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# PC WORLD

November 1987 \$2.95

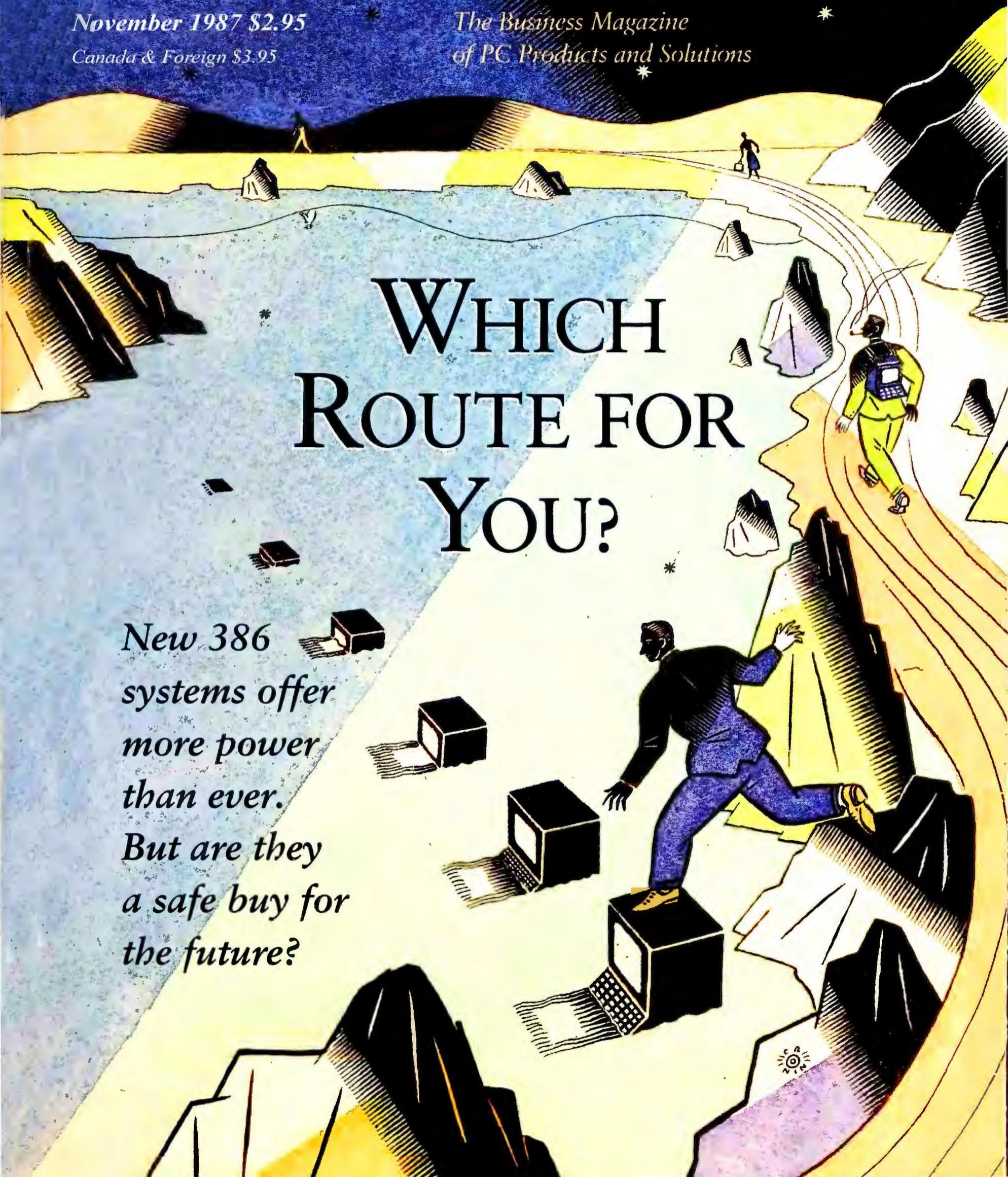
Canada & Foreign \$3.95

The Business Magazine  
of PC Products and Solutions

## WHICH ROUTE FOR YOU?

*New 386  
systems offer  
more power  
than ever.*

*But are they  
a safe buy for  
the future?*

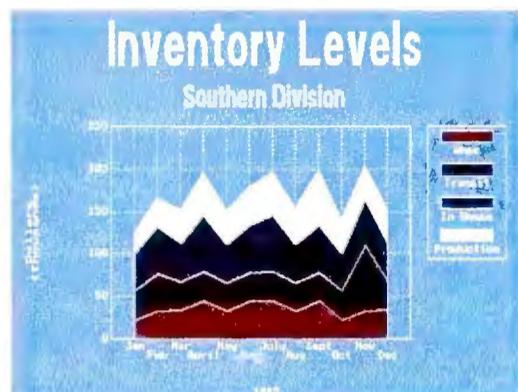


# With Quattro, S

Quattro™, our new generation professional spreadsheet proves there are better and faster ways to do everything. To do graphics. To recalculate. To do macros. To save and retrieve. To search, sort, load. To do anything and everything that state-of-the-art spreadsheets should do.

## Quattro gives you presentation-quality graphics

Quattro brings new highs in quality graphics to your spreadsheet. It also brings new variety and diversity to the kinds of graphs and graphics you can produce from your spreadsheet, and you can produce hard copy of your graphics—with either printer or plotter—*directly* from the spreadsheet without leaving the spreadsheet. All you do is hit "Print." Quattro makes it easy to get hard copy—and you don't have to buy a separate graphics program.



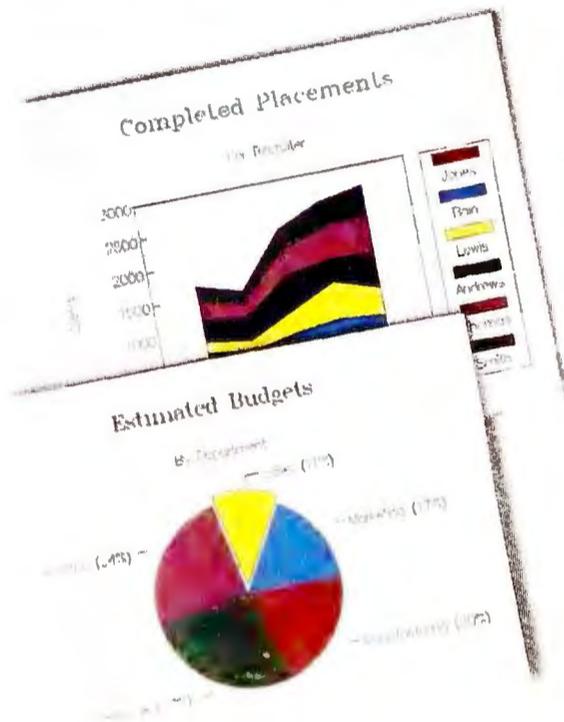
"What we show you"

## Quattro recalculates a lot faster than you-know-who

The smartest and fastest way to recalculate a spreadsheet is to do what Quattro does, something called "intelligent recalc," which in English means you only re-count the numbers that count.

In a spreadsheet, not all numbers are born equal, and changing one number doesn't always change *everything* so Quattro recalculates just the formulas that matter, not all the formulas it knows. (You wouldn't reshoot a whole movie just because you changed one scene,

but unfortunately, that's the way 1-2-3 does it—and that's why it takes so long.)



## Naturally, Quattro: has PostScript support

Quattro is state of the art, so of course it supports Postscript™—now the industry standard. Quattro merges desktop publishing into spreadsheets, lets you use tomorrow's technology today, and gives you access to all the latest laser printers and the professional results they provide—which make both you and your work look good.

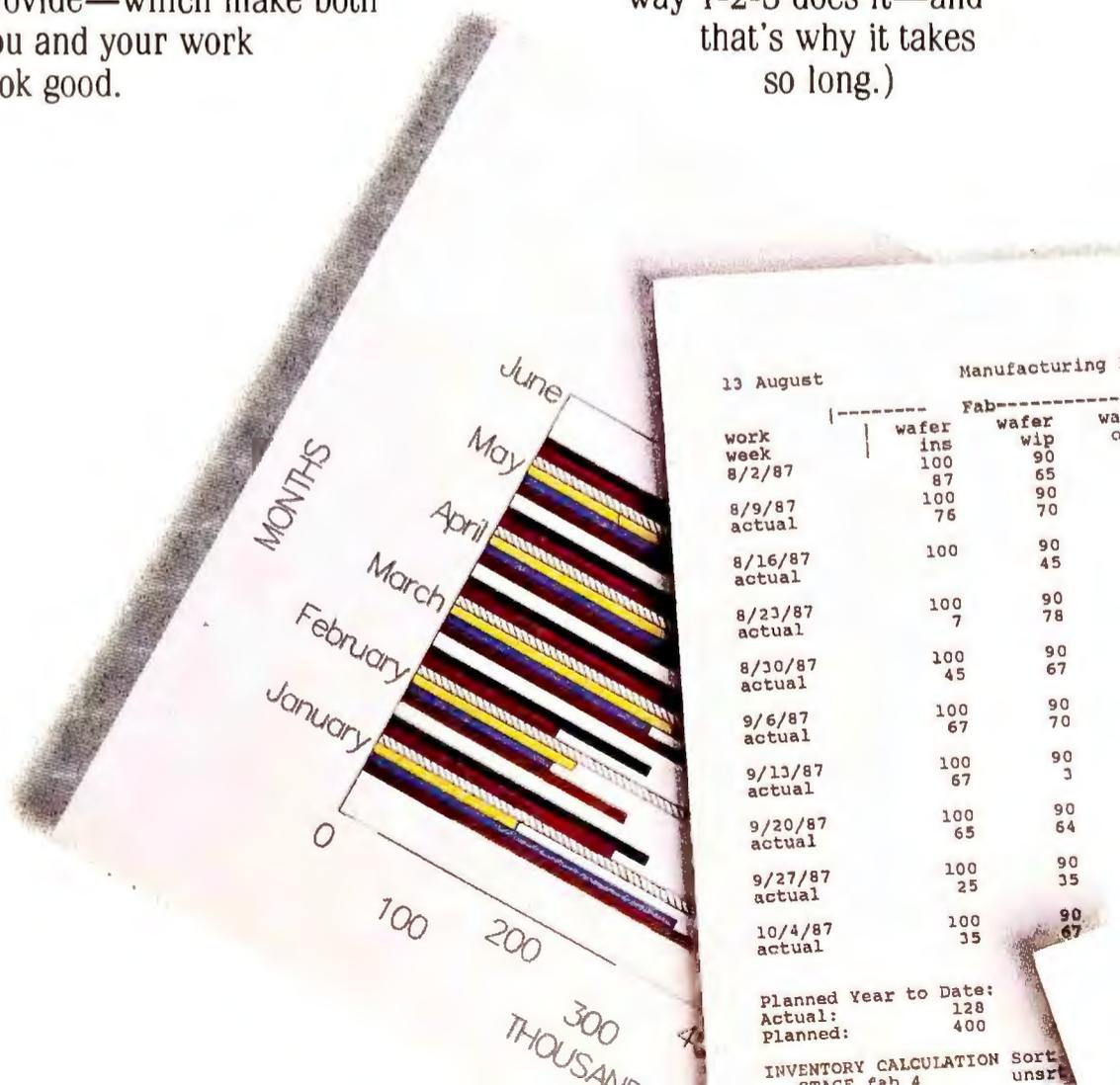
## Technical superiority means product superiority

Lotus Development, makers of 1-2-3,\* is bigger by factors than Borland. Bigger, not better. Technical superiority is a Borland trademark, and Quattro is fresh proof that it produces a better product.

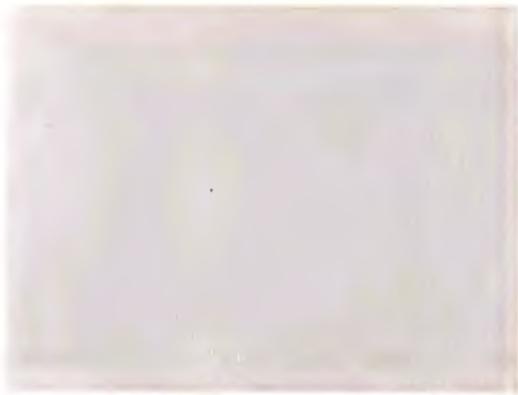
Once you've seen or used Quattro, you'll be convinced, because Quattro's faster than 1-2-3, has much better *quality* graphics and a far greater *variety* of graphics than 1-2-3.

For the IBM PS/2™ and the IBM® and Compaq® families of personal computers and all 100% compatibles

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# Seeing is Believing



"What they show you"

## Quattro demystifies Macros and makes your work go faster

Using macros—electronic shortcuts—is easy with Quattro. Quattro offers a complete macro debugging environment and puts you in control as you “single-step” or fast-forward through your macros. Quattro’s “Macro Learn Mode” lets you record macros as you work—which is something 1-2-3 users have been waiting for—and the wait is over.

## You can't lose with Quattro

If you forget to close and save your spreadsheet—or a power outage shuts down your computer—all is not lost. Quattro automatically keeps track of every change you've made to the spreadsheet during the session, so if disaster strikes, it misses.

## Quattro lets you build your own menus

Quattro includes a Menu Builder that lets you customize menus. Coupled with macros, this application development feature allows you to create dedicated applications quickly and easily.

## You know how to use Quattro

You can tell Quattro to respond to 1-2-3 commands. You don't have to learn a whole new

program. Quattro works directly with all 1-2-3 file formats. No importing/exporting or macro translation is required.

Quattro can also directly load and save ASCII, Paradox,\* and dBASE,\* files.

Compatible with 1-2-3? Yes.

Faster than 1-2-3? Yes.

Technically superior to 1-2-3? Yes.

Half the price of 1-2-3? Yes!

“ A formidable competitor to Lotus.

