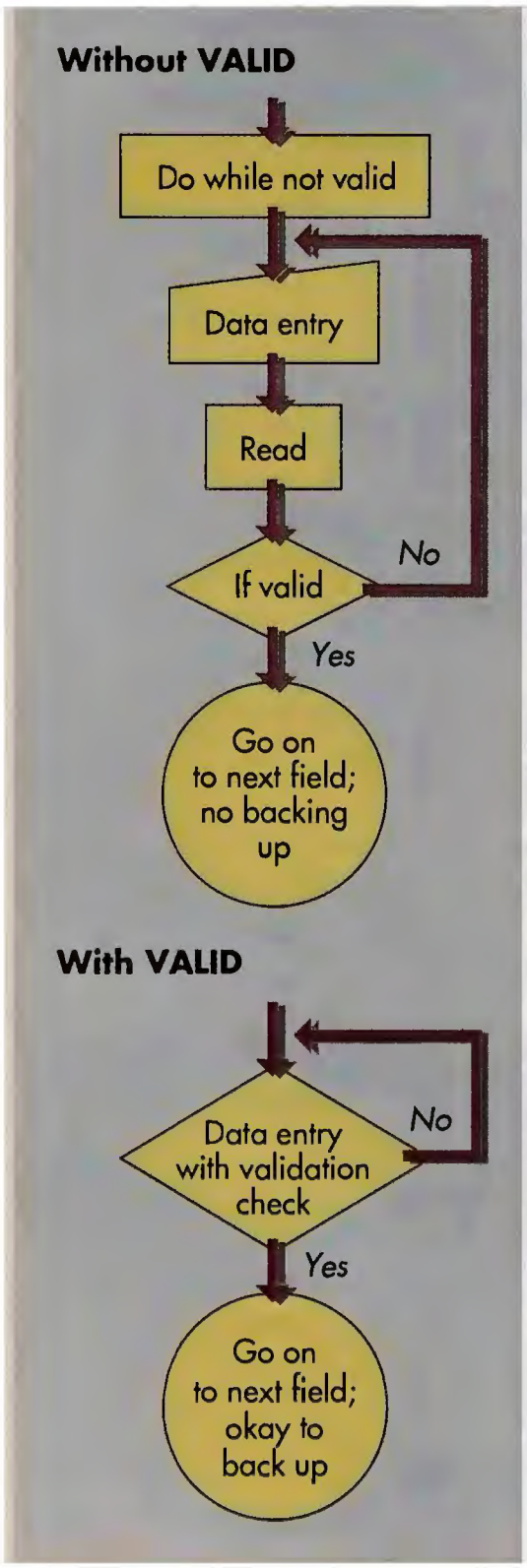
dGE's stand-alone graph designer uses clearly arranged pulldown menus to lead you through the process of specifying colors, shading, legends, and the links between data fields. When you're done, *dGE* generates dBASE code for you to embed in your programs or **do** from the dot prompt. Thus, graphs will always reflect current data.

You can display the graphs from any flavor of dBASE, although a 44K TSR is required with all except *Clipper*. *dGE 4.0*, due out this summer, will allow *QuickSilver* users to forgo the TSR as well.

dGE lists for $195, but it will go to $295 with the release of *4.0*. You can freely distribute the display module with your applications. The stand-alone designer requires 512K and DOS 2.1 or a later version. —*A. S.*

dGE 3.0; Pinnacle Publishing, P.O. Box 8099, Federal Way, WA 98003; 800/231-1293, 206/946-1491 (fax).
Reader service no. 603

Validating a Field Entry



The VALID clause gives you a simple replacement for an otherwise complex routine and lets the user return to an already entered and validated field.

'RANGE is 04/30/89 to 04/25/90', and the user has to press the <Space> bar to reedit the entry—a fact *dBASE* may or may not reveal. Users who have set SCOREBOARD and BELL off to control their environment will get no feedback whatsoever. Novices, convinced that the system is frozen, may reboot in panic, trashing files. RANGE is best avoided.

It's better to validate data in *dBASE III Plus* with rule-checking routines, usually DO WHILE loops. For example, to ensure users enter only invoice dates that fall within the past year, you might convert a simple '@ 8,3 SAY 'Invoice date: ' GET In_date' statement into the routine shown in **LISTING 1**.

This approach, however, is awkward for field-by-field validation because it requires several READ commands per screen. The problem with READs is that until each one is processed, the fields below it are invisible, and afterward, the ones above it can't be edited.

dBASE IV and most compatible programs have a VALID clause for @...SAY...GET, letting you define an expression that's true or false depending on the entry. You could replace the code in **LISTING 1** with **@ 8,3 SAY 'Invoice date: ' GET In_date VALID In_date > (DATE() - 365) .or. In_date > DATE() ERROR CTOD(In_date) + ' is not within the past year.'**. If the verdict is false, the cursor stays in the field until a change in data makes the expression true. The result is less work for you and your users.

Alan Schwartz is a partner in Micromega Systems in San Francisco, specializing in custom data base application development.

PARADOX SHORTCUT

"Copying" a Calculated Field

Celeste Robinson

When you're designing a report with a number of similar, complex calculated fields, it's handy to copy a formula from one field to another. Unfortunately, *Paradox* has no commands for doing this. You can get around this shortcoming by creating an Instant Script macro when you first enter the formula.

While designing a report, before creating the first calculated field, press **<Alt>-<F3>** to start recording your keystrokes to an Instant Script. Then press **<F10>** and select *Field Place Calculated*. Next, type in your formula, and press **<Enter>** **<Alt>-<F3>** to end recording. Place the field as prompted.

When you want to place a similar calculated field in another location, simply press **<Alt>-<F4>** to play the Instant Script. You will soon be prompted to place the field. Press **<Esc>** **<Ctrl>-F**, edit the formula, press **<Enter>**, and place the field as prompted.

Celeste Robinson is the author of The Best Book of Paradox *(Howard W. Sams and Co., Carmel, Indiana, 1990).*

```
DO WHILE In_date < (DATE() - 365) In_date > DATE()
 @ 8,3 SAY 'Invoice date: ' GET In_date
 READ IF In_date < (DATE() - 365) .or. In_date > DATE()
  @ 9,3 SAY "Invoice date must be..."
 ENDIF
ENDDO>
```

LISTING 1: Validating input with READ and IF clauses allows you to include error messages, unlike with an @...SAY...GET...RANGE.

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The Art of Persuasion

Publishing & Graphics

Expert advice for creating high-impact documents and presentations

This month: tips for successful presentations, and how to produce outline fonts in Ventura

Richard Jantz

Business graphics packages like *Freelance Plus* and *Harvard Graphics* make it easy to produce professional charts, but they don't help you plan *presentations.* This month we offer tips on creating winning presentations and designing slides and transparencies.

Most presentations rely on overhead transparencies or 35mm slides. Transparencies are better for informal meetings with smaller groups. A 35mm slide presentation offers the best image quality and can be used with audiences of any size, but since slides are shown with the lights off, there's little opportunity for group discussion.

No matter which method you use, you should approach the presentation as a whole. Start with an outline containing an introduction, body, and conclusion, and decide which points require text charts and which need data charts. Focus on the key points you want the audience to remember, then choose graphics (such as clip art) to make them memorable. Finally, match your speaker notes with printouts of your slides and transparencies, and give the presentation a dry run.

Effective Slides and Transparencies

The most important rule to remember is, keep it simple. Your audience doesn't want to be overwhelmed with information, so use data charts only when you need evidence to support your argument. A well-designed word chart can be worth a thousand points of data. Here are some of the keys to creating effective visuals:

- Use *templates* for a consistent look. Like master pages in desktop publishing, templates contain colors, fonts, and graphic elements that repeat on each image. Templates ensure that background colors remain consistent and that rules, bullets, or company logos appear in the same place every time.
- Use light-colored text against a dark, neutral background for slides, and dark type on a light background for transparencies. Use brighter colors to emphasize key elements, but no more than six colors per image.
- Use no more than two typefaces in

NUTS & BOLTS

Creating Outline Type in Ventura

If you've got a PostScript printer and *Ventura,* you can produce outline type (hollow characters) for eye-catching logos or headings. Simply use a special PostScript prologue (a file that defines PostScript subroutines) that's provided on the *Ventura* utilities disk.

1. Go to your VENTURA directory and copy the file PS2.EFF from the POSTSCPT directory on the utilities disk. For example, type **copy a:\postscpt\ps2.eff c:\ventura** and press **<Enter>**.

2. Now rename the regular PostScript prologue (PS2.PRE). Type **ren ps2.pre ps2.reg** and press **<Enter>**.

3. To make PS2.EFF the active PostScript prologue, type **copy ps2.eff ps2.pre** and press **<Enter>**.

4. Start *Ventura* and open a chapter.

5. In Paragraph or Text mode, select the text you want to make outline type. Use the Font menu or Set Font button, respectively, to assign the color *Magenta* to the text. Click *OK.*

Any text or font assigned the color magenta will now automatically print in outline form, while all other text will print as normal. Of course, if you later use a color PostScript printer and want to use the actual color magenta, you'll need to rename the PS2.REG file as PS2.PRE.

—R. J.

DESKTOP PRESENTATION TOOLBOX

Showstopper

If you use *Freelance Plus, Harvard Graphics,* or any other top graphics package to produce 35mm slides, Magicorp has an eye-opening proposition for you. Showstopper lets you add compelling photo backdrops to your slides for a fraction of what a professional photographer would charge.

Showstopper provides realistic 3-D shadow effects plus backgrounds in a variety of textures (marble, wood grain, fabric) and images (money, landscapes, skylines, and more). Simply choose the backdrop from a catalog, and Magicorp adds the effect when it processes your slides. The $25 package comes with a sample catalog, plus software that lets you assign Showstopper effects to files when you transmit them. Showstopper costs an extra $5 per image, for a total of $20 per slide for overnight service.