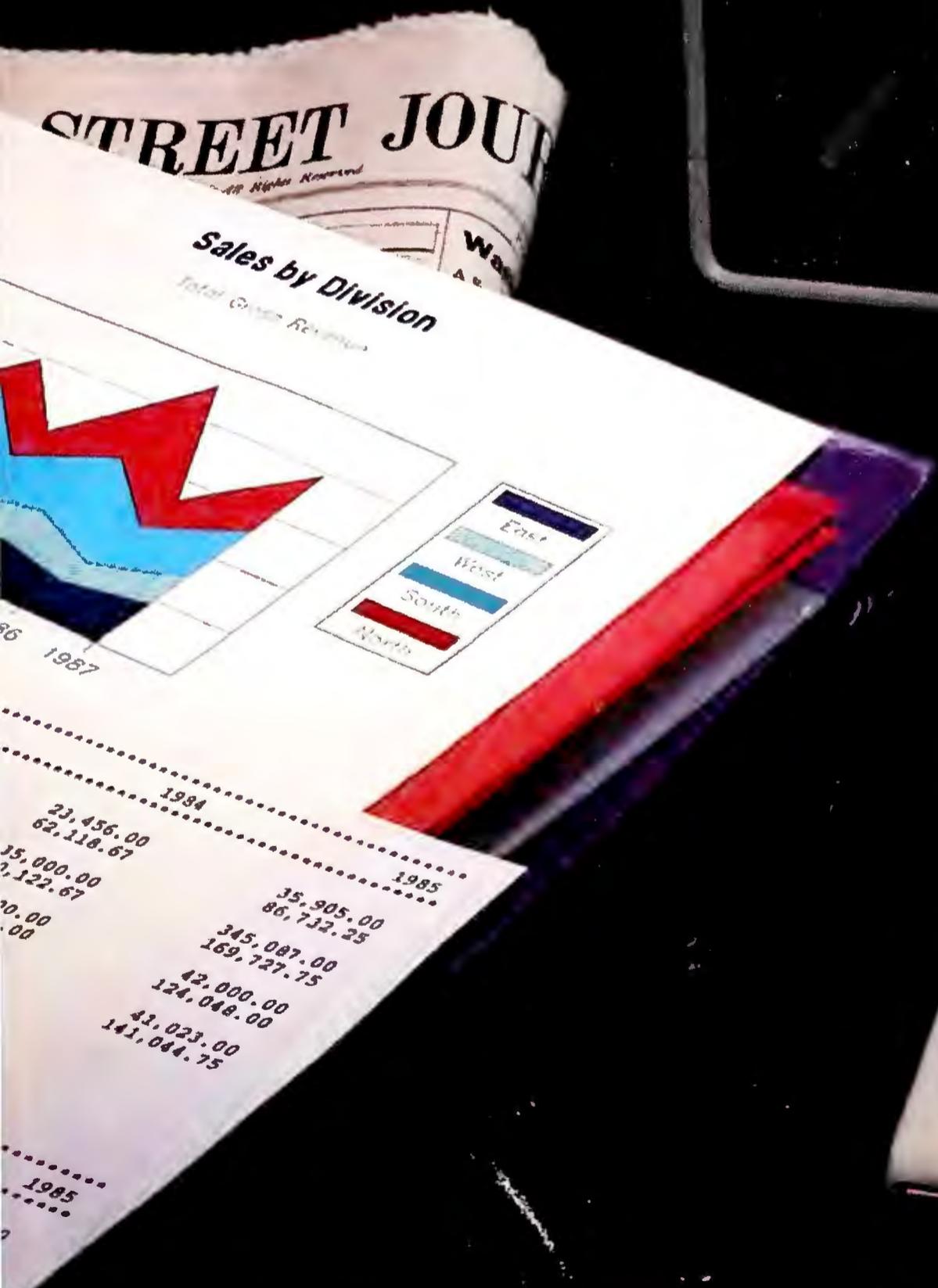
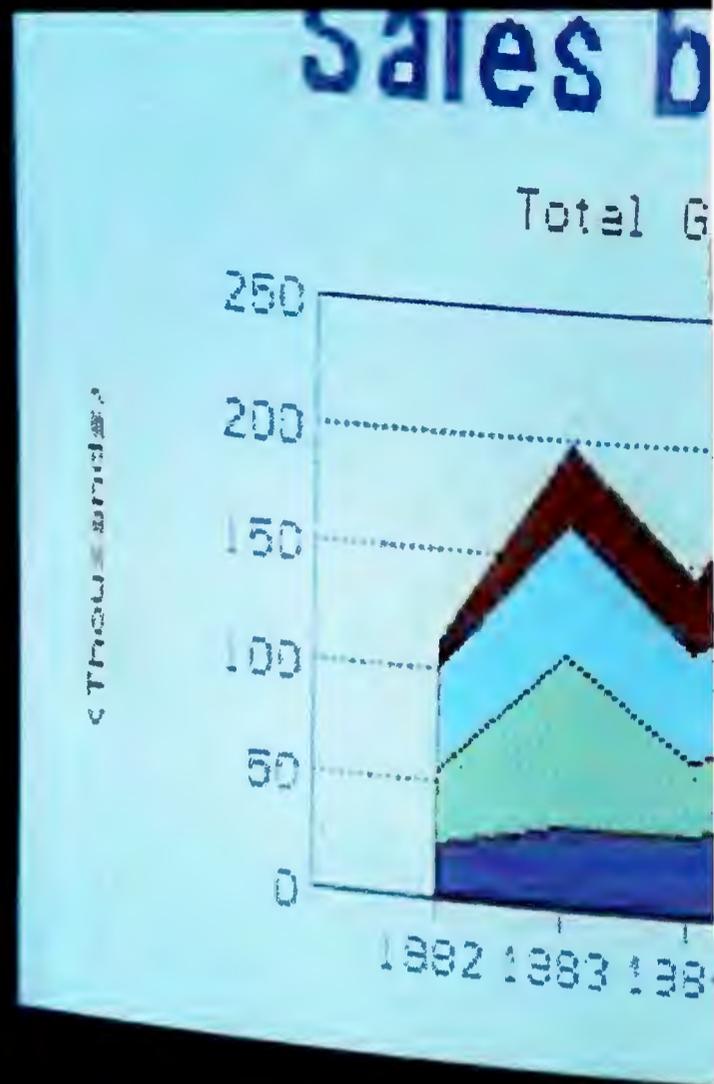
John C. Dvorak

This is the first time a major software company has taken on Lotus on its own terms—namely speed.

Stewart Alsop ”

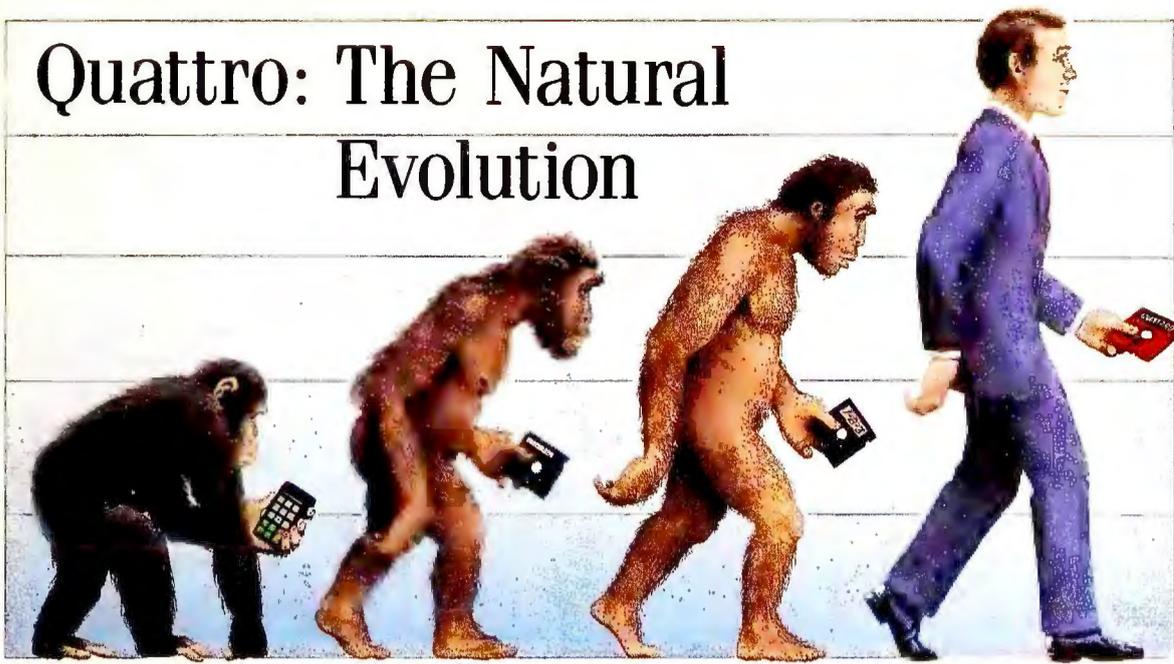


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Quattro: The Professional Spreadsheet

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Quattro is so advanced it's easy to use, and it's less than

half the price of 1-2-3. It's compatible with all your existing 1-2-3 files—but it makes everything in them look better, print better, and makes your work go faster.

## Quattro: The New Generation Spreadsheet

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SPEED	ReCalc Cash Flow Model (5K cells)	.27	2.90 sec.
	Delete Row 15K cells (Recalc Time)	.76 sec.	2.38 sec.
	Load File (15K cells)	15.9 sec.	19.8 sec.
	Page Down (A1 to A1000)	12.2 sec.	17.4 sec.
GRAPHICS	Presentation-quality Graphics	YES	NO
	Graph Types	10	6
	Integrated Graph Printing	YES	NO
	Full Graph Customization	YES	NO
	On-Screen Font Styles	11	1
	PostScript Support	YES	NO
VERSATILITY	User-modifiable Menus	YES	NO
	Menu Shortcuts	YES	NO
	Pull-down menus	YES	NO
	Point and Press Editing	YES	NO
	Automatic Installation	YES	NO
POWER	Macro Learn Mode	YES	NO
	Maximum Number of Macros	Unlimited	27
	Single Step Macro Debugging Environment	YES	NO
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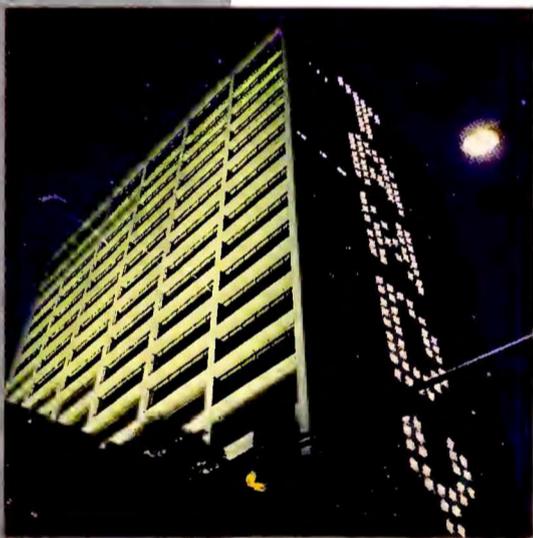
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*The Business Magazine of PC Products and Solutions*  
November 1987



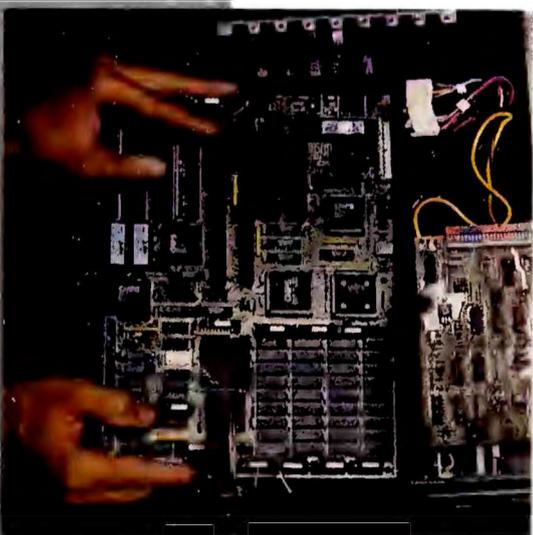
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*Cover illustration by Brian Cronin*

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Volume 5, Number 11

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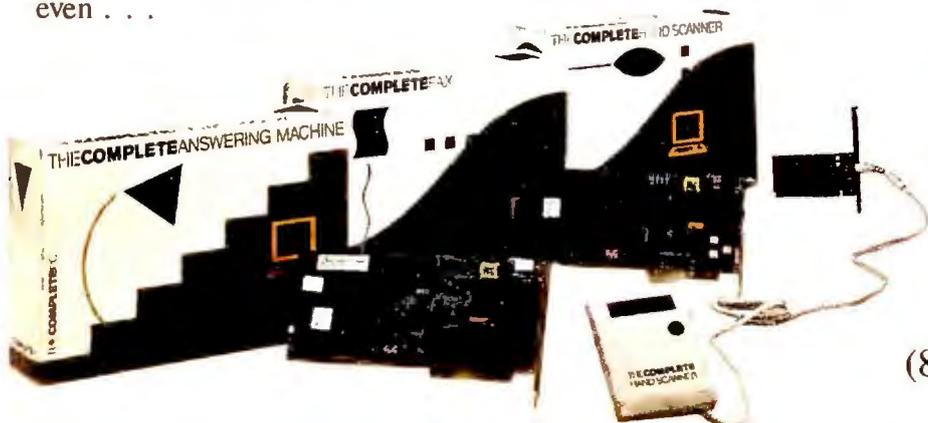
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or compatible computer without DESQview"—InfoWorld, Michael Miller.

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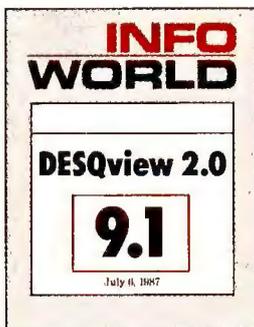
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#### SYSTEM REQUIREMENTS

IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286 or 80386 processors) with monochrome or color display; IBM Personal System/2 • Memory: 640K recommended; for DESQview itself 0-145K • Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage • Disk: Two diskette drives or one diskette drive and a hard disk • Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA), IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA) • Mouse (Optional): Mouse Systems, Microsoft and compatibles • Modem for Auto-Dialer (Optional): Hayes or Compatible • Operating System: PC-DOS 2.0-3.3; MS-DOS2.0-3.2 • Software: Most PC-DOS and MS-DOS application programs; programs specific to TopView 1.1, GEM 1.1 and Microsoft Windows 1.03 • Media: DESQview 2.0 is available on either 5¼" or 3½" floppy diskettes



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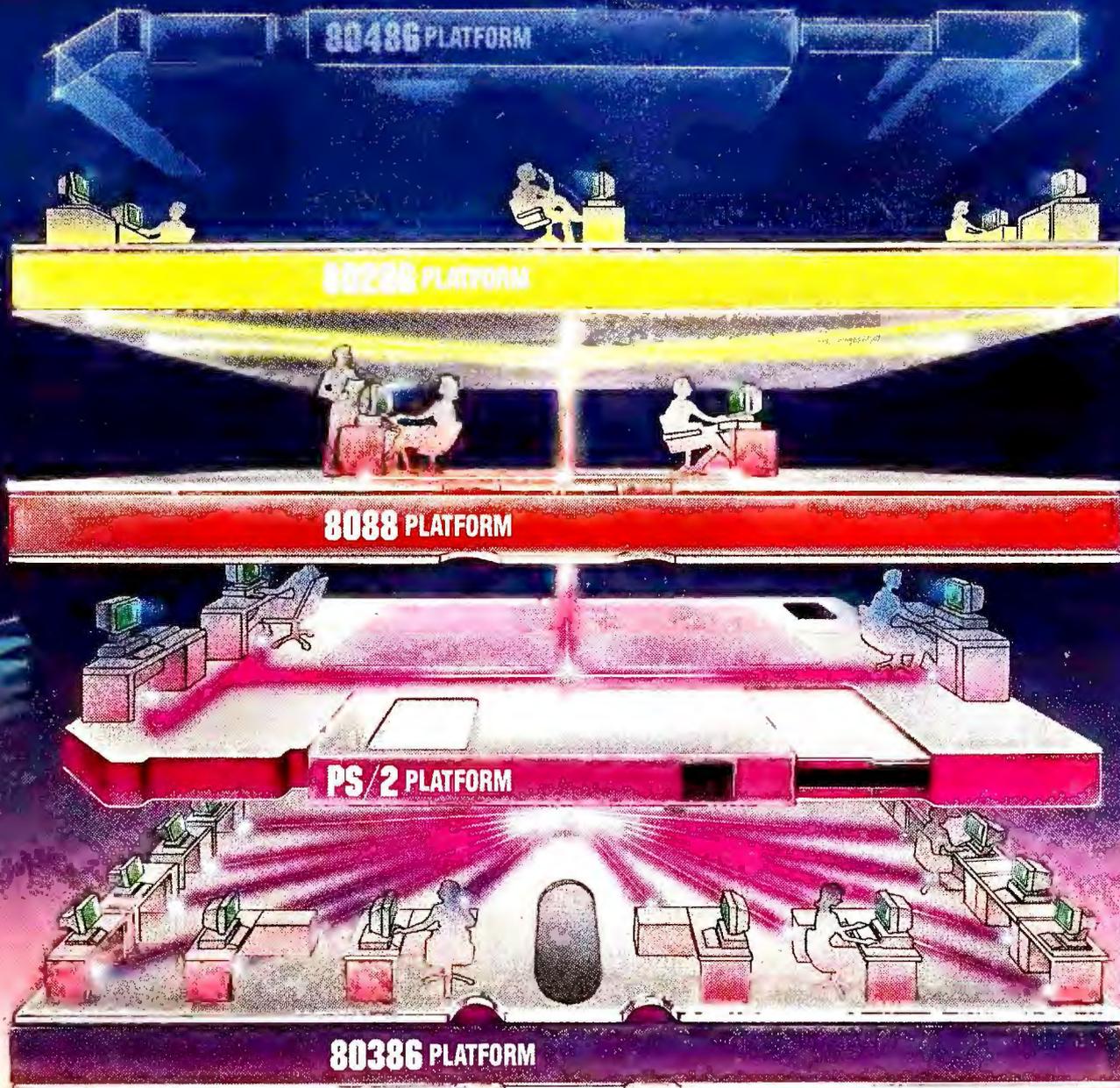
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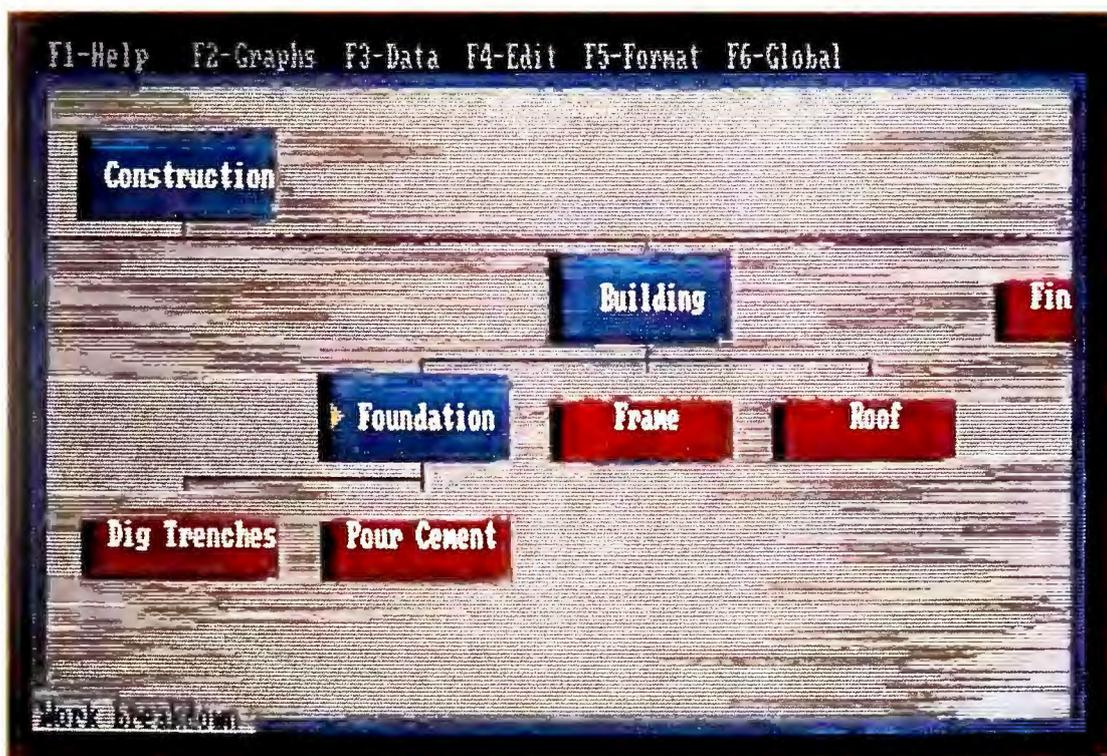


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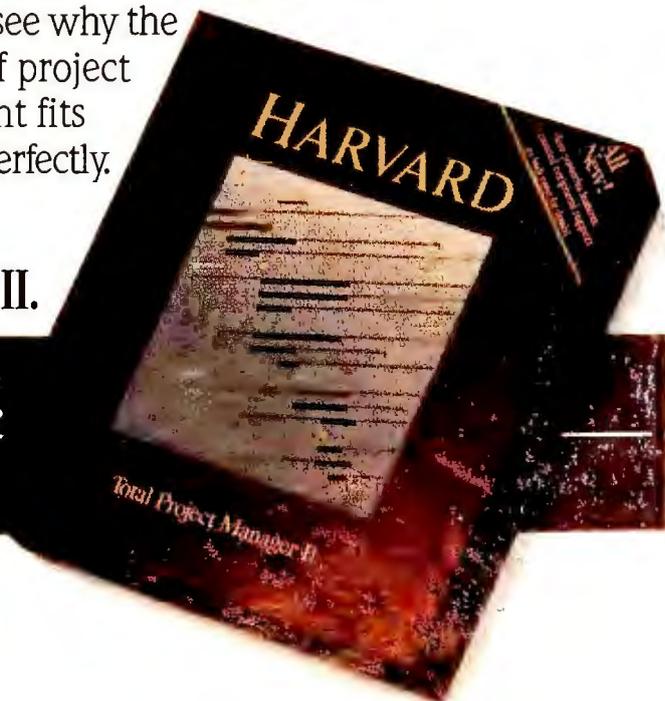
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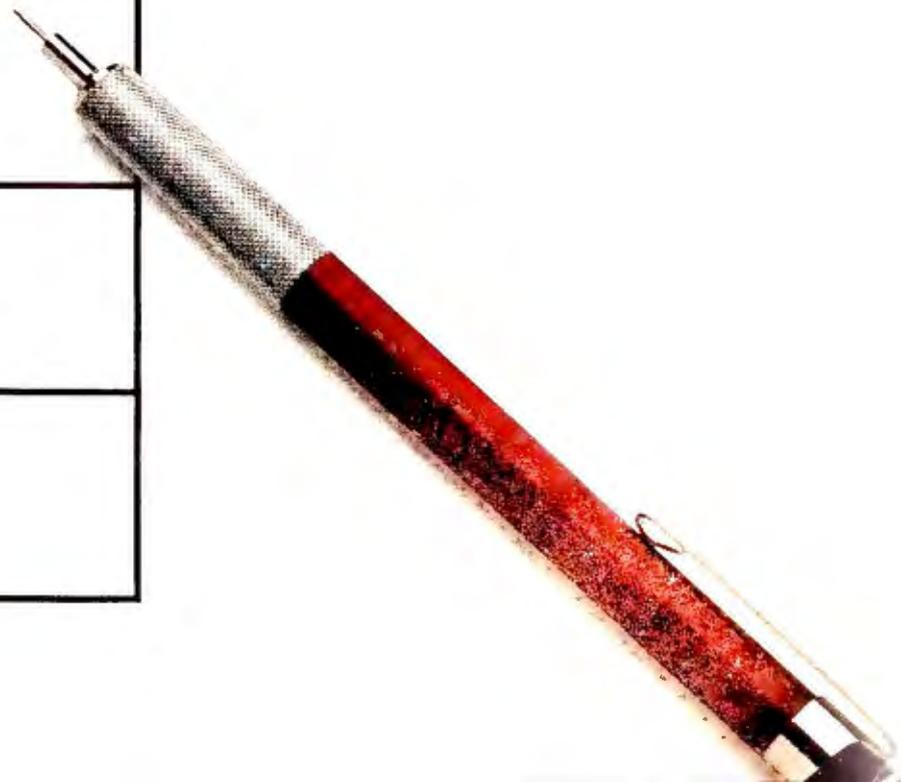


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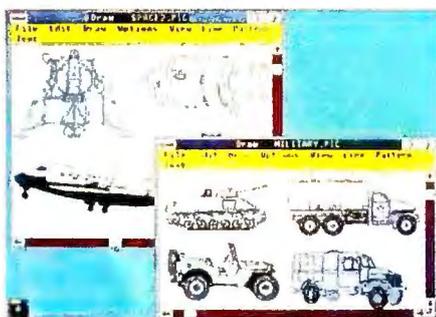


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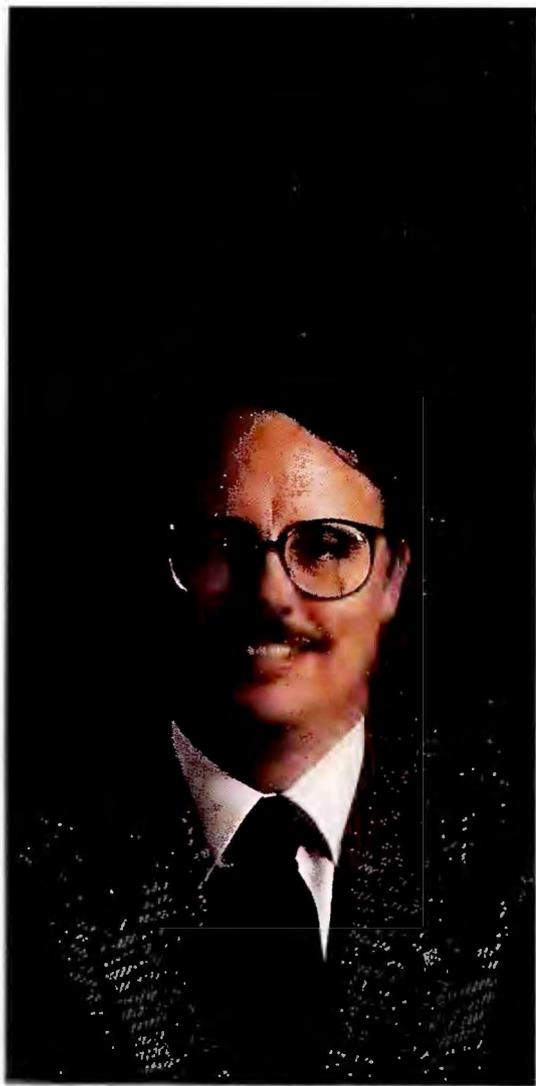
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David Bunnell

Before the Hypersofts and the Hyper-1-2-3s begin coming down the chute, let's pause and take a look at what's really going on with hypermedia. Are we any closer to having computers that think the way we do?

# The Challenge of Hypermedia

The whole notion of hypermedia has been on my mind for a long time. I began to really think about it seriously, though, at Macworld Expo in Boston this past summer. That's when Apple introduced *HyperCard*, the new software created by Apple Fellow Bill Atkinson and now included with every Macintosh. I was amazed at people's reactions.

*HyperCard* was greeted variously as "the greatest thing since Mom and apple pie and the Mac," "the most important development since the Macintosh was invented," and "the next step in personal computing." So I feel we owe it to ourselves to give the whole concept of hypermedia its semi-annual checkup—a sort of hyperexamination.

Several PC wizards have created different forms of hypermedia over the years. The word *hypertext* was first coined by visionary Ted Nelson back in 1965, when he was searching for a term to describe nonsequential writing on screen. Mouse inventor Doug Engelbart was also a prophet of the hypertext idea.

A couple of years ago Alan Boyd, president of OWL Interna-

tional in Bellevue, Washington, actually developed a working hypertext product called *Guide*. We used *Guide* at PCW Communications to create the world's first hypertext magazine when we did an issue of *PC World* on CD ROM early this year.

Another hypertext product in this hypermedia family was created for the IBM PC and the Atari ST around that time. It's called *Zoomracks* and was produced by Paul Heckel's company, Quickview Systems, in Palo Alto, California.

But none of these efforts seemed to get very far. Now Apple comes along hyping *HyperCard* for every Mac, and suddenly it's the greatest thing that ever happened to personal computers. People say it out-VisiCalcs *VisiCalc*.

As Ted Nelson likes to say, "The reaction to any new idea is first, 'It isn't true'; then 'It isn't new'; then 'We knew it all the time.'"