Whether you choose a dramatic backdrop like cascading fireworks to highlight explosive sales figures or a marbled background for an entire slide series, Showstopper can add sparkle and elegance to your presentations. —*R. J.*

Showstopper $25; Magicorp, Ltd., 50 Executive Blvd., Elmsford, NY 10523; 800/367-6244, 914/592-1178 (fax)
Reader service no. 602

SCREEN 1: An effective text chart reinforces the key points of your presentation. In this sample build series slide, new topics are introduced one at a time and highlighted in yellow. Each slide features a medically oriented Showstopper background and uses the same fonts, rules, colors, and graphics—giving the presentation a consistent look.

the presentation. Text characters should be at least 18 points (approximately ¼ inch high) and printed in upper- and lowercase for better legibility.

- Use *serif* typefaces only for headlines and other display type. (A serif typeface, such as Roman, features cross-strokes at the end of a character.) A sans serif face like Helvetica is easier to read at small sizes.
- To avoid surprises at print time, use fonts and graphics you know your printer or slide service supports.
- Avoid complete sentences. Use text charts to stress key words, and use no more than six lines of text per chart.
- Normally, you should bullet key items in text charts. However, you can use boxes or other graphics to set off especially important items.
- Use a *build series,* in which a new line of text is added or highlighted with each successive image, to introduce new topics or outline a presentation's main points (see **SCREEN 1**). To ensure a consistent look, create your final image first, then delete items one by one to create the images that will precede it.
- Make graphs consistent, employing the same colors, dimensions, and placement in each image.
- Use pie charts to show proportional relationships such as market share. Place the slice you want to emphasize in the upper right quadrant.
- Use bar charts to compare totals or show data that changes over time, such as quarterly profits. In general, use no more than 12 bars per chart to avoid visual clutter.
- Use line graphs to plot cycles or trends, such as sales figures. Use no more than three lines per chart, giving each a unique color or line style.
- Save your flashiest graphics to illustrate your main points. Scanned photos or custom backdrops (see "Desktop Presentations Toolbox") can be particularly effective.

Contributing Editor Richard Jantz is the author of Ventura for Windows 3.0 *(John Wiley & Sons, New York, 1990).*

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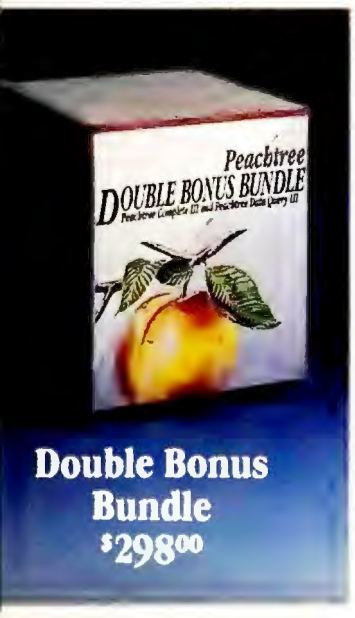

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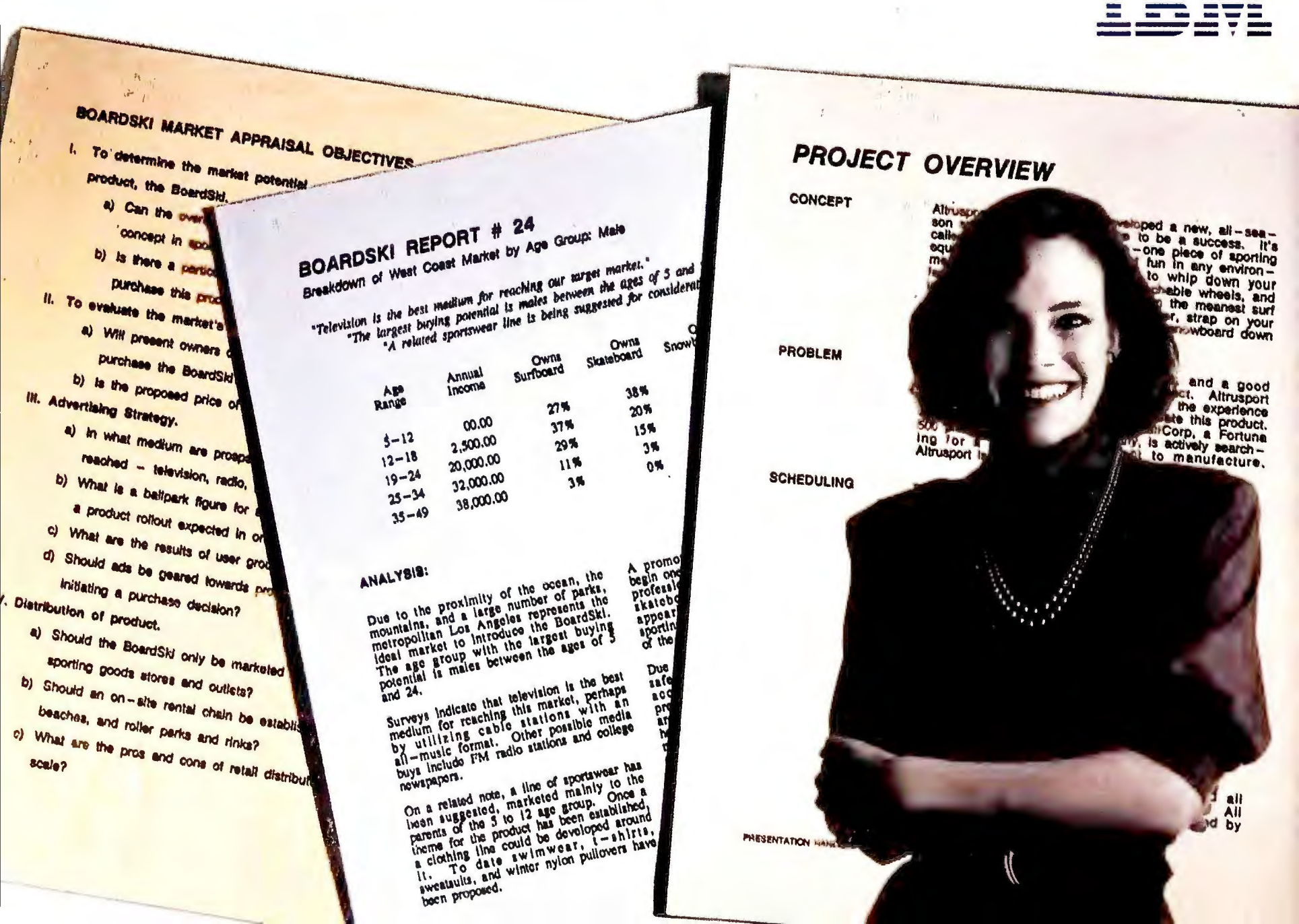
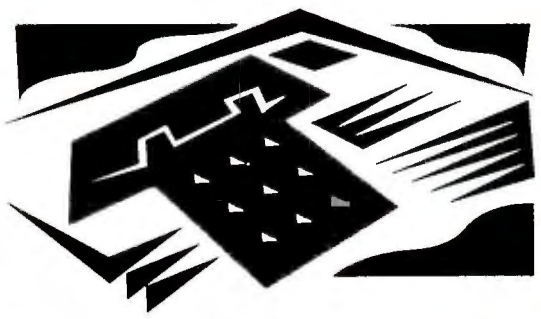


The Information Edge



Communications

On-line resources for business and professional users

This month: SprintMail delivers all the benefits of LAN E-mail—without a LAN—and ABA/net helps solve legal problems 24 hours a day.

Judy Getts

Imagine linking up all your employees—not only locally but around the world—with an on-line system that's every bit as powerful as the latest LAN E-mail package but doesn't require complicated installation or expensive network cabling.

SprintMail (formerly Telemail) is a 350,000-user, full-featured dial-up E-mail service with a big extra: the ability to set up private bulletin boards for you and your employees free of charge. Originally aimed at Fortune 500 companies, it's designed to reward the large-volume user. How does SprintMail define "large volume"? Well, that's open to negotiation, but if you qualify you can get dedicated high-speed phone lines (which reduce connection costs) plus free on-site employee training.

SprintMail runs from a command-line interface and provides all the usual E-mail amenities. You can send carbon copies, create mailing lists, and request receipt notification; and fax, telex, and hard copy options are available. Not-so-common features include the ability to attach binary files without using special software. Thanks to its support of multiple network protocols, SprintMail can send and receive mail via MCI Mail, AT&T-Mail, and Bell Atlantic's mail system—although the address line may require you to enter X.400 syntax—and can connect with a wide range of networks and message services. SprintMail can also print messages on dedicated *print stations*—remote systems with an attached printer.

SprintMail's ability to set up and administer private bulletin board services at no extra cost is its key advantage over other E-mail systems. Businesses can use these private areas to share messages or even post frequently updated data base files, which can be downloaded by offices around the country—client mailing lists, for example.

SprintMail lets you designate a system administrator who can set access rights, including specifying which groups and individuals can write to a bulletin board and which can only read it, who can send messages to whom, and who can use the fax, telex, and X.400 options to send mail to remote E-mail systems. A detailed bill is provided for use in internal charge-backs.

Unfortunately, SprintMail's prices are steep—especially for users with moderate E-mail requirements. While $10 a month buys a mailbox on MCI Mail and about 60 messages, the same ten-spot covers only half an hour on

ON-LINE TOOLBOX

Check the Headlights

If your external modem is having trouble making a connection, you might want to check the headlights. Here's what you should look for.

When the modem is powered on, the modem ready (MR) light should shine. The terminal ready (TR) light tells you that the modem and your PC are communicating and are ready to make a call. If you've set the modem to answer the phone, the auto-answer (AA) light will be lit. And whenever the modem "picks up the phone," the off hook (OH) light should go on.

Once your modem and the remote system make a connection, the carrier detect (CD) light is supposed to flash on. While the modem is sending and receiving data, the receive data (RD) and send data (SD) lights will flicker. As soon as the connection is severed, the carrier detect lamp should go out.

If your modem lights behave differently, you may have a hardware problem. Call the tech support line and report the light show. —*J. G.*

SprintMail, with enough credit to send about 12 memo-sized messages. For one thing, SprintMail (unlike MCI) charges a connection fee in addition to a character transmission fee.

But for large corporations with megabytes of data to send and high-speed modems to send it with, the combination of volume-user benefits (discounts, dedicated lines, and surcharge-free 9600-bps access) brings the price down. Moreover, SprintMail's transmission costs are only 37.5 cents per 7500 characters, compared with $1 on MCI. There are so many variables that it's impossible to come up with a cut-and-dried cost comparison, but somewhere in the vicinity of 200,000 characters a day, SprintMail becomes less expensive than MCI.

Although you can log on to the service using any communications package, special software for automating the log-on, up/download, log-off process is available for $135: *PC SprintMail.* It's pricey, but busy users may find the convenience worth the extra cost.

While its competitors have the edge when it comes to luring PC users with modest E-mail needs, SprintMail is a smart choice for the business with a powerful E-mail appetite. ●

Judy Getts is a contributing editor for PC World.

WHERE TO BUY

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THE PROFESSIONAL EDGE

ABA/net Is Essential for Lawyers

Nick Kees

It's past midnight in Phoenix, you've just finished that all-important brief, and you need to get the file to your local counsel in Atlanta in time for a court appearance at 8:30 tomorrow morning. Unfortunately, counsel needs it in *WordPerfect* format, and you've written it in *WordStar* format.

So you dial ABA/net, an on-line service operated by the American Bar Association specifically for attorneys, where a file conversion utility can translate text to and from more than a dozen word processor file formats. Then you can have ABA/net forward the converted file to your Atlanta counsel.

ABA/net offers access to nearly 1000 legal and general interest data bases such as Westlaw, Lexis, Dialog, and Dow Jones—most of which can be searched via the same easy-to-use, menu-driven interface. In addition, ABA/net is equipped to handle E-mail, faxes, binary files, telexes, and hard copy mail, with connections (E-mail only) to MCI and Western Union EasyLink, among others.

With a few simple commands, you can go from looking up patent numbers and ownership to reading offerings from the American Bar Association itself (including meeting minutes, ethics notes, law news, and notes from Capitol Hill).

The only other on-line service that offers a remotely comparable package of services and data bases is CompuServe. Even with CompuServe you'd need separate subscriptions to Westlaw, Lexis, and Dialog, and you'd lose access to ABA forums, not to mention the on-line file conversion feature.

ABA/net costs $18 an hour during prime time, $8 an hour at other times—with a minimum monthly charge of $20. And there's a small additional Telenet charge for access at speeds over 1200 bps. Still, for the attorney who needs file conversion and transfer, instant access to those data bases, or simply inexpensive access to Lexis and Westlaw (ABA/net requires lower monthly minimums), *not* subscribing to ABA/net is downright foolhardy.

Nick Kees is a patent attorney in Milwaukee who specializes in the practice of software and electronics law.

ABA/net, c/o INET Company of America, 14800 Conference Center Dr. #300, Chantilly, VA 22021-3805; 800/322-4638
Reader service no. 658

POWER TIP NO. 120

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James D. Schriner
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Were you born with a memory situated squarely on the tip of your tongue? Do you forget things like which day you placed an order or important numbers? If you are forgetful you need INFO SELECT - the software that remembers almost everything for you.

INFO SELECT is easy to use - yet powerful.

Better than a PIM

INFO SELECT is better than a desktop organizer and better than a Personal Information Manager (PIM). For example, Sidekick can't show the multi-views of Agenda. Agenda takes weeks to learn and can't add one plus one. Grandview can show an outline of the features of Sidekick but can't dial a phone number! INFO SELECT combines many of the benefits of all these types of software and then goes even further. It costs less too!

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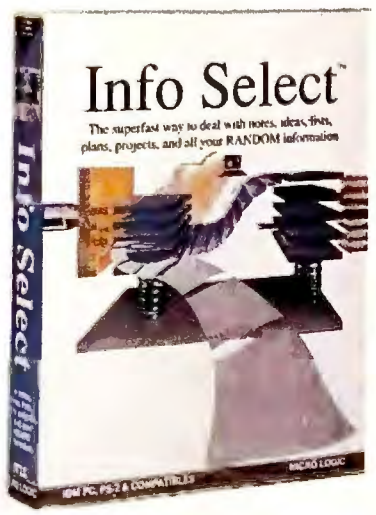

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BASIC OPERATION: You will see several windows of different sizes side-by-side on your screen. Info Select windows can hold: notes, plans, lists, facts, letters, contacts, and much more. You can: open a new window, type into it, and shape it; edit an existing window; resize, remove, or print a window; browse through windows with the arrow keys; search for a group of windows related by a word or phrase; hot-key between INFO SELECT and a wordprocessor or spreadsheet; and much more. EASY POWERFUL FEATURES: five ways to see overviews; hypertext; fast sort; line drawing; date tickler; dialer; searching by text or date ranges; add columns of numbers; 3-D wordprocessing; support of some commands of popular wordprocessors; can store data in EMS; template or free-form windows; import and export files, screens, and databases; move, join, and duplicate windows; efficient on portables; stand-alone or memory-resident; pull-across menus; and much more. Data is structured in multiple stacks of intelligent text windows; uses a unique easy powerful system of parallel text processing and progressive resolution searching without keywords. Version available with LAN file locking and sharing. SPECIFICATIONS: infobases up to 10 megabytes; text searches up to 700kb/sec; up to 32,000 characters per window; up to 64,000 windows per infobase; takes just 7K in swap mode; for the IBM PC/XT/AT/PS2 and true compatibles; not copy protected. MAIL ORDERS: Send name, address, phone number, and payment by check, Visa, or MC to address shown. Please include $3.50 shipping ($10 outside continental USA). 30 day money back guarantee. TORNADO OWNERS: INFO SELECT includes everything in Tornado and much more. Call today for our special limited time trade-up offer. EUROPEAN CUSTOMERS: Contact Atlantex U.S.A. (203) 655-6980. TRADEMARKS: Trademark (owner): Tornado and Info Select (Micro Logic), Agenda (Lotus Development), Sidekick (Borland International), Grandview (Symantec), IBM PC, XT, AT, PS/2 (IBM). © 1990 Micro Logic Corp. U.S.A.

User Group Tips

Helpful hints from members of the nation's user groups

Dating Your Spreadsheet Reports

If you use a *1-2-3* template for monthly reports, you may want the month of the report—often the one before or after the month the report is actually printed—in a particular cell. The process can be automated with the @NOW function, which returns the current date and time every time you recalculate or retrieve your worksheet. If you place the formula **@NOW-30** in a report template, a date from the previous month will appear in reports made from that template. **@NOW+30** will produce a date in the next one.

Since *1-2-3* treats dates as numbers (with January 1, 1900, equaling 1.0), you must format the cell to show its contents as a date. Select */Worksheet Range Format Date,* and pick the *3 (MMM-YY)* format so that the day is not shown.

Be aware that these formulas are not always accurate. For instance, 30 days after May 1 still falls within May.

Steven Semas
IBM Users Group of California
Los Angeles, California

WordPerfect Box Drawing and Proportional Fonts

WordPerfect's Line Draw feature (<Ctrl>-<F3>2) produces lovely text boxes on screen, but they print out as a mess if you use proportional fonts. With *WordPerfect 5.0* or *5.1,* you're better off using the Graphics menu.

The Graphics Text Box Options menu (**<Alt>-<F9>bo**) allows you to select borders, shading, caption formats, and inside and outside box margins for all your text boxes. To set up an individual box, you use the Graphics Text Box Create menu (**<Alt>-<F9>bc**). From this menu, you can anchor a box to a page position or to text, adjust its size and shape, and have outside text flow around it or through it. The text in the box can be a separate file, or you can type it in through the Create menu's Edit option.

Christine Rivera
New York PC Users Group
New York, New York

Printing a Paradox Table Structure

None of *Paradox*'s interactive functions prints a listing of a table's structure. The script STRUCT.SC [see **LISTING 1**] prompts you to select a table, then prints that table's structure and the number of records.

STRUCT.SC can be typed in with either *Paradox*'s own editor or another one. Use the Scripts Play command to run it.

Bruce McCormick
Southern California Paradox Users Group
Northridge, California

Are you a user group member with a tip to share? Would you like to see your name in PC World *and earn $25 in the bargain? See How to Contact PC World, page 4.*

```
;struc.sc,display the structure of a table
;1990 Jan 9 1552, Bruce McCormick
CLEAR
CLEARALL
WHILE true
 SHOWTABLES
 DIRECTORY()
 "Select table, press Esc to exit."
 TO tabname
 SWITCH
  CASE NOT (retval) OR tabname = "None":
   QUITLOOP
  CASE retval:
   MESSAGE "Printing structure of"+tabname+"."
   Menu {Tools} {Info} {Structure} TYPEIN tabname Enter
   Menu {Report} {Design} {Struct} {R} {} {Tabular}
   Down Down Down Down Down Down   ;move to time line
   Menu {Field} {Place} {Time} {1) hh:mm pm} Enter
   "         Structure of "
   TYPEIN tabname                  ;type in table name
   Enter                           ;move back to left margin
   Down Down Down                  ;move to table band
;***insert and format Field Number column in the report
   Menu {TableBand} {Insert} Enter "Field Number" Enter
   "--------" Enter
   Menu {Field} {Place} {#Record} {Overall} Enter Enter
   Rotate                          ;correct report format
;***insert and format "Number of records in..." line
   End                             ;move to report footing
   Enter                           ;insert a blank line
   "Number of records in "         ;insert footing title
   TYPEIN tabname " = "            ;insert table name
   TYPEIN NRECORDS(tabname)        ;no. of records in table
   InstantReport                   ;print report
   CancelEdit                      ;cancel report
 ENDSWITCH
ENDWHILE
CLEARALL
```

LISTING 1: STRUCT.SC will print the structure and number of records in a Paradox table.