(continues)

So what about *HyperCard*? In Apple president and CEO John Sculley's words, it's a "new way to organize information." It's not a traditional data base with a hierarchical structure. Rather, it allows you to organize text, pictures, and sound by association—by context. The same way we organize information in our minds.

*It seemed wonderful—just what I always wanted. So why was I also nagged by the thought that HyperCard was for the birds?*

When I first saw it, it seemed wonderful. Just what I always wanted. So why was I also nagged by the thought that *HyperCard* was for the birds?

It took a conversation with an old friend of mine, Nelson Winkles, to figure it out. Nelson and I go back to *Personal Computing* magazine, where I was the publisher and he was the editor. He's been a brilliant and iconoclastic commentator on technology for more than 20 years. He pinpointed the fundamental problem with *HyperCard* by telling me a story that illustrates it perfectly.

Back in 1963, he worked on a project to create a navigating system for satellites. NASA needed a series of landmarks that would be easy for a crew to spot, such as isolated islands, volcanoes, or lakes. Nelson and his project team were trying to find information about an island called Islote Pe-

lado, off the coast of Peru. They had found it on aeronautical charts and needed to know its characteristics.

They needed to find out, for example, if the size of the island changed a lot with the tides, what color the island was, and whether the vegetation changed. Was there a different spectral output in dif-

ferent seasons, and what was the weather like? Nelson couldn't find out anything. Even the Peruvian consulate couldn't help.

They finally went to the Department of Systematic Biology at Stanford. The department had just been moved, and its Books were all piled up at random, along with lots of stuffed animals. It was an exotic situation, but all of the usual library searching and referencing systems were suspended. Nelson and his team were explaining their dilemma when the librarian said, "Here, try this."

"It was a book called *Birds of the Americas*," Nelson said with a smile. "Somehow it had clicked in her mind that we might be able to find something in that book."

So they rummaged through it and found a passage about Islote Pelado. The author had landed there in 1924, and his crew had had quite a time because the island had cliffs all around it, and there was no beach. Well, that

told Nelson the island didn't change much in size.

The crew had finally climbed onto the chalky-white land, but they were disappointed because there was only about one load of guano from it. It was hardly worth the effort. So Nelson learned the island was guano-colored and that there wasn't vegetation.

It turned out everything they needed to know could be figured out from that book. But the interesting thing is that the author thought the book was about birds. The publisher thought it was about birds. The person who did the index thought it was about birds. Nobody in the world thought it was about islands except Nelson and his team. And the only way *they* happened to make use of it was that a librarian had leafed through the book one day and then thought to show it to them.

The moral of Nelson's story?

If the person who designs the index thinks the book is about birds, you'll never find out it's about islands. Unless you run into the right librarian.

And that is precisely *HyperCard*'s Achilles' heel. As Nelson concluded, "The basic problem with *HyperCard* is that the classification is determined by the person who does the classifying in the first place—someone who doesn't know how your mind works. There's no general solution

*(continues)*

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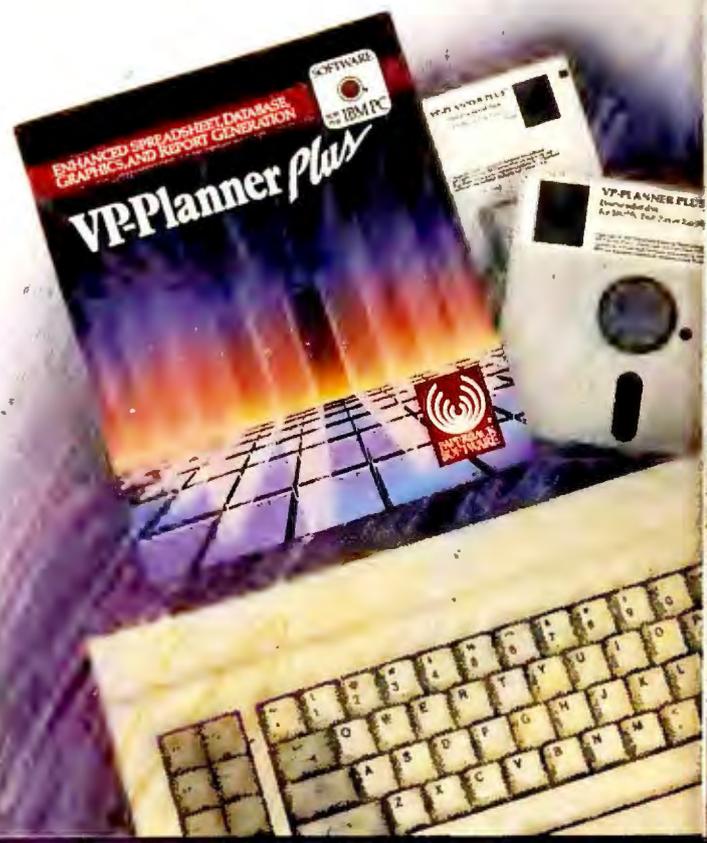
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**Circle 140 on reader service card**



# Small news from IBM.

**Introducing a new low-priced, high-powered IBM Personal System/2.**

It's called the Model 25, for short, and it comes with the power, graphics and quality that have made the IBM® Personal System/2™ family the acknowledged new leader in personal computing. What's more, it comes in a size that fits virtually anywhere and at a price that fits most any budget.

**It's at home wherever you work.**

Whether you work in an office, bring office work home or run a business from home, the Model 25 can help you keep up with correspondence, prepare proposals and balance budgets. It can also help you track inventory

and handle your business and personal accounting as well.



The system works with the other members of the Personal System/2 family. And it was designed to run lots of the popular programs that are already available for IBM Personal Computers.\*

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IBM Personal System/2	Model 25
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David Bunnell

for this problem, just steps along the way until this stuff is truly content-addressable by anyone."

I do think *HyperCard* is a good step forward because it legitimizes the whole concept of hypermedia. I just don't think it's the be-all, end-all package—at least not yet. It's only one manifestation of hypermedia. I think, for example, that *Guide* should be a tool within *HyperCard*. So should *Zoomracks*. Both *Guide* and *Zoomracks* can be easier to use when you're working with a huge amount of data. With *HyperCard*, you're restricted to the size of the screen, or "card," so you have to divide the information into different cards. *Zoomracks* has card-scrolling capability that lengthens your view to 252 lines.

Furthermore, the reference marks, or "buttons," in *Guide* are related to the context of the information itself. In *HyperCard* they relate to the position of the information. So if you move a paragraph in *Guide*, the button moves with the paragraph. That's how it should be. But in *HyperCard*, the buttons aren't linked to the text—they're linked to a position on the screen. If you attach a button to a particular word and then go back and edit that line, the button ends up over a different word. That's wrong. The button should be linked to a concept.

(continues)

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You've announced your intention to offer SQL. I really don't feel that you're going to offer SQL for OS/2 and the Personal System/2. I have every confidence your SQL will be full-featured and I hope you will get it done.

## Dear IBM,

Old Orchard Road  
Armonk, NY 10504

Attached is a blank check. I keep reading that you've already announced that you're going to announce SQL for OS/2 and the Personal System/2.

When you do, fill in the check amount. Hope to hear from you sometime in the next couple years.

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On the other hand, *HyperCard* excites me because it has real potential to become a bona fide hypermedia vehicle. In my opinion, the most important aspect of *HyperCard* is that it could be the link between PCs and video.

It could be the much-promised, long-awaited, and passionately predicted product that will finally make the personal computer a genuine communication tool, not just a processor. It could be the window on the worlds of text, video, and sound.

Of course, there will be flak. Just as desktop publishing ushered in a wave of ungainly graphics design, *HyperCard* will probably unleash wild and reckless bike gangs of programmers who will crisscross the hyperhighways of personal computing, leaving the potholes and debris of incompatibility in their wake.

But I have faith that we will ultimately find our way. I am confident that one day, for example, we will have compatible hypermedia that will run on the IBM PC or the Macintosh or the Apple II or on any machine of your choice. We all have to push for compatibility because it will make the whole personal computer proposition that much more powerful.

That's not too much to expect. After all, we already live in a hypermedia world. ●



*These unretouched print samples show the superior print quality of QMS-PS 810 over printers using first-generation print engines.*



## Introducing the PostScript laser printer that blacks out at high speeds.

The new QMS-PS<sup>®</sup> 810 can compose and print the most complex pages in record times, with richer, more saturated blacks than ever before. All with the desktop publishing power of Adobe PostScript<sup>®</sup>, and the superior print know-how of QMS, an industry leader.

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Along with PostScript, the HP LaserJet<sup>+</sup><sup>™</sup>, Diablo<sup>®</sup> 630 and HP-GL<sup>™</sup> printer emulations are added for your non-PostScript software.

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# e wrote the catalog on laser printing.

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#### Where to find our guide in the field

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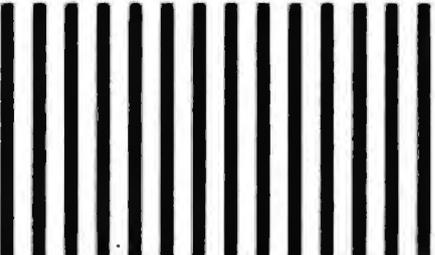


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# Letters

## Reactions and responses from the PC World community

### WordStar Bait and Switch?

In "MicroPro's Message" [*Letters, PCW, August 1987*], you responded to a reader's complaint about how difficult it is for unregistered *WordStar* users with valid registration numbers to obtain the upgrade to *WordStar 4.0*. I called the update number and the president's phone number you published and was told by a MicroPro representative that the quote attributed to company president Leon Williams was totally unauthorized. I was told that I must buy an upgrade at the full list price at a computer store or from a mail-order house.

*Jack A. Bick  
Madera, California*

*We rechecked MicroPro's WordStar 4.0 update policy both officially and anonymously and confirmed the information published in PC World. According to MicroPro, you don't have to be a registered owner to purchase the 4.0 upgrade as long as you have a valid registration number. The cost is \$89 plus \$5 for shipping and handling. We stand by our response. —Ed.*

### MicroPro Responds

*PC World* accurately stated the *WordStar 4.0* update process. Leon Williams devised the policy; I definitely agree with it.

Whether you're a registered *WordStar* owner or not, when you call MicroPro for the 4.0 update, the customer support representatives ask you for a serial number. They check to see that the number is valid and register you for the update on the spot. Some people may not want to be registered, but as long as the serial number is valid, the purchase price is \$89.

I honestly don't know how well the policy is being implemented, but Mr. Williams gave me the same information that was reported in *PC World*. That's the most accurate and most honest thing I can say.

*Seymour Rubenstein  
Board Member and Founder  
MicroPro Int'l  
San Rafael, California*

### Far From Perfect

We appreciate *PC World's* review of *PlanPerfect 3.0* ["Perfection According to Plan?" *PCW, July 1987*], and though we feel that your overall assessment was fair, several statements need clarification.

The program reviewed was actually *MathPlan 3.0*—not *PlanPerfect 3.0*. We mistakenly indicated to *PC World* editors that no changes were made between *PlanPerfect* and *MathPlan*, when in fact both calculation and display speeds in *PlanPerfect* are significantly greater than in *MathPlan*.

The review tested *MathPlan* with a 152K worksheet and stated that the "irritating virtual memory scheme" slowed the spreadsheet down to a crawl. But *MathPlan 3.0* will not access virtual files until much larger worksheets are used. Also, we feel that criticisms of the *WordPerfect*-like interface were oversimplifications based on biased judgment.

*Kevan R. Kjar  
Product Manager  
WordPerfect Corporation  
Orem, Utah*

*(continues)*

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## STANFORD 286-12/1

6/12 MHz

- Compact size AT main board
- 80286-10 CPU, 6/12 MHz Switchable
- Award BIOS, Norton SI:13.3
- 640K, 100 Nano Seconds, 0 wait state DRAM, expandable to 1024KB DRAM on board
- Hard & floppy controller card
- 1.2 MB floppy drive
- Clock/calendar w/battery backup
- Hardware Reset and Turbo switches
- Socket for 80287 math co-processor
- 180 watt power supply
- Enhanced keyboard (101 keys)
- Complete documentation
- High quality, heavy duty packaging

**\$1145<sup>00</sup>**

## STANFORD 286-12/2

8/10 MHz

0 Wait State 12 MHz Thruput

Same configuration as in System 286-12/1 above except,

- 640K (120 N/S) DRAM on board
- 8/10 MHz switchable clock
- Phoenix BIOS option

**\$1119<sup>00</sup>**

## STANFORD 286-10/1

6/10 MHz 0 Wait State

Same configuration as in System 286-12/1 except,

- 6/10 MHz clock w/0 wait state

**\$1145<sup>00</sup>**

## STANFORD 286-10/2

6/10 MHz

Same configuration as in System 286-12/1 except,

- Regular size AT main board
- 640K (120 N/S) DRAM on board w/6/10 MHz clock
- Phoenix BIOS

**\$959<sup>00</sup>**

## STANFORD 386-16/1

16 MHz 0 Wait State

- Intel 32 Bit 80386 CPU (16 MHz), 6/16 MHz software (keyboard) switchable clock
- Norton SI: 18.7
- 512K interleaved 32 bit RAM on board
- RAM can be expanded to 4 MB of 32 bit high speed interleaved memory
- 2-32 bit, 4-16 bit & 2-8 bit expansion slots
- Supports 80287 math co-processor
- Phoenix or Award BIOS
- 1.2 MB floppy drive
- Enhanced keyboard (101 keys)
- Complete documentation included
- High quality, heavy duty packaging

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## STANFORD 386-16/2

Same configuration as in System 386-16/1 above, plus includes socket for 80387 math co-processor.

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## STANFORD 4.77/10

- 4.77/10 MHz, software switchable
- Built-in clock/calendar
- 640K DRAM on board
- Socket for 8087 math co-processor
- Floppy drive controller
- 360K floppy drive
- AT/XT style keyboard
- AT Jr. case, XT size with AT features

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## STANFORD 4.77/8

Same configuration as 4.77/10 MHz XT, except,

- XT slide case

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PC World *specifically requests that products for review be what users will find on retail shelves. We rely on information supplied to us by the manufacturer. We regret any inconvenience this may have caused our readers.* —Ed.

**What's Right About PC-Write**  
I was surprised to find *PC-Write* [From the Software Shelf, PCW, August 1987] characterized as hard to learn. I've given it to several people who have been discouraged by other word processors, and they've all found it to be an excellent program.