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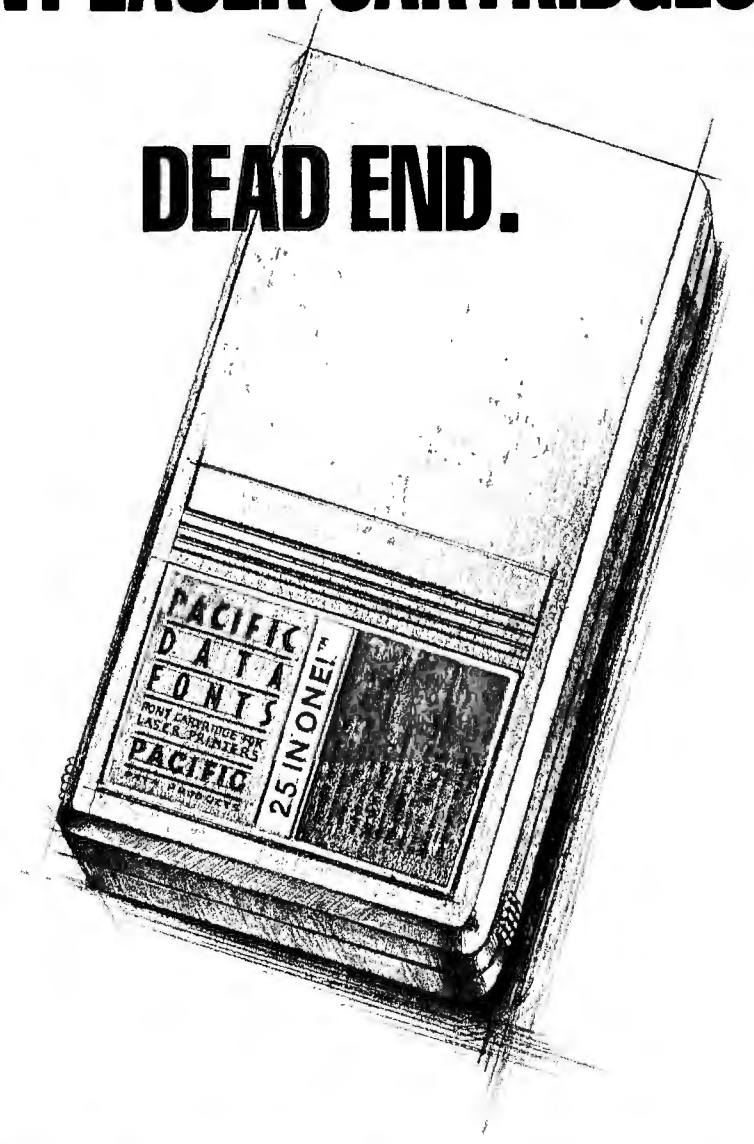
DEAD END.



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Actual Number of Type Choices	69	77
Symbol Sets	20	22
Bar Codes & Zip Codes	No	Yes
Zapf Dingbats	No	Yes
Maximum Point Size	18 points	Unlimited with modules
Spreadsheet Sizes	3.6 points	3.6, 4.8 points
Headline Sizes (24 points and up)	Requires an additional cartridge	Unlimited with modules
Accepts Additional Fonts	No	Unlimited with modules
Custom Symbols/Graphics	No	Unlimited with modules
Drivers for Most Programs	Yes	Yes
Cartridge Price	$399.00	$399.00
Module Price	NA	$99.00 - $149.00
Expansion Potential	None	Unlimited

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STAR-DOT-STAR *.*

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Print running page numbers with a WordPerfect 4.2 macro, know when you've doubled back to DOS, calculate 360-day-calendar dates with 1-2-3 and Quattro, print marked blocks with WordStar, repair a QuickBASIC function, correct a Paradox script, and dig into a toolbox of amazing widgets.

Edited by Tom Swan

ANTHONY RUSSO

Perfect Page Counter

It's easy to print page numbers in *WordPerfect 4.2,* but it's not so easy to print them in the form "Page 3 of 20," which requires calculating the total page count in advance.

I found a way to accomplish this with a macro [see **FIGURE 1**] that tricks *WordPerfect* into counting the number of pages as though it were preparing a table of contents. The macro inserts the page count into a footer that will print on each page.

Evan H. Farr
Fairfax, Virginia

Editor's note: Create this macro by loading a sample document, then typing the **FIGURE 1** *keystrokes. To print a document that has running page numbers, first load or enter the text as you normally do, then press* **<Alt>-<F10>** *and type* **pagexofy<Enter><Shift>-<F7>1.**

If you have WordPerfect 5.0 *or a later version, you won't need this macro, thanks to the Cross Reference option on the Mark Text menu. To use this feature, simply place a Cross Reference target at the end of the file and a reference to that target in the header. Before printing, use Mark Text's Generate option to make sure the page numbers are up-to-date.*

```
<Ctrl>-<F10>
pagexofy<Enter>
<Home><Home><Cursor Down>
<Alt>-<Numpad 1>
<Alt>-<F5> 6212
<Space>marker<Alt>-<F4>
<Ctrl>-<Cursor Left>
<Alt>-<F5>11<Alt>-<F5>68Y
<Ctrl>-<Cursor Right>
<Ctrl>-<Cursor Right>
<Alt>-<F4><End><Ctrl>-<F4>11
<Home><Home><Cursor Up>
<Alt>-<F8>631
<Shift>-<F6>page<Space>
<Ctrl>-B<Space>of<Space>
<Shift>-<F10><Enter>
<F7><Enter>
<F2><Alt>-<Numpad 1><F2>
<Cursor Left> <Alt>-<F4>
<Home><Home><Cursor Down>
<Del>Y<Ctrl>-<F10>
```

FIGURE 1: Enter this WordPerfect 4.2 macro to print footers in the form "Page 3 of 20."

Doubling Back to DOS

Many programs have a Shell-to-DOS or System command that lets you double back to the DOS prompt. Most of those programs let you issue multiple DOS commands and then type **exit** and press **<Enter>** to return to the program. The trouble is, if you scroll or clear the display, there will be nothing on screen to remind you that your program remains idling in RAM. If you turn off your computer, you might lose changes to files you were editing.

This bugged me until I discovered a neat trick that I use with *1-2-3* and that should work equally well with other programs. Instead of running *1-2-3* directly, I use 123.BAT [see **LISTING 1**]. In this batch file, the first PROMPT statement inserts a message into the DOS prompt, which is always visible after you've exited temporarily to DOS. A second PROMPT resets the prompt string to normal when I quit *1-2-3.* This way, I always know when a program is hiding in RAM.

```
echo off
prompt Type EXIT to return $p$g
c:
cd \lotus
123
prompt $p$g
```

LISTING 1: Prepare batch files like this one to run programs and remind you when you've doubled back to DOS.

Don McNally
Kalamazoo, Michigan

Editor's note: Create a separate batch file for each program that lets you exit

(continues)

to DOS. Replace '123' in the sample listing with the necessary commands to change directories, and run your programs.

You can name the batch files anything you like, but it's probably best to use the same names as the programs; for example, WORD.BAT for Microsoft Word, *Q.BAT for* Quattro, *TURBO.BAT for* Turbo Pascal, *and so on. To run the batch files from any location, store them in a PATH command's directory. Then enter a program's name to run.*

On my system, because I prefer a shorter prompt, I changed the first PROMPT argument to pg$g. This places a double greater-than symbol (>>) after the current directory, letting me know when I've doubled back to DOS.

Hath 30 Days, Will Calculate

Our company uses a financial calendar, with a 360-day year of 30-day months, to calculate future values for municipal bond projects. Because many of our users prefer to use *1-2-3* release 2.1 or *Quattro,* both of which lack *1-2-3* release 3's 360-day @D360 function, I wrote my own formula [see **FIGURE 2**].

The expression calculates the difference between two dates in a 360-day year. To use it, insert the starting date into cell A2 and the ending date into A1,

```
(12*(@year(A1)-@Year(A2))+
(@month(A1)-@month(A2)))*30+
(@day(A1)-@if(@day(a2)=
31,30,@day(a2)))
```

FIGURE 2: This formula counts days between dates in a 360-day financial calendar for 1-2-3 and Quattro.

then enter the formula into the cell where you want the result to appear.

Kevin Fisher
Sicklerville, New Jersey

Editor's note: **FIGURE 2** *should be entered as one formula.*
(continues)

DEVELOPER'S TOOLBOX

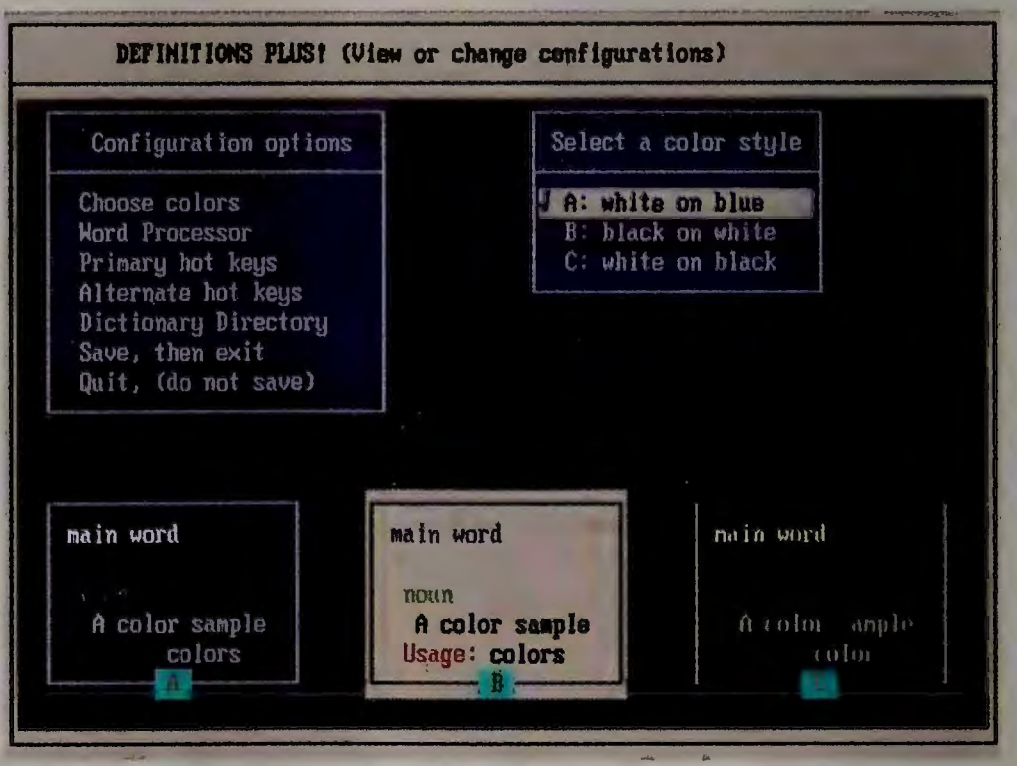
Amazing Widgets

I've got this banged-up toolbox that has more dents than the loser in a demolition derby. It's stuffed with greasy junk, but somehow, whenever I need the right tool for a job, I can always find it in that old steel case. It's never failed me.