Consequently, calling the command lines a drawback is incomprehensible to me. On the contrary, they are part of *PC-Write's* appeal. For the program to reformat a document any faster, it would have to read the user's mind.

I've always preferred using a manual to using on-line help, so I can't comment on the criticism of the help screens. But to balance that critique, I would like to point out that the manual is very clear, well organized, and well indexed. The review didn't mention the customizability that makes *PC-Write* adaptable to any need or taste. Also, DCA conversion is now available for the program.

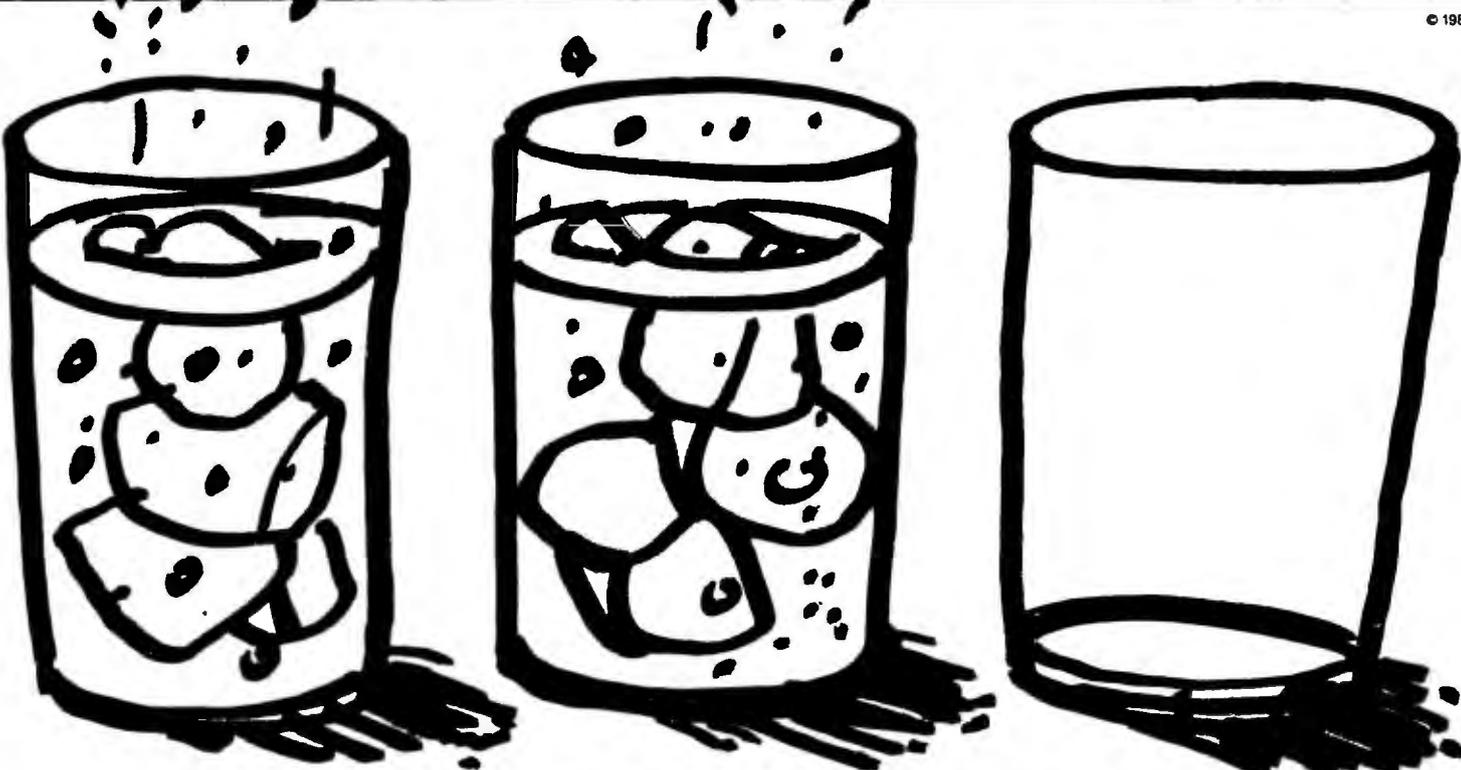
*PC-Write* is an intelligent, elegant word processor. I wouldn't have recognized it from the review.

Mary Thomas  
San Francisco, California

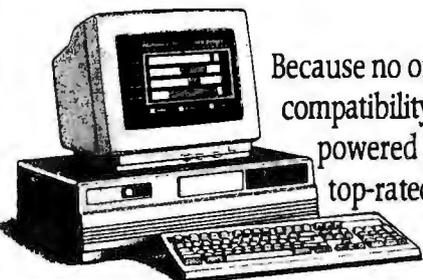
**DisplayWrite or WordPerfect?**  
Most software reviews miss the most important elements of word processing programs. The reviews of *DisplayWrite 4* and *WordPerfect 4.2* ["DisplayWrite Keeps Trying" and "Almost Perfect," PCW, July 1987] illustrate the point.

*WordPerfect*, despite well-deserved praise, does have some glaring deficiencies. For example,

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the program can produce only two header changes per document, which can be quite inconvenient in a lengthy business report that requires changes every few pages. *WordPerfect* won't place page numbers on a specific line in footers when those pages require hard page breaks. Users who want to merge data from data base programs into a *WordPerfect* document will find that when the program converts data base files into its merge configurations, it stores all the records in the default directory. This takes up a tremendous amount of disk space.

On the other hand, *DisplayWrite* is often criticized for its page-oriented document formatting. But you can change headers

for any page of a *DisplayWrite* document and place footers on any line. *DisplayWrite* merges data base information into a document at print time without eating up any disk space. It's true that *DisplayWrite* lacks *WordPerfect's* variety of features, but the program efficiently handles most business output needs.

Perri Natalizio  
Jensen Beach, Florida

#### A Point of Grammar

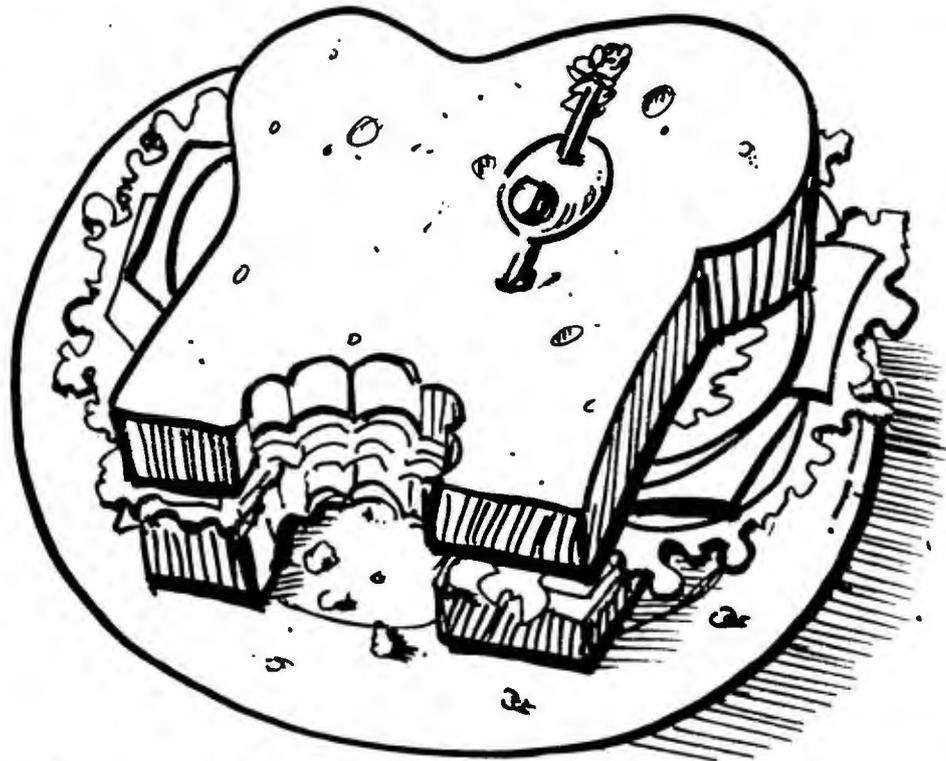
I was saddened to see these two sentences in the *GEM Desktop Publisher* screen for *Product Outlook* [PCW, August 1987]: "The

elements...is a concept..." and "Ms. Hunter...was employed as a principle." To make matters worse, the example appeared to be from an educational document.

This grammatical error illuminates one of the misfortunes the rapid growth of computer technology has brought us: technical expertise in one field that sanctions ignorance in another. The media often gloat over the low literacy rate of the population while professing ignorance of its origin. Well, here's a perfect example of how it comes about.

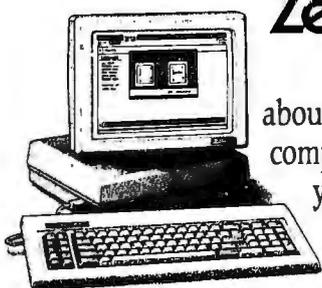
I also deplore your editorial decision to use the word *data* as a singular noun. I surmise that you

(continues)



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# Strokes C

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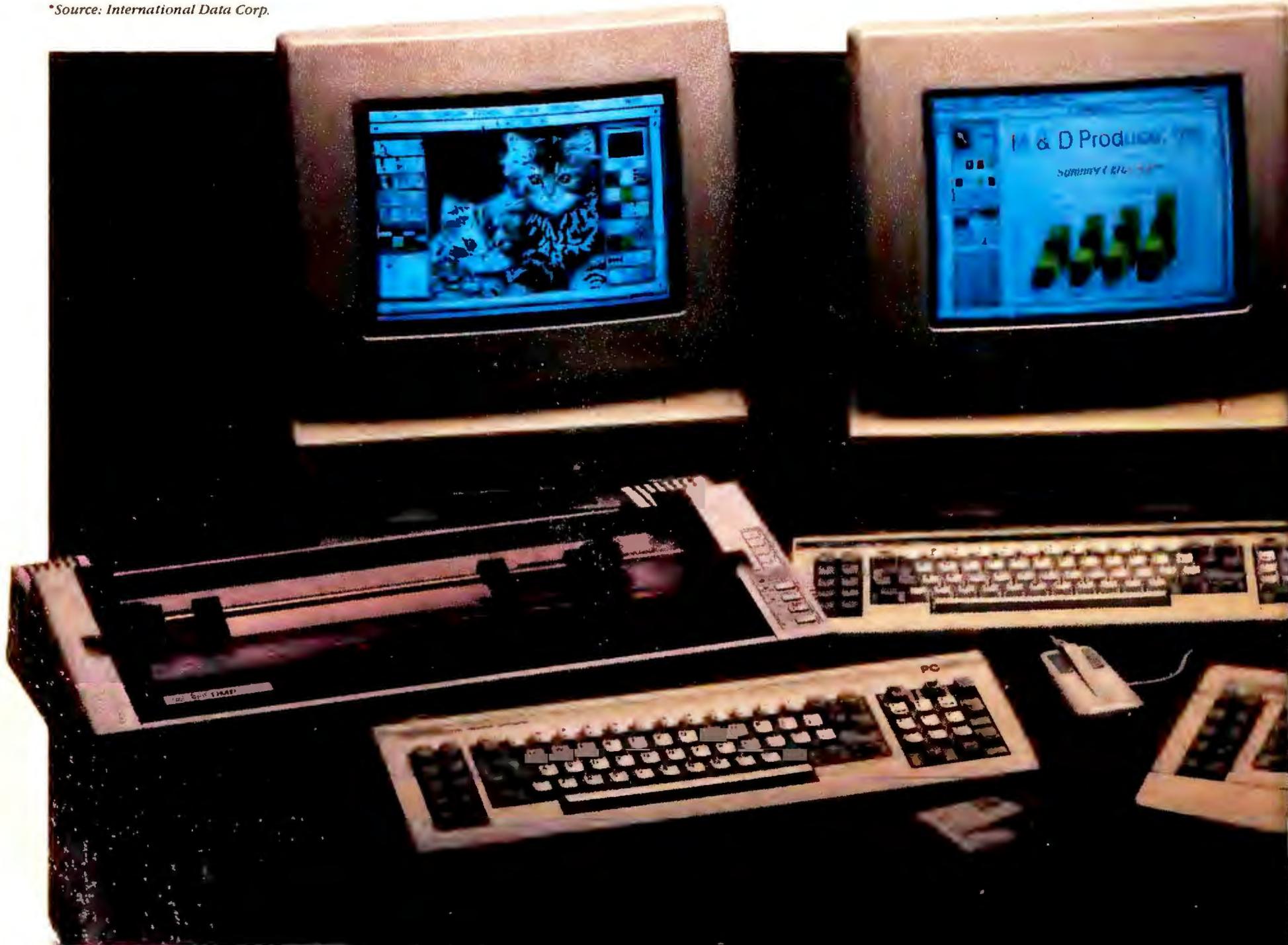
Of course, we realize that's not everything you need to start computing. That's why both computers come with lots of software — MS-DOS V 3.2, GEM® Desktop, GEM® Paint, LOCOMOTIVE Basic and more.

Imagine. Virtually everything you need to start computing within minutes after you open the box. (A smart way to buy a computer, don't you think?)

## Extraordinary printers, too.

AMSTRAD gives you a choice of two brilliantly designed printers — the DMP 3000 and the DMP 4000. Both offer IBM compatibility and a list of standard features other printer manufacturers call options.

\*Source: International Data Corp.



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can buy a complete AMSTRAD computer system, for less than \$700. Add a printer and the price is still less than a thousand dollars. Or buy a complete word processing system for less than \$800.