The Developer's Toolbox is getting like that—except for the grease, I mean. Actually, the original *Toolbox* has grown to a dozen or so cartons, drawers, and shelves that are bulging with disks, manuals, books, and programming libraries. People keep sending the most amazing widgets. For instance...

If you want to extend your library of public domain and shareware programs, you can spend six months dialing bulletin boards. Or you can get *Programmer's ROM* from Quanta Press. Putting it plainly, this is one of the most fantastic collections of utilities, software tools, and spreadsheet templates you can buy. It truly has something for everyone.

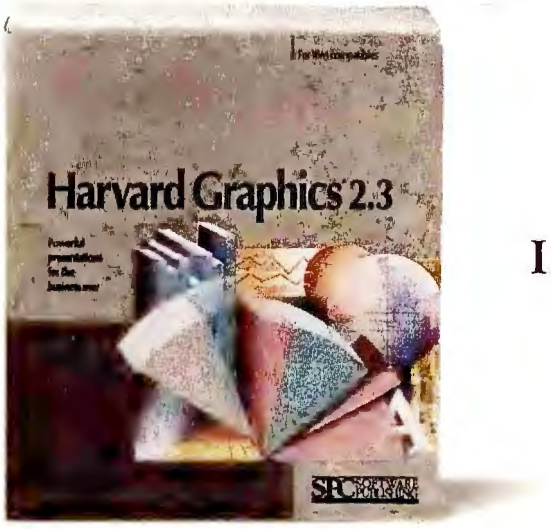
On this single compact disk are thousands of files ranging from the recreational (the game of Scrabble, for example) to all-work-and-no-play accounting systems. Each compressed "archive" holds one or more files that you can extract with a supplied utility. I'm guessing, but there must be at least 10,000 files organized in directories for Pascal, C,



Quantasm Power Lib subroutines ease the job of creating text-based windows and menus, such as these from the Definitions Plus configuration program. Power Lib works with Turbo Assembler, Microsoft Macro Assembler, and OptASM.

(continues)

MAKE YOUR NEXT DOG AND PONY SHOW EVEN BETTER. EVEN FASTER.



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...and more!

DEVELOPER'S TOOLBOX

(continued)

QuickBASIC, 1-2-3, dBASE, Ada, and assembly language. It's a real find far browsers and collectars.

I like to brawse as much as anyane, but I frequently don't have the time. That's why I need tools like *Quantasm Power Lib,* a tool kit of assembly language subroutines that's especially useful for cading text-based windows and menus. This package has same of the slickest pragramming I've seen in *any* tool kit. The documentation is good, too.

Power Lib works with *Turbo Assembler, Microsoft Macro Assembler,* or *OptASM.* Far an example af what the tool kit can do, check out Ward-Science Corparation's *Definitions Plus,* the disk-based *American Heritage Dictionary. Power Lib*'s author, Mike Schmit, wrate that program using these same subroutines.

When not coding assembly language, I usually prefer *Turbo Pascal,* which can handle just about any task I devise. But it daes have one majar shortcaming—a limitatian of 32K an arrays and other large structures. Now, *Turbo VMM* (Virtual Memary Manager) by Syntax has sent that limit sky-high.

Written ta replace *Turba Pascal 5.5*'s overlay unit, *Turba VMM* has the unique ability ta swap cade and data to and from disk, in effect making a portion of a hard drive available as data storage for a memary-starved program. If your arrays are tao large, ar if yaur linked lists have came to the end of their chains, *Turba VMM* is the answer. With this package, na pragram has to run out af room again.

I'm aut af storage room, here, though, so dan't send any more taals. Send filing cabinets, even dented ones. (Just kidding.)

Let's talk it over. My MCI Mail handle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swan*

For more information about all products in Developer's Toolbox, circle reader service no. 904.

WHERE TO BUY

Programmer's ROM
Quanta Press, Inc.
2550 University Ave. W #245 N
St. Paul, MN 55114
612/641-0714, 612/644-8811 (fax)
LIST PRICE: $149
REQUIREMENTS: CD ROM player
Reader service no. 630

Quantasm Power Lib
Quantasm Corp.
19855 Stevens Creek Blvd. #154
Cupertino, CA 95014
408/244-6826
LIST PRICE: $99.95 ($299.95 with source code)
REQUIREMENTS: 256K, DOS 2.1 or later version
TECHNICAL SUPPORT: unlimited free support for registered users, toll number, M–F 8–5
OTHER SUPPORT: CompuServe ID 76347,3661
Reader service no. 631

Turbo VMM
Syntax Software
Helgolandsgade 2
DK-1653 Copenhagen V
Denmark
Phone: (45 31) 319 299, (45 31) 318 299 (fax)
LIST PRICE: $129 ($179 with source code)
REQUIREMENTS: Turbo Pascal 5.5
TECHNICAL SUPPORT: unlimited free support for registered users, toll number
Reader service no. 632

(continues)

PC WORLD

Instant Reference Card #3

For use with PC World Instant Reference Card Portfolio

BASICS: 1-2-3

What to do: To stort *1-2-3*, change to the Lotus directory (usuolly /123) ond enter **123** at the DOS prompt. Press **/** to pop up *1-2-3*'s menu, then top the initiol letters of the choices you wont. For instonce, to sove o file, press **/**, then press **f** for File, then press **s** for Save. Below, commonds ore obbreviotes; for instonce, '/File Sove' is shown os **/fs**. This reference cord is designed for use with *1-2-3* releases 2.01 and 2.2 anly; its instructions won't always work properly with other versions.

FILE TASKS	
Sove o file	**/fs**, enter nome of up to 8 chorocters, <**Enter**>
Retrieve o file	**/fr** <**F3**>, select *filenome* (press <**Backspace**> to mave up one directory level or <**Enter**> to move into highlighted directory), <**Enter**>
Cleor o file from memory	**/wey**
Erase o file from disk	**/few**, select *filenome*, <**Enter**>
Chonge current data directory	**/fd**, type in o *drive/directory name*, <**Enter**>
Chonge default data directory	**/wgdd**, type in a *drive/directory name*, <**Enter**> **uq**

SHORTCUTS WHEN SELECTING A BLOCK (RANGE)	
Cancel o highlighted ronge	<**Esc**>
Cancel o highlighted range ond return cell pointer to cell from which you invoked commond	<**Backspace**>
Change movoble carner of highlighted range	period key

MANIPULATING CELLS		
	Single cell	**Block of cells (range)**
Copy	move cell pointer to destination cell, **/c**<**Backspace**>, mave cell pointer to source cell, <**Enter**><**Enter**>	move cell pointer to top left corner of destination block, **/c**<**Backspace**>, move cell pointer to o corner of source block, press period key to anchar, highlight block, <**Enter**><**Enter**>
Move[1]	mave cell pointer to destinotion cell, **/m**<**Backspace**>, move cell pointer to saurce cell, <**Enter**><**Enter**>	move cell pointer to top left corner of destination block, **/m**<**Backspace**>, move cell pointer ta corner of source block, press periad key to anchor, highlight block, <**Enter**><**Enter**>
Erose	move cell pointer ta target cell, **/re** <**Enter**> (*never* blank a cell by entering a spoce)	move cell pointer to one corner of block, **/re**, highlight black, <**Enter**>
Formot numbers, formulas	move cell painter ta torget cell, **/rf**, select formot (Fixed, Scientific, Currency, comma, or Percent), type number of decimal ploces, <**Enter**><**Enter**>	move cell pointer to one corner of block, **/rf**, select format (Fixed, Scientific, Currency, comma, ar Percent), type number of decimol places, <**Enter**>, highlight block, <**Enter**>
Left align[2]	precede entry with opostrophe (')	move cell pointer to one corner of block, **/rll**, highlight block, <**Enter**>
Center[2]	precede entry with coret (^)	mave cell painter ta ane corner af block, **/rlc**, press period key to anchor, highlight block, <**Enter**>
Right align[2]	precede entry with quotation morks (")	move cell pointer to one carner af black, **/rlr**, press periad key ta anchor, highlight block, <**Enter**>
Edit	move to torget cell; <**F2**>; edit contents using <**Home**>, <**End**>, <**Insert**>, <**Delete**>, <**Backspace**>, and/ar <**Cursor Left**> and <**Cursor Right**> with or without <**Ctrl**>	n/o
Sort	n/a	move cell pointer ta one corner of block, **/dsd**, press periad key to anchor, highlight block you want to sort (be sure to include oll desired columns), <**Enter**> **p**, mave cell pointer into column to sort by, <**Enter**>, select **a** for oscending or **d** for descending sart order, <**Enter**> **g**; to reset sort range far new sart, use **/dsr**

[1]Since Move can olter formulos, recheck formulo results after moving dota.
[2]To enter o lobel beginning with o number, precede it with one of these prefixes.