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 "It makes doing your taxes almost fun"—**PC Magazine**  
 "TurboTax takes the prize for most forms"—**InfoWorld**  
 "TurboTax is still the easiest personal tax return on the market to use and learn"—**PC Magazine**  
 "the only thing TurboTax can't do is print the money"—**PC World**

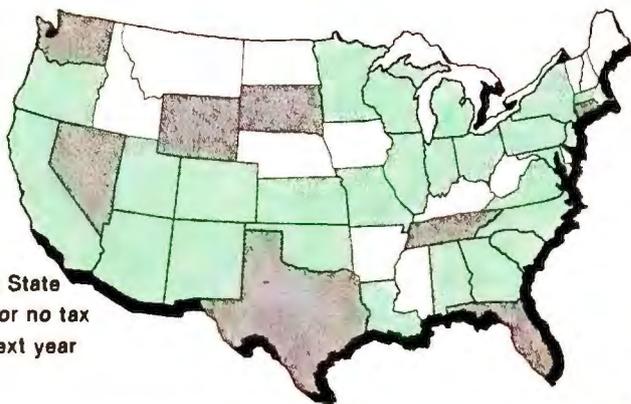
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are bowing to popular usage of the word, though you should be aware that many publishers and most professional journals maintain the correct usage of *datum* for the singular and *data* for the plural form of the word. *PC World* clearly stands out among PC magazines for its high standards of writing and production. Why mar this image? *PC World* should use its editorial influence to pillory incorrect grammar or, better yet, to advocate grammar standards for software publishers.

Halmuth Schaefer  
 Atascadero, California

Although I agree that the ungrammatical constructions in the GEM screens were unfortunate, I disagree with your conclusion that technology is tied to illiteracy.

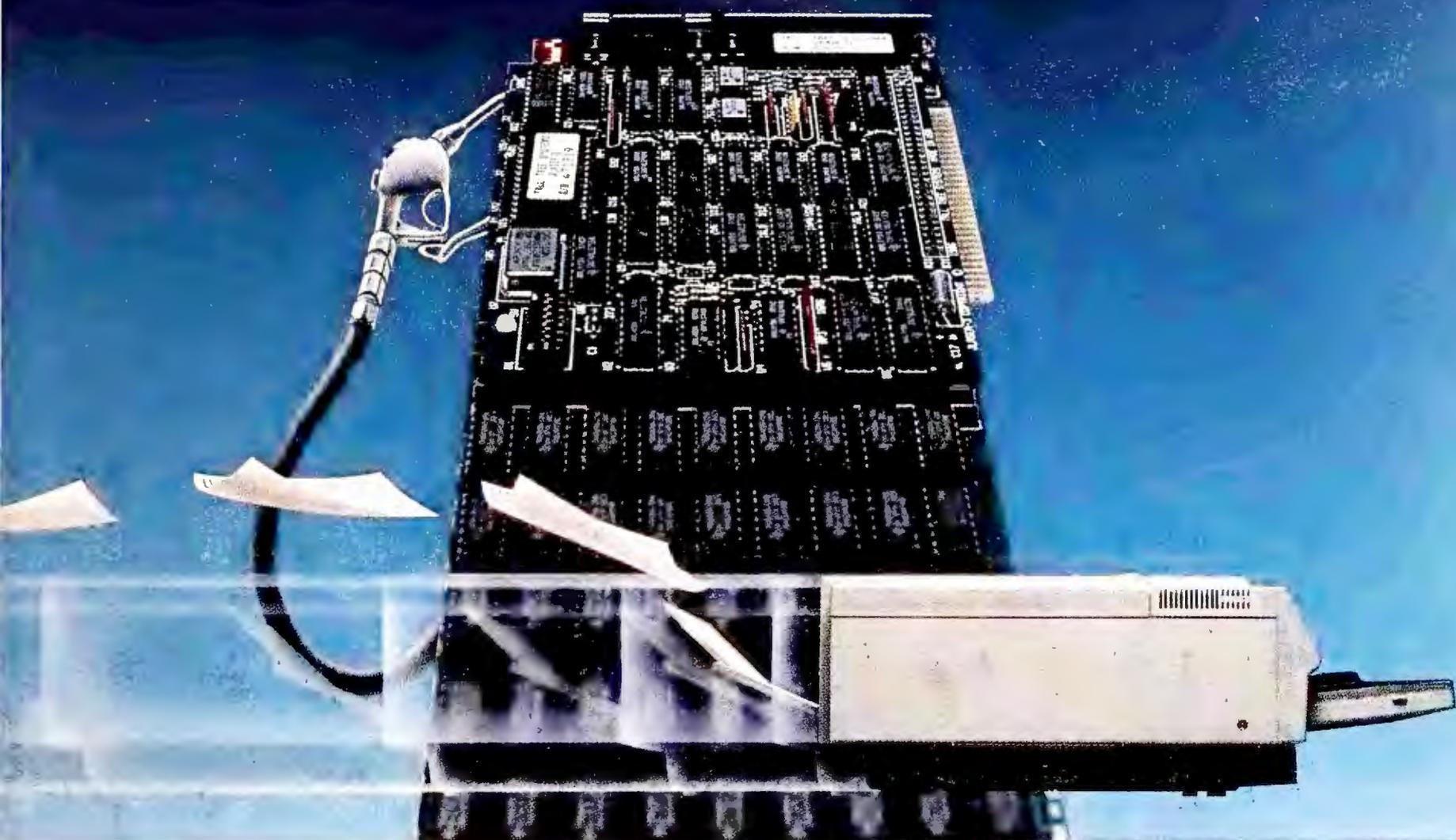
Why not throw in the fall of Western civilization while you're at it?

The GEM illustrations were supplied by Digital Research and reproduced verbatim in Product Outlook.

As to our use of data as a singular noun, yes, we bow to popular usage in this instance—and we're proud of it. I might add that any number of standard reference works (including Webster's Third New International Dictionary) consider the usage valid. *PC World* is a magazine of and for popular culture, and we take our role of influencing the culture and the language very seriously. Language is not a dead, unchanging thing; it's as dynamic and multifaceted as the technology we write about. —Tema Goodwin, Senior Copy Editor

(continues)

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# A Number of Reasons A Number



**1. Designed for the 80386** There's a revolution taking place in desktop computing. A revolution that's been launched by a square wafer of silicon known as the 80386 microprocessor chip. It puts minicomputer potential at PC users' fingertips. It's a fact that virtually every leading PC manufacturer has built a "box" around this chip. And it's a fact that the "New Operating System" will, supposedly, even run on it. But, it's also a fact that *their* system wasn't designed for the 80386. Ours is. And it's called PC-MOS/386™

**4. Thousands of DOS Programs** PC-MOS/386™ gives you the best of the past, and the best for your future. Which means that while PC-MOS/386™ totally replaces your old DOS, you won't have to replace the programs you've spent a lot of time learning.

And it all happens so effortlessly. You'll continue to reap the benefits of your favorite DOS programs, while entering a new arena of power.

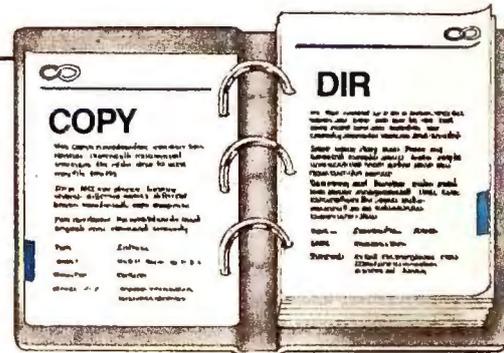
Think of it! Programs like dBASE III, WordPerfect, Lotus 1-2-3 and Symphony, WordStar, MultiMate...literally thousands of DOS programs—all compatible and multi-user available.



**2. PC and PS/2 Compatible** In designing PC-MOS, we knew our first priority was to exploit the minicomputer capabilities of 80386-based PCs & PS/2s. But we went further, and developed a system which would be fully compatible with the millions of PC-compatibles. Power without sacrifice. You'd expect nothing less from the new standard bearer.

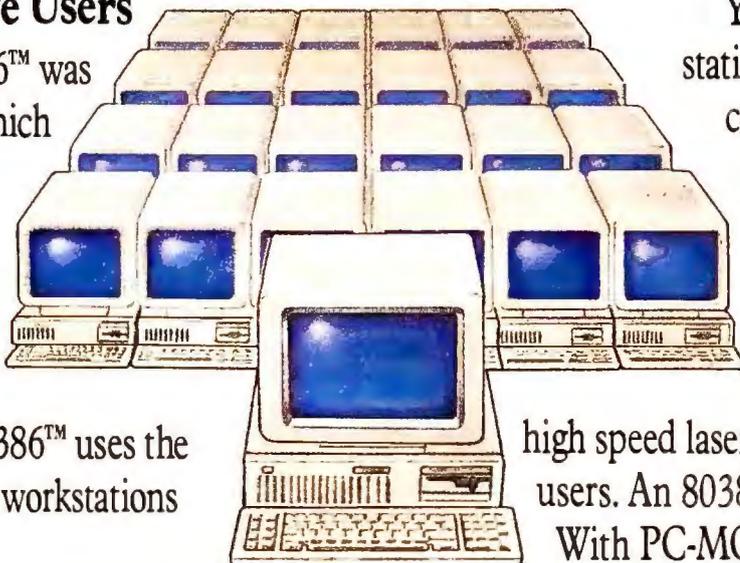
**5. Familiar Commands Like DIR and COPY** Just as you don't have to learn a whole new array of software to take advantage of PC-MOS/386™, neither do you have to learn an entirely new set of commands.

Instead, the system builds on the knowledge you already have. "COPY" still copies files, and "DIR" still gives you a directory listing. As you might expect, we didn't stop there. There's a wealth of features that have strengthened the commands you know, making them more powerful and easier to use.



**3. One, Five, Up to Twenty-five Users** From the beginning, PC-MOS/386™ was designed as a versatile operating system which could support twenty-five users as easily as it supports one. The system comes in single, five, and 25-user modules, so you're able to start with what you need and expand when you're ready.

In a multi-user setting, PC-MOS/386™ uses the computing power of the host PC to drive workstations linked to standard RS-232 ports.



You can choose from a variety of workstations. Mix and match dumb terminals costing under \$500 each with PCs and PS/2s running our terminal emulation software.

All of the host's resources can be shared. Programs, data, hard disks, tape backup units & printers (including high speed laser printers) are suddenly available to all users. An 80386-PC has minicomputer potential. With PC-MOS/386™ you can "mini" your micro.

# of Users Will Choose PC-MOS/386.™

## 6. Concurrently Supports Virtual 8086 and 80386 32-Bit Mode

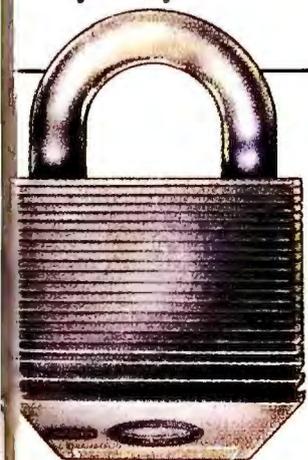


80386-based PCs & PS/2s are dual-personality computers. To run DOS programs, they act as PCs with a 640K memory limit. But to take advantage of their minicomputer capacity, they operate in true 80386 mode which lets them address up to four gigabytes of memory. PC-MOS enables the 80386-host and its workstations to independently switch between these modes—making DOS compatibility and 80386 power simultaneously possible.

## 7. Multi-Tasking

While it's true you could look elsewhere for multi-tasking, why would you want to? The *other* multi-tasking operating system is not now, nor is it planned to be, multi-user. It won't even run multiple DOS applications in multi-tasking mode.

Now consider PC-MOS/386.™ At the touch of a key, you can switch between up to 25 different tasks. And if you have workstations connected to a host, they get multi-tasking, too. Finally...a system that won't hold you back.

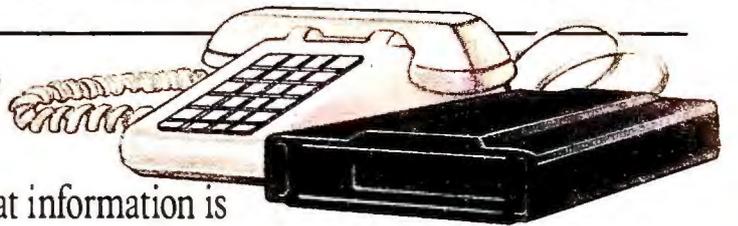


## 8. File/Record Locking and Security

When you decide to implement either a network or a multi-user system, there's a two-fold problem which must be solved: protecting your work from accidental misuse and securing it from intentional theft.

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## 9. Remote Access



It's been said that information is power...which makes PC-MOS/386.™ a deadly weapon to your competition. Imagine on-the-road salespeople being able to file call reports and access your latest inventory data. Picture executives being able to access your corporate database from across the country, or around the world—giving them the information they need, when they need it.

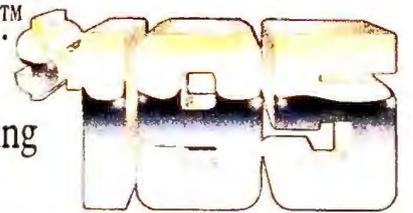
Visualize branch offices tapping time-critical data with nothing more than a modem and a workstation. Working at a home office in the evening or over the weekend suddenly gets awfully productive. And that makes good business sense. The kind of sense you can't afford to be without.

## 10. The Price...

As you evaluate operating systems, ask yourself if it's reasons you're considering...or rhyme. Ask if you're getting a system for tomorrow, or one that was made for yesterday. See if you're being forced to buy new hardware because of *their* software.

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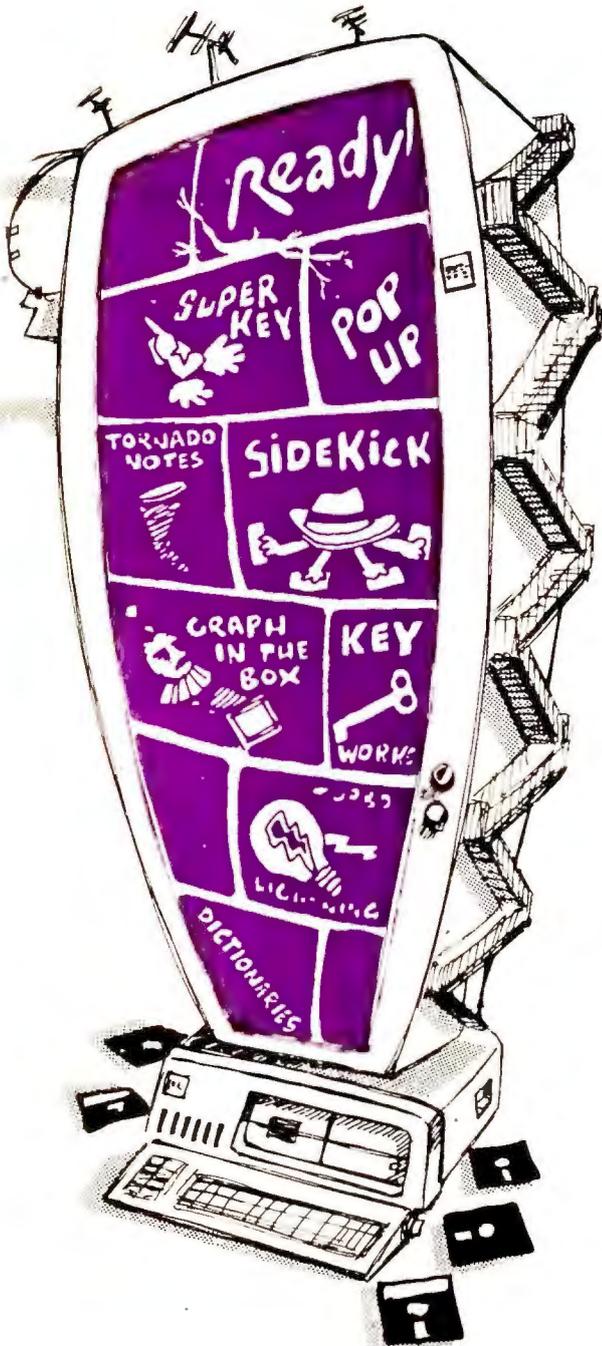
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## Letters

### Thank You, PC World

I've received a return on my *PC World* subscription fee 100,000-fold! I base this statement on my interaction with the people behind *PC World*. I refer specifically to Karl Koessel, Technical Editor.

Purely because of his professional expertise and concern for "Joe Subscriber," Mr. Koessel solved a critical upgrade problem for my company that stymied the manufacturer, its technical service representative, the wholesaler, the retailer, and assorted other experts despite our willingness to plunk down cold cash for a solution.

Economists forecast the growing significance of service industries. Clearly, in a service-oriented economy the Karl Koessels of the world will continue to be in a position to prosper and succeed.

*Eric R. Weil*  
President, Strategic Market-  
ing Communications  
Ridgewood, New Jersey

### Credit Due

The benchmark tests for *Fox-base +* version 1.21 and *DBXL* version 1.1 in "The Great Pretenders" [*PCW*, August 1987] were conducted by the Lambda Group, a computer consulting firm specializing in the design and testing of custom LAN software in San Francisco.

(continues)



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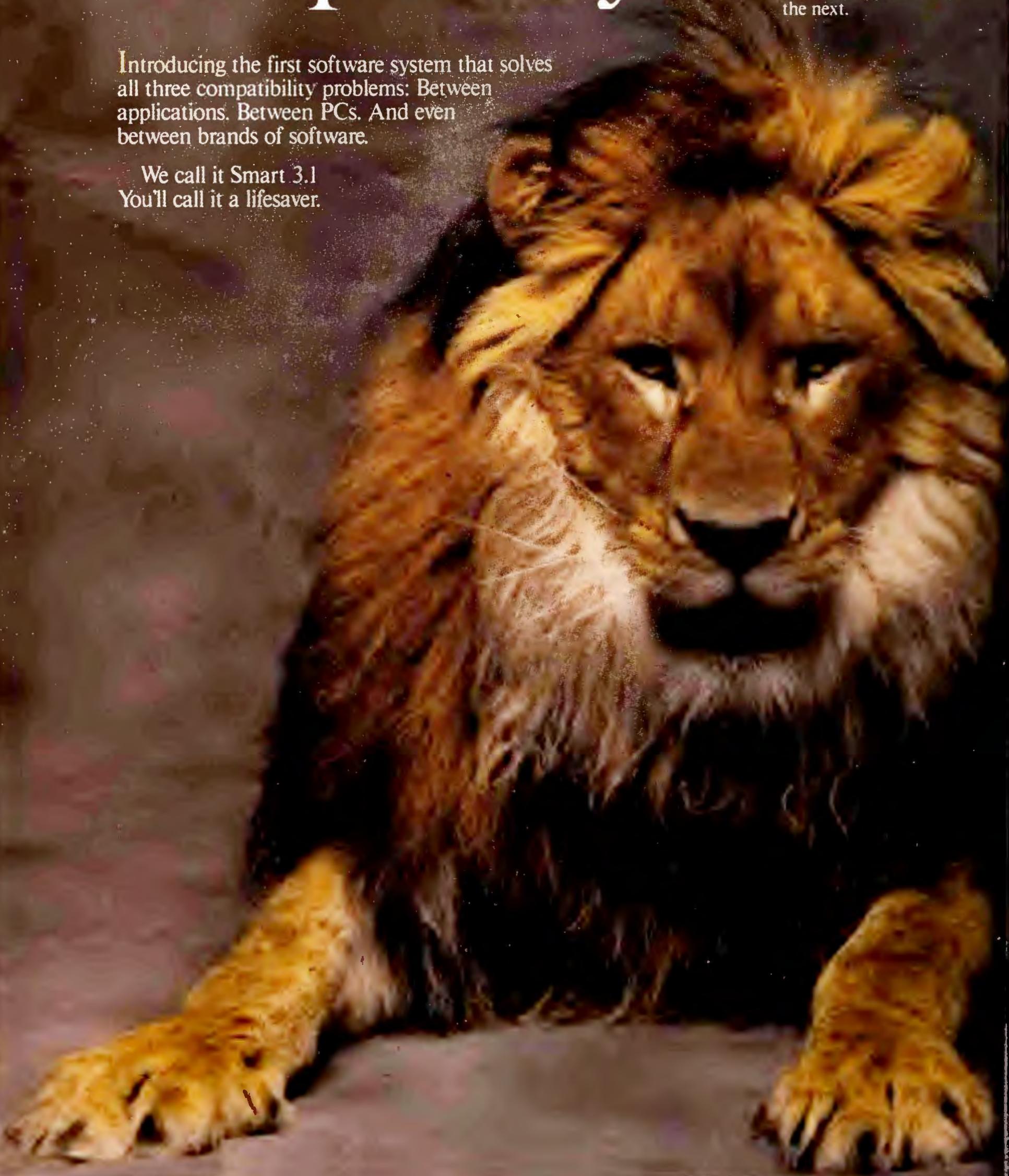
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### Clarification

The November 1986 issue of *PC World* featured a column by Kevin Strehlo entitled "Computers and the Compleat Angler," in which Mr. Strehlo discussed both fly-fishing and PC applications. A well-known fly-fisher, Bing Lempke, has expressed concern that the column, which refers to him as "having a contrary opinion on every subject," unfairly characterizes him as an unduly argumentative individual.

Perish the thought. As the context makes clear, Mr. Strehlo and *PC World* intended the statement in question to express only respect for Mr. Lempke, his mastery of his art, and his unique style. Not only was no negative implication intended, none should be found. *PC World* and Mr. Strehlo regret any misunderstanding.

*Letters should be mailed to Letters, PC World, 501 Second St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD/179-3813, Compu-Serve 74055,412, or The Source STE908. All letters must include the writer's name, city, and state. They should not exceed one double-spaced typewritten page. We reserve the right to edit letters.* ●

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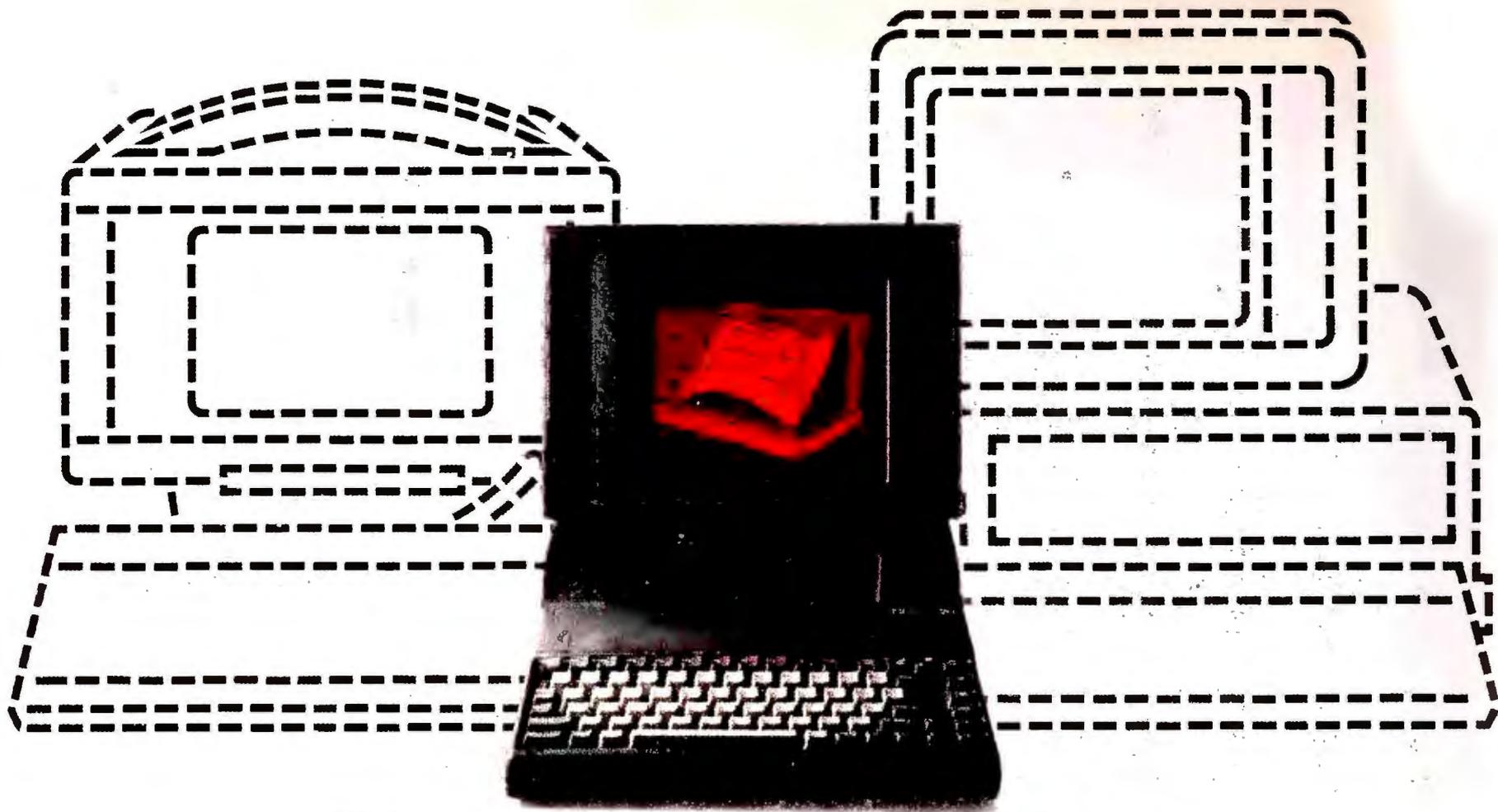
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# The Next- Generation Gap



Richard Landry

Who can you believe when everyone claims to have the “next generation” of computing power?

Talk to vendors and knowledgeable users about personal computers these days, and you’ll hear them bemoaning “market fragmentation” and “end-user confusion.” What do they mean? Simply this: For all its advances over the past decade, the personal computer industry is more mixed-up than ever. And it’s putting prospective buyers behind the eight ball.

At first glance, that doom-and-gloom talk seems pretty unjustified. After all, right now we’re experiencing the greatest period of growth and innovation in personal computers since the introduction of the IBM PC. Despite the confusion, more power and more alternatives are available than ever before.

Flip through the pages of this issue and you’ll find information on new products—such as *Windows 386*, the improved Lotus/Intel/Microsoft expanded memory specification 4.0, and the Hauppauge 386 replacement motherboard for the XT—that appear to break through the traditional limits of personal computing. With

the PS/2, OS/2, and the Presentation Manager, IBM and Microsoft are promising the ease of use that Macintosh owners have always known, along with capabilities they’ve never dreamed of—even with the new Mac II and its forthcoming operating system.

The problem is that so many companies are offering so-called next-generation products that it’s becoming harder and harder to figure which ones are a truly safe bet. If you can afford to watch from the sidelines for a while, then it may all seem like a great game. But if you have to make a PC purchase—or multiple PC purchases—within the next six months, then it may feel like you’re playing Russian roulette. Without a doubt, some of those choices will turn out to be dead branches on the PC family tree. Yet there are precious few clues as to which will be smart investments and which will be duds, the next generation of Osbornes and Morrrows.

*(continues)*

At last count there were about seven ways to get into the next generation of computing, but none seems a sure winner. You could buy into the IBM PS/2 line, of course, but in some respects you won't be purchasing next-generation technology at all. With 10-MHz 286 microprocessors, for example, the Models 50 and 60 underperform many AT clones in standard benchmark tests. Neither the 50 nor the 60 will be able to take advantage of future operating system enhancements specifically designed for the more powerful 386 chip. In this sense only the Model 80 deserves the rubric *next generation*.

Nor are all of the PS/2's next-generation enhancements welcome. For example, everyone knows by now that the Micro Channel bus in the Models 50, 60, and 80 can't accept regular AT add-in boards. What isn't widely known, though, is that the Micro Channel will exact a higher price than AT incompatibility. Manufacturers are already grumbling that they will have to charge much more for PS/2 boards than for AT boards, simply because they will be more costly to make. Some manufacturers in narrow markets like scientific data acquisition will have to forgo making PS/2 boards altogether, because their production runs are so small and the PS/2's design specs so exacting.

Unfortunately, vendors tend to cloud the picture in more ways than one. IBM television ads that show the underpowered PS/2

Models 25 and 30 running *Windows* are a cruel joke. Worse yet, some computer retailers tout these bottom-of-the-line PS/2s as examples of the new IBM Micro Channel technology. Actually, they're just repackaged XTs with precious few advanced PS/2 features. Even industry analysts have been guilty of this goof.

*If you have to make a PC purchase within the next six months, then it may feel like you're playing Russian roulette.*

Competing with Big Blue for your loyalties and buying power, Compaq, Tandy, and others are offering alternatives to the PS/2 that speed up or extend the old AT bus standard—but use the 386 chip instead of the old 286. Throughout this issue we describe several new high-performance machines that wear the AT stripe. But we've also heard rumors of a PS/2-killer coming soon from a major board and system manufacturer that goes them all one better. With a bus that can accept the old AT-style add-in boards as well as new advanced boards, this system will be the first kid on the block to actually implement one of the most significant capabilities of the Micro Channel—its ability to support several intelligent devices, or bus masters, at once. This company, not IBM, will be the first out of the chute with an add-in board that concretely demonstrates the advantages of this new technology—an intelligent disk controller that should speed

up disk access times well beyond anything now obtainable.