MANIPULATING ROWS AND COLUMNS				
	Single row	**Multiple rows**	**Single column**	**Multiple columns**
Insert	move cell pointer to where you wont new raw to appeor, **/wir**<**Enter**>	move cell pointer to top row of where you want new rows ta oppear, **/wir**, press <**Cursor Down**> to highlight as mony rows os you want to insert, <**Enter**>	mave cell pointer to where you wont new column to appeor, **/wic** <**Enter**>	move cell painter to leftmost column of where you want new columns to appeor, **/wic**, press <**Cursor Right**> to highlight os many columns as yau want to insert, <**Enter**>
Delete	move cell pointer to torget row, **/wdr**<**Enter**>	move cell pointer to top or bottom torget row, **/wdr**, highlight rows to be deleted, <**Enter**>	move cell painter to target column, **/wdc**<**Enter**>	move cell pointer to left- or rightmost target column, **/wdc**, highlight columns to be deleted, <**Enter**>
Set width	n/o	n/o	move cell pointer to torget column, **/wcs**, odjust with <**Cursor Right**> ar <**Cursor Left**> or type desired width, <**Enter**>	2.2 or loter versian anly: move cell painter to left- or rightmost target column, **/wccs**, highlight columns to odjust, <**Enter**>, adjust with <**Cursor Right**> ar <**Cursor Left**> or type desired width, <**Enter**>

Fold Here

Fold Here

PC WORLD

Instant Reference Card #3

For use with PC World Instant Reference Card Portfolio

ADVANCED: 1-2-3 Printing Worksheets With the LaserJet

Getting Started

You must make three adjustments before you can use 1-2-3's printer setup string to control your LaserJet reliably. You will need to make these changes only once—after you've made them, go to "Controlling the LaserJet" below.

1. Reset the LaserJet to its default settings: On the Series II, IIP, IID, or III, press the On Line button to take the printer off line, then hold down the Enter Reset Menu key until the printer displays '09 MENU RESET'. On the Plus or 500 Plus, take the printer off line and hold down the Hold To Reset Continue key until the printer displays '07'. On the 2000, turn the printer off, and hold down the On Line key while you turn the printer back on and until the printer displays 'COLD RESET'. Skip this step for the original LaserJet.

2. Disable Lotus's LaserJet text printer driver: Start 1-2-3's Install utility, then select *Change selected equipment Text printer(s) Unlisted no backspace Save changes*, and press <**Enter**> **y** <**Enter**>.

3. Adjust 1-2-3's printer defaults: Start 1-2-3, then select */Worksheet Global Default Printer AutoLF No Left*, type **0**, and press <**Enter**>; select *Right*, type **80**, and press <**Enter**>; select *Top*, type **0**, and press <**Enter**>; select *Bottom*, type **0**, and press <**Enter**>; select *Pg-length*, type **60**, and press <**Enter**>; select *Wait No Setup*, type **\027E**, and press <**Enter**>; select *Name, Unlisted no backspace*, and press <**Enter**>; and select *Quit Update Quit*.

Controlling the LaserJet with 1-2-3 Print Options

First, define your print range and any header, footer, or borders in the usual way. Then find the kind of output you want on the left side of the LaserJet Output chart, and enter the corresponding print settings from the right side: Select */Print Printer Options Margins Right*, and enter the number from the "right margin" column; select *Setup*, and enter the codes from the "printer setup string" column (don't confuse uppercase O with zero [Ø] or lowercase L [l] with numeral one [1]); select *Pg-Length*, and enter the number from the "page length" column; select *Quit* to return to the main Print menu; and to start the print job, select *Align*, then *Go*.

Ejecting the Last Page and Resetting the LaserJet

Select */Print Printer Page* to eject the last page of a print job. With a stand-alone LaserJet, reset the printer manually. To reset a shared LaserJet, find a worksheet cell in an area that will never be printed. (You will have printing problems if you try to print the area surrounding the cell.) Enter **\027E** into the cell, then use */Range Name Create* to name the cell **Reset**. After every print job you send, immediately print that cell (select */Print Printer Range*, type **reset**, then press <**Enter**> **G**). This will courteously reset the printer for other users.

To Load 14-Inch Paper From the Lower Tray

Use the settings for manual paper feed, but change '2h' in the setup string to **4h**.

LaserJet Output					Lotus Print Option Settings		
Paper size, orientation	Lines per page	Characters per inch	Typeface	Paper source	Right margin	Printer setup string	Page length
11-inch portrait	60	10	Courier	tray	80	\027E	60
		12	varies[1]	tray	96	\027E\027(sØp12H	60
		16.66	Line Printer[2]	tray	132	\027E\027(sØp16.66H	60
	89	10	Courier	tray	80	\027E\027&l5.39C	89
		12	varies[1]	tray	96	\027E\027&l5.39C\027(sØp12H	89
		16.66	Line Printer[2]	tray	132	\027E\027&l5.39C\027(sØp16.66H	89
11-inch landscape	45	10	Courier	tray	106	\027E\027&l1O	45
		12	varies[1]	tray	127	\027E\027&l1O\027(sØp12H	45
		16.66	Line Printer[3]	tray	176	\027E\027&l1O\027(sØp16.66H	45
	66	10	Courier	tray	106	\027E\027&l1a5.45C	66
		12	varies[1]	tray	127	\027E\027&l1a5.45C\027(sØp12H	66
		16.66	Line Printer[3]	tray	176	\027E\027&l1a5.45C\027(sØp16.66H	66
14-inch portrait	78	10	Courier	tray	80	\027E	78
				manual	80	\027E\027&l84p2H	78
		12	varies[1]	tray	96	\027E\027(sØp12H	78
				manual	96	\027E\027&l84p2H\027(sØp12H	78
		16.66	Line Printer[2]	tray	132	\027E\027(sØp16.66H	78
				manual	132	\027E\027&l84p2H\027(sØp16.66H	78
	100	10	Courier	tray	80	\027E\027&l6.24C	100
				manual	80	\027E\027&l84p2h6.24C	100
		12	varies[1]	tray	96	\027E\027&l6.24C\027(sØp12H	100
				manual	96	\027E\027&l84p2h6.24C\027(sØp12H	100
		16.66	Line Printer[2]	tray	132	\027E\027&l6.24C\027(sØp16.66H	100
				manual	132	\027E\027&l84p2h6.24C\027(sØp16.66H	100
14-inch landscape	45	10	Courier	tray	136	\027E\027&l1O	45
				manual	136	\027E\027&l84p2h1O	45
		12	varies[1]	tray	163	\027E\027&l1O\027(sØp12H	45
				manual	163	\027E\027&l84p2h1O\027(sØp12H	45
		16.66	Line Printer[3]	tray	240	\027E\027&l1O\027(sØp16.66H	45
				manual	240	\027E\027&l84p2h1O\027(sØp16.66H	45
	66	10	Courier	tray	136	\027E\027&l1a5.45C	66
				manual	136	\027E\027&l84p2h1a5.45C	66
		12	varies[1]	tray	163	\027E\027&l1a5.45C\027(sØp12H	66
				manual	163	\027E\027&l84p2h1a5.45C\027(sØp12H	66
		16.66	Line Printer[3]	tray	226	\027E\027&l1a5.45C\027(sØp16.66H	66
				manual	226	\027E\027&l84p2h1a5.45C\027(sØp16.66H	66

Fold Here

Fold Here

[1]Requires font cartridge or soft font. Your LaserJet will automatically select a typeface (usually Courier, Letter Gothic, or Prestige Elite) from those installed.
[2]Requires font cartridge on the original LaserJet.
[3]Requires font cartridge or soft font on the original LaserJet, Plus, and 500 Plus.

A Print off the Ol' Block

I sometimes need to print a marked block of text in *WordStar*, which lacks a feature for doing so. I therefore wrote a macro [see **FIGURE 3**] that does the trick by copying a text block to a temporary file, TEMP.$$$, printing that file, and then deleting it.

After entering the macro, move the cursor to the beginning of the text you want to print, and press **<Ctrl>-KB**. Next, move the cursor to just after the last character to print, and press **<Ctrl>-KK**. Make sure the printer is on line, and press **<Esc>K**.

Robert E. Bond
San Diego, California

Editor's note: Start WordStar *and type the macro keystrokes to create the macro, pressing <Enter> only where shown. For* WordStar 4.0, *instead of 'pptemp.$$$', use* **pntemp.$$$**. *Instead of '<Ctrl>-P<Ctrl>-K' on the ninth line, enter* **<Ctrl>-P<Esc>**.

WordStar 5.*x users must enable classic menus. To do this, return to DOS, go to the* WordStar *directory, and enter* **wschange ws**. *Type* **dbhi**, *answer* **y** *or* **n** *to turn on 'Classic commands', and type* **xaa3<Enter>xxxy** *to change the help level to 3 (2 for abbreviated menus).*

For all versions, if you receive the error message 'Background printing is off' or something similar, at the DOS prompt enter **wschange ws**. *Then, for* WordStar 5.*x type* **beca** *(for* WordStar 4.0 *type* **bfda**), *and answer* **y** *or* **n** *to permit 'Concurrent printing'. Finish with* **xxxy** *to save the changes to disk.*

```
<Esc>?K
Print Block<Enter>
<Ctrl>-P<Ctrl>-KW
temp.$$$
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Ctrl>-K
pptemp.$$$
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Ctrl>-K
<Ctrl>-P<Ctrl>-KJ
temp.$$$
<Ctrl>-P<Ctrl>-MY
<Enter><Enter>Y
```

FIGURE 3: Create this WordStar macro to print marked blocks of text.

VALuable Repair

Small differences between Microsoft *QuickBASIC* and interpreted BASIC can drive programmers batty. For example, I believe I've discovered a bug in the VAL function, which is supposed to return the value of digits in a string.

The problem is, in BASICA and GW BASIC, the expressions VAL("100.0"), VAL("100.0 %"), and VAL("100.0 &") return 100, just as they should. But under *QuickBASIC*, the last two of these functions produce 'Type mismatch' errors. This makes VAL anything but valuable for extracting numbers from strings that contain the common characters % and &.

Differences between BASICs can drive programmers batty.

To get around the problem, I wrote a new function XVAL [see **LISTING 2**], which changes the offending characters to spaces before passing a string to VAL. The function is useful for converting old BASIC programs to *QuickBASIC*. Just replace every use of VAL with XVAL.