Other tantalizing products on the market include 16-MHz AT clones seemingly capable of performing just as well as many 386 systems, and 386 add-in boards or motherboard replacements for the XT and AT. Both have their downside, however. Some AT

clones may not be able to run OS/2, and none will take advantage of future versions of OS/2 designed for the 386—not to mention the current 386 capabilities of *Desqview 2.0* and *Windows 386*. The add-ins and motherboard replacements offer an economical option for the adventurous, but make almost no sense without a hard disk upgrade, too. Add a monitor and adapter upgrade for VGA graphics, and you'll find very little difference in price between upgrading and buying a new system.

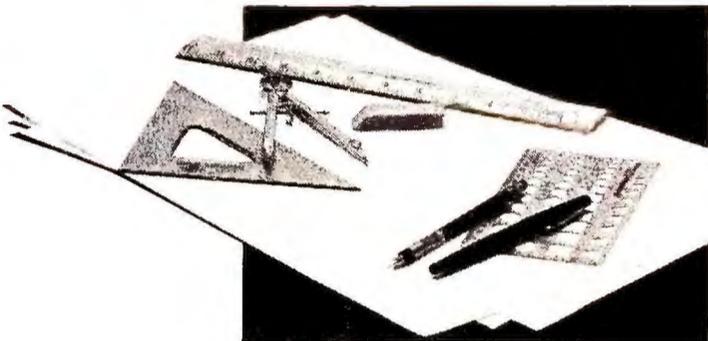
Finally, the price on 286 speed-up boards is plummeting—but beware! Microsoft says that its new Mach 20 board can run OS/2, but many other manufacturers are going to be left out in the cold.

Besides the rumored 386 machine, none of the above AT-compatible options share the mul-

*(continues)*

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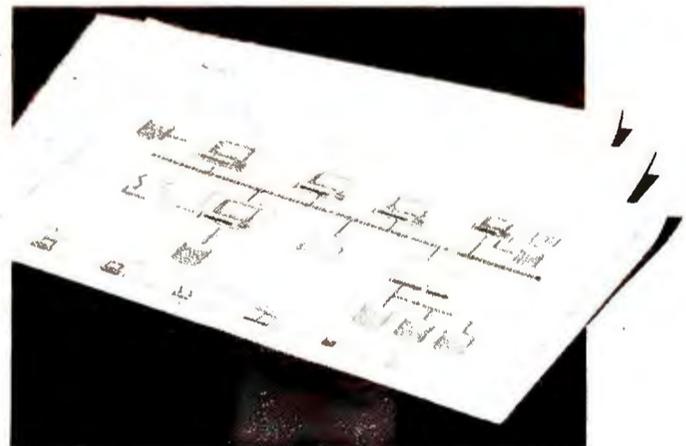
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timaster capabilities of the Micro Channel, and some are dubious achievers in the OS/2 game. This puts them woefully behind IBM in the race to be part of the next generation. Yet when running DOS applications they'll meet or exceed Big Blue's new machines on almost every score, including price.

Small wonder that the personal computer market seems confused. With so many choices before you, and so few indications of a safe direction, the question is: Which way to go?

You can make life easier on yourself if you shelve the next-generation talk and focus instead on the appropriate technology for a given task. When insiders talk about the next generation, they usually think of brute performance. But that may not be your highest priority. Instead of tweaking a little extra speed out of your system, you probably spend more time dealing with the mundane issues of setup, installation, and ease of use. Ironically, both IBM and Microsoft have been trying to get this point across about the PS/2 and OS/2, saying that ease of use and a higher level of reliability should take precedence over speed. They're right. Dennis Andrews, head of the IBM labs that designed the PS/2 line, says that Big Blue's objective first and foremost with the Model 50 was to create a "damn good PC." But you don't have to look just to IBM if you want simple, reliable systems and peripherals.

*(continues)*

Circle 139 on reader service card

# The official box score of the software industry.

**Software Digest**

Vol. 4, No. 7

**RATINGS REPORT**

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

**NEW PERFORMANCE BENCHMARKS**  
- 1987-1988

**Relational Database FOR IBM, COMPAQ, TANDY, AND OTHER COMPANIES**

This year's relational database management issue presents the results of NSTL's testing of twelve programs. The editor is once again the top-rated program, with the latest version scoring even higher than last year's top score. The top scorers in this category are XDB and Open Access II (second and fourth places, respectively). In second place are industry leaders such as dBASE III PLUS and R-Base System V. Of the twelve programs tested, nine are new versions of programs tested last year. PowerBase moved up to third place, while dBASE and R-Base both slipped considerably in the rankings.

This month's features R-Base testers. Another top-scoring relational database program approaches. Next month we bring twelve programs to you.

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Place this issue in your binder and discard last year's relational database.

Software Digest Rating	Overall Evaluation	Program Name	Version Tested	Ease of Learning	Ease of Use	Performance	Versatility	Memory Requirements	Price	Volume Purchase Discount	Program Can Be Copied	Demo Disk Available	Page
★★★★	8.7	Paradox	1.1	■	■	■	■	512K \$495	✓	✓	✓	✓	32
★★★★	8.2	XDB	1.1	■	■	■	■	320K \$750	✓	✓	✓	✓	42
★★★★	7.6	PowerBase	2.1	■	■	■	■	384K \$349	✓	✓	✓	✓	34
★★★★	7.0	Open Access Database	2.0	■	■	■	■	256K \$395	✓	✓	✓	✓	40
★★★★	7.0	DataEase	5 Ref 2	■	■	■	■	384K \$600	✓	✓	✓	✓	22
★★★	6.6	dBASE III PLUS	1.1	■	■	■	■	384K \$695	✓	✓	✓	✓	26
★★	6.4	R-Base System V	1.1	■	■	■	■	512K \$700	✓	✓	✓	✓	36
★★	6.0	Datastore, inc	1.23	■	■	■	■	226K \$495	✓	✓	✓	✓	24
★	5.9	The Smart Data Base Manager	3.1	■	■	■	■	256K \$695	✓	✓	✓	✓	38
★	5.5	Condor 5	12.11 11G	■	■	■	■	128K \$195	✓	✓	✓	✓	20
★	5.3	KnowledgeMan/2	2.01	■	■	■	■	512K \$595	✓	✓	✓	✓	28
★	5.2	dBASE Relational Database Manager/1 System	3.0	■	■	■	■	256K \$495	✓	✓	✓	✓	40

**Ratings Key**  
(On a scale of 0 to 10.)

**OVERALL EVALUATION**

★★★★ 9.0 or higher

★★★ 8.0-8.9

★★ 7.0-7.9

★ 6.0-6.9

5.0-5.9

**ALL OTHER RATINGS**

■ 7.0-9.9

■ 5.0-6.9

■ under 5.0

**Contents**

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That's why we always disclose our methodology, including benchmark tests and weight factors. That's why each program is tested multiple times, by multi-

ple users. Each test is a real-world task, completed by people with varying levels of experience. Just like your users.

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We start with the big news. Each cover rates the issue's software on a five-star scale. One chart tells the whole story.

Then we move into greater detail. Our overview section explains what the application is supposed to do. And what our tests actually revealed.

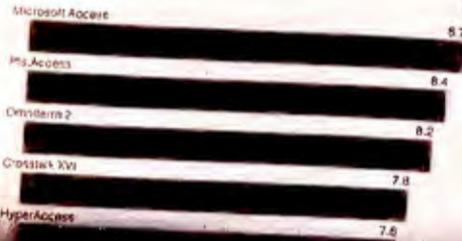
## EASE OF USE

Bar charts show how easy or how difficult the testers found each program in routine situations.

## VERSATILITY

An accurate table of checklists rates the packages side-by-side for their ability to handle hundreds of tasks typically performed by the application. So you know exactly what a program will and won't do.

### EASE OF USE Summary



## PROGRAM EVALUATIONS

A two-page profile of each software package tested, including scores, sample screens, specs and pricing.

## VERSATILITY

### INTRODUCTION

Pages 46-57 present over 175 applications/features for side-by-side comparisons of versatility for the 15 word processing programs tested for this issue. NSTL staff experts created a master list of features and verified each one for the chart.

Shown below each chart are brief explanations of the items. The overall abundance or lack of features for each program is reflected in the Versatility Summary on page 13, which also includes the methodology and formula for overall versatility.

	METROLOGY WESORT	DisplayWrite 4	Erasmus Writer	Framework II	Microsoft Word	MultiMate Advantage	OfficeWriter	Professional Writer	QMA	Sigma Word IV	The Smart Word Processor	Erato	Wordmaster 3	WordPerfect	WordStar 2000 Plus	XYWrite III
<b>CURSOR MOVEMENT FUNCTIONS</b>	2															
Word right/end ( # of keystrokes)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Beginning/end of line ( # of keystrokes)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Beginning/end of sentence ( # of keystrokes)	0	NA	NA	U2	1	1	1	1	1	1	1	1	1	1	1	1
Top/bottom of screen ( # of keystrokes)	0	4.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Beginning/end of document ( # of keystrokes)	1	2	2	NA	1	1	1	1	1	1	1	1	1	1	1	1
Go to a specific page ( # of keystrokes)	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Horizontal scrolling	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Jump to bookmark	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

### EXPLANATION OF VERSATILITY ITEMS

**CURSOR MOVEMENT FUNCTIONS** ( # of keystrokes) This is the number of keystrokes necessary to move the cursor from any line of page of the document to the beginning or end of the document.

**Go to a specific page ( # of keystrokes)** This is the number of keystrokes necessary to move the cursor to a particular page indicated by the selected page. The selected page need not be adjacent to the present page. The selected page can be moved horizontally beyond the width of the document.

## Paradox ★★★

### SPECIFICATIONS

**Version**  
1.1 (Released March 1986)

**Price**  
\$495

**Requirements**  
Minimum drives: 2 double-sided  
Minimum memory: 512K  
Operating system: PC-DOS 2.0, 2.1, 3.0, 3.1, 3.2, 3.3

**Copy Protection**  
Program can be copied

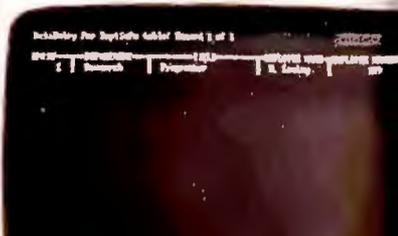
**Demo Disk**  
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**3.5-Inch Disk**  
IBM PS/2-compatible version available for additional \$30.

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Epson FX, MX series; Hewlett-Packard LaserJet; IBM Graphics Printer, Okidata Microline 82, 83, 92, 93, 192, 193

**Other Peripherals Supported**  
8087 and 80287 math coprocessors

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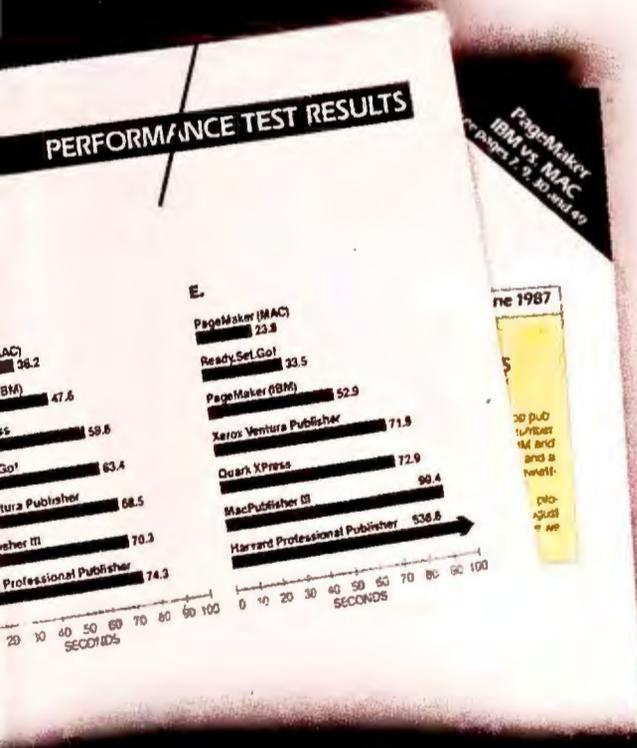
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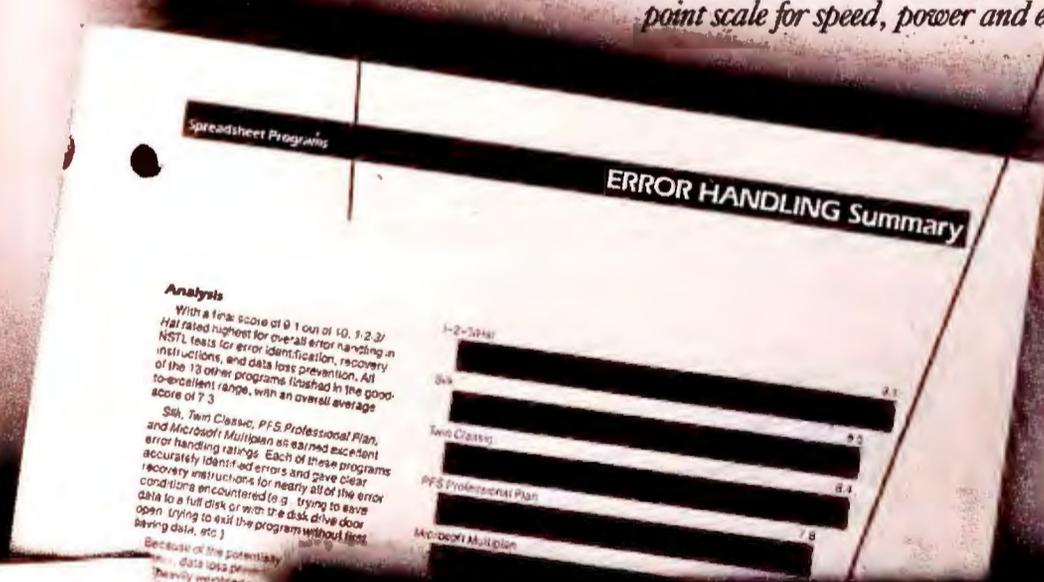
## PERFORMANCE RESULTS

A series of speed and capacity