Mike Yang
Fountain Valley, California

Editor's note: Mr. Yang is correct that VAL doesn't give identical results under different BASICs. In BASICA and GW BASIC, VAL ignores the % (integer) and & (long integer) symbols because it stops looking for digits in "100.0 %" and "100.0 &" upon reaching the blank after 0. When used with interpreted BASIC, VAL strips leading "white space" from strings—it doesn't remove blanks inside.

But, under QuickBASIC *and compiled BASIC, VAL strips all white space from strings before searching for digits, not just those at a string's beginning; thus it treats "100.0 %" as "100.0%" and "100.0 &" as "100.0&". The result is a type mismatch error because, in effect, the expressions ask VAL to convert floating-point values to integers.*

```
declare function xval%(a$)
print xval("100.0 %")
print xval("100.0 &")
function xval%(a$)
  for i=1 to len(a$)
    b$=mid$(a$,i,1)
    if b$="%" or b$="&" then
      mid$(a$,i,1)=" "
    end if
  next i
  xval=val(a$)
end function
```

LISTING 2: XVAL.BAS demonstrates the QuickBASIC XVAL function, which works like VAL in BASICA and GW BASIC.

Technically, this is not a bug. It's the result of QuickBASIC *and interpreted BASIC implementing two different specifications for the same function. But it is an annoying quirk, for which Mr. Yang has provided a useful solution.*

Don't Brace Yourself

I liked the PRSTRUCT.SC script in "Printing Paradox Table Structures" [*Star-Dot-Star*, April 1990]. But there's a mistake in the listing. The symbol {1} on line 11 should be (1). A right parenthesis, not a right brace, should follow the 1.

Michael Nekora
Pacific Palisades, California

Tom Swan is a contributing editor for PC World *and the author of several books, including* Mastering Turbo Assembler *(Howard W. Sams, Indianapolis, Indiana, 1989).*

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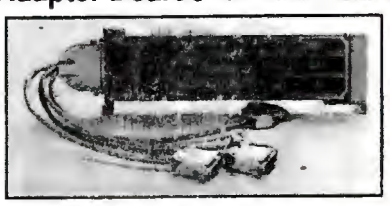

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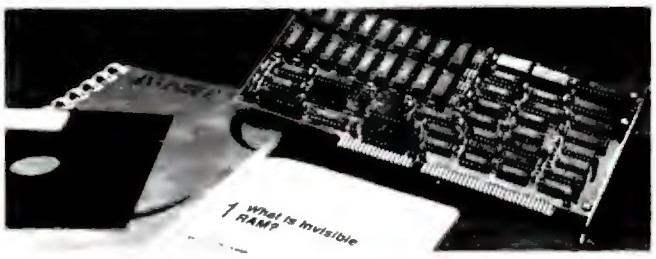

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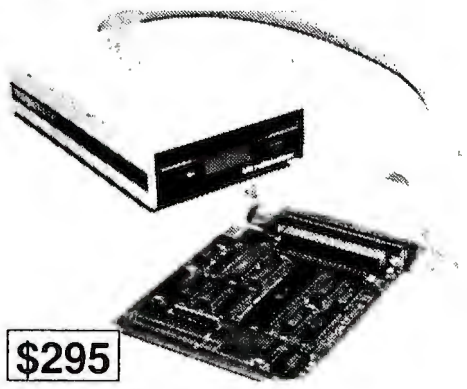

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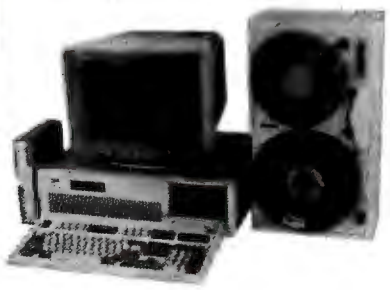

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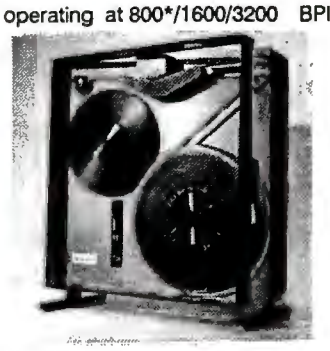

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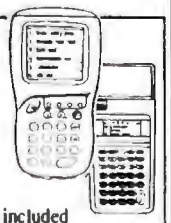

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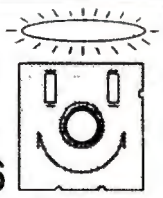

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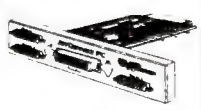

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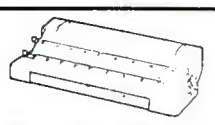

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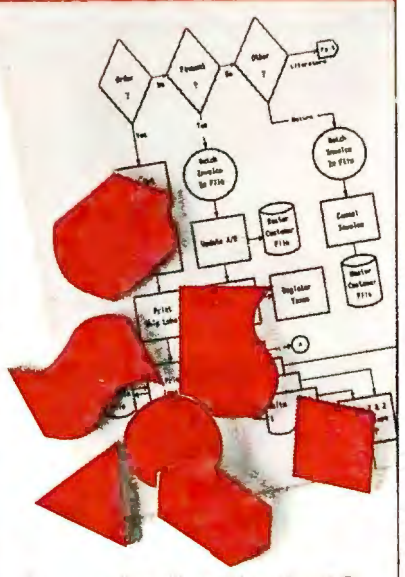

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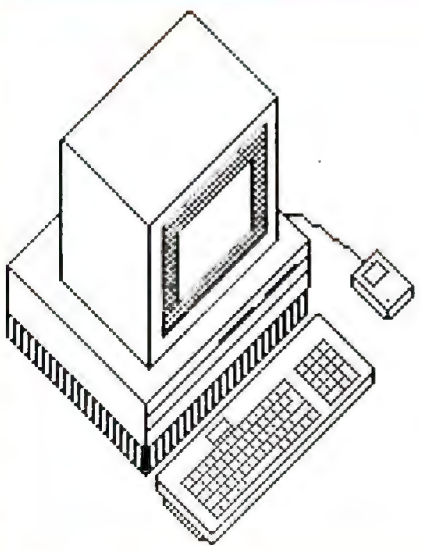

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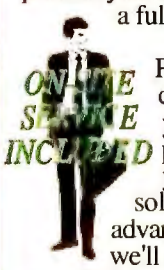

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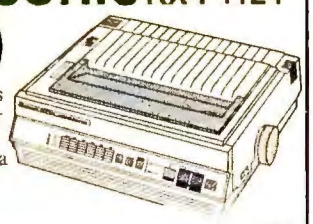

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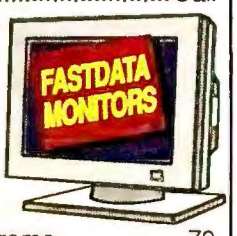

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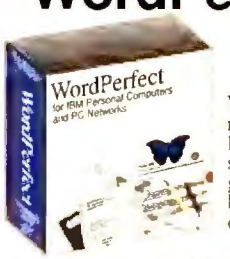

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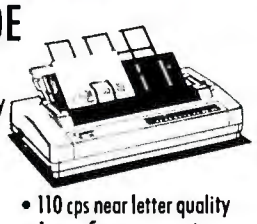

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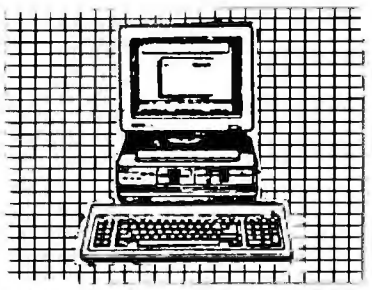

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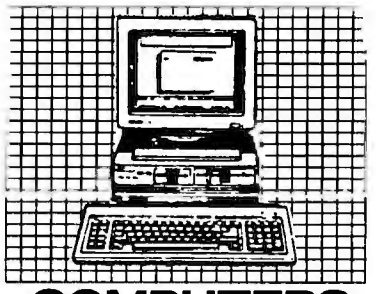

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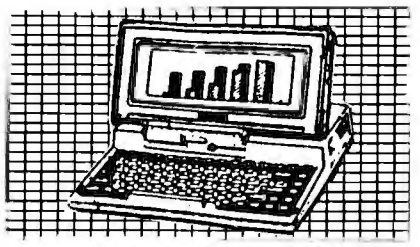

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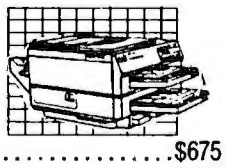

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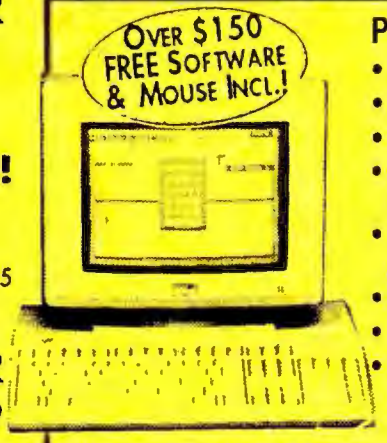

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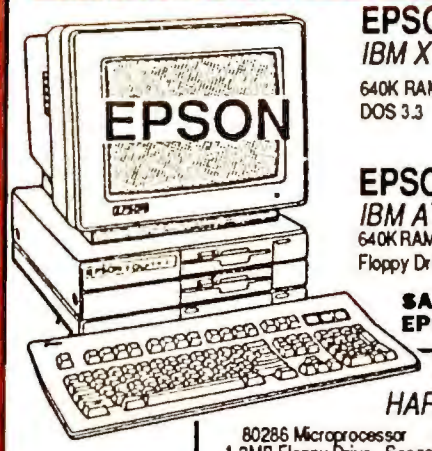

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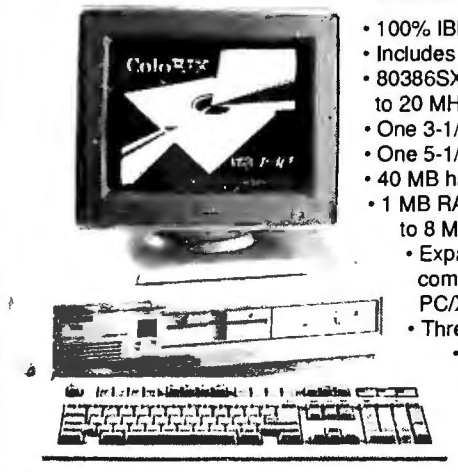

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Toshiba 3100E 40	2979
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Pacific Rim external drives available for most Laptops - Call for prices!

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MODEMS

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Hayes 1200/2400	295/345
Megahertz 24 for Zenith	165
Megahertz 24 for Toshiba	175
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ARC Net PC 130E	169
ARC Net Active Hub/Passive Hub	289/79
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ARC Net PC 500WS	285
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TAKING IT HOME

The practical guide to home/office computing

Have it your way.

Lawrence J. Magid

Burger King popularized the slogan "Have it your way." The company was talking about hamburgers, but I just built myself a 386 clone and, unlike with off-the-shelf PCs, I'm having this one my way.

I learned a lot about computers building one, but it was much more work than I'd expected; and, to be honest, I had to get some last-minute help to attach the motherboard to the case. I didn't save that much money over an off-the-shelf PC, but then I used only top-of-the-line components and ended up with a dream machine that can best even so-called premium PCs from major vendors.

My goal was to put together a *Windows*-capable 25-MHz 386 with a large, quiet hard disk. It also had to have a quiet power supply; as I said in my May column, I hate noisy computers. I began my buying spree at JDR Microdevices, a mail-order house in San Jose, California, that attracted me because of its longevity (more than ten years in business), its 30-day "no questions asked" money-back guarantee, and its toll-free technical support line.

Tim Daughters, JDR's director of engineering, helped me select a 25-MHz "mini 386" motherboard ($799), an AT-style case ($89.95), a 1.2MB 5¼-inch TEAC floppy drive ($99.95), a 1.44MB 3½-inch Mitsubishi floppy drive ($129.95), 4MB of RAM ($500), and an I/O card with one parallel and two serial ports ($85). I already had a $450 multiscan monitor, a $169 VGA card, and a very quiet $149 power supply (PC Power and Cooling's Silencer 220).

JDR's selection of hard disks didn't suit me, so I went to a local electronics store, where I bought a Conner 80MB 3½-inch hard disk with controller ($660). It was fast and very quiet, but after installing the *Windows 3.0* multitasking environment, I realized that the drive wouldn't be large enough for the needs of a software reviewer. I turned it in for Conner's 212MB SCSI drive ($900), which I paired with a $249 Future Domain SCSI hard disk/floppy controller to create a fast subsystem. Using DOS 4.01, I was able to configure it with three logical drives: C is 34.5MB; D and E are each 87.3MB.

For my keyboard, I selected Datadesk's new customizable Switchboard ($175). I prefer to have the <Ctrl> key set just to the left of the A rather than below the <Shift> key as it is on IBM's 101-key keyboard. The Switchboard also allows for a trackball, a calculator, and various other options. What's more, the same keyboard can be used with both a Mac and a PC.

Taking into account the components I recycled from my old PC, the total street value of my system is just over $3300 with an 80MB drive and just under $3800 with the 212MB. It would have cost me twice as much for a comparable machine from IBM or Compaq, and that system still wouldn't have given me the same combination of components without wasting some stock items. I could have saved a few hundred dollars more on a no-name clone, but then I wouldn't have gotten a complete selection of top-of-the-line components.

If I had to do it over again, though, I don't think I'd build my own PC. It was too much work. I have since discovered that there are any number of "system integrators"—clone builders—in San Francisco (and most big cities) that would have been happy to deliver almost the same system within a couple of hundred dollars of my cost. Even mail-order kingpin Dell Computer would have configured a system especially for me. Of course, Dell's would have cost around $5000 (with an 80MB Conner drive), but it also would have come with a 32K memory cache and a one-year, on-site service contract. I also could have bought my system from Domino Computer, a San Francisco Bay Area clone builder, for around $2800 (with an 80MB Maxtor)—less than I paid for my parts. I would have had to sacrifice my Conner drive, but I would have gotten a one-year walk-in warranty.

And service can be an important issue if you're thinking about a new PC. If you call around, you should be able to find a computer dealer or consultant or even a reputable mail-order house willing to build from scratch or to customize a clone to your specifications. You'll get not only helpful suggestions on how best to configure your system but also a warranty in the bargain.

Don't be afraid to ask. In today's competitive marketplace, plenty of computer sellers are willing to let you "have it your way." ●

Lawrence J. Magid is a nationally syndicated computer columnist.

ANTHONY RUSSO

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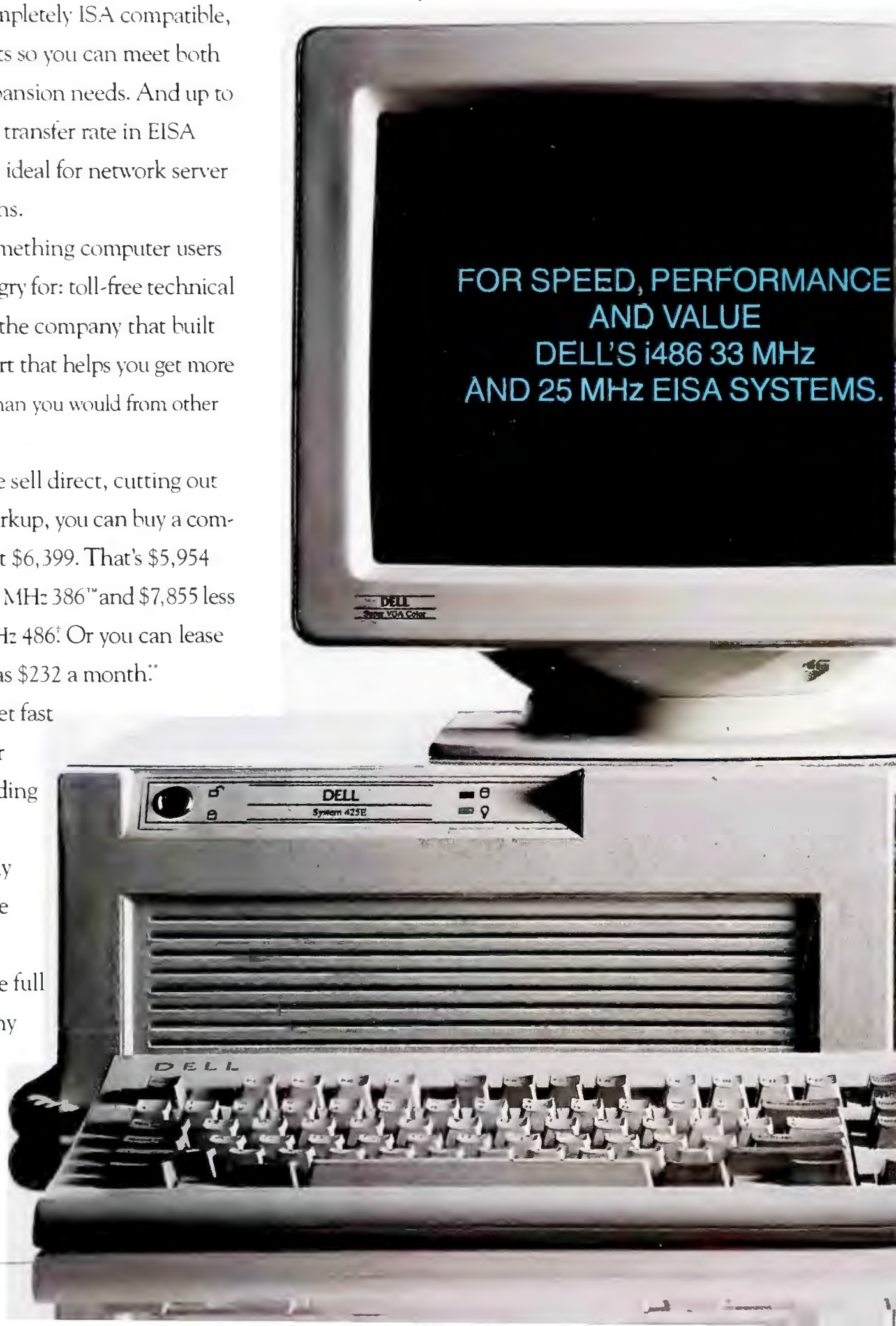

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This full-featured, battery-powered 386SX laptop costs less than most 286 laptops

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz
- Minimum 1 MB of RAM, optional 2 MB of RAM* expandable to 8 MB (on the system board using 1 MB SIMMs).
- LIM 4.0 support for memory over 1 MB.
- Adjustable and detachable 640 x 480 VGA Liquid Crystal Display.
- One industry standard half-size 8-bit expansion slot.
- Socket for 16 MHz Intel 80387SX math coprocessor.
- 3.5" 1.44 MB diskette drive.
- 83-key keyboard with embedded numeric keypad and separate cursor control keys.
- 1 parallel, 1 serial, and external VGA monitor port.
- Connector for 101-key keyboard or numeric keypad.
- Two removable and rechargeable NiCad battery packs utilizing Dell's "Continuous Power Battery System" (patent pending).
- AC Adapter.
- 12-month On-Site Service Contract provided by Xerox.∴

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∴Xerox Extended Service Plan pricing starts at $303.

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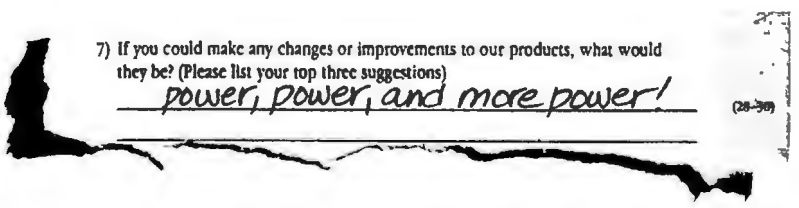

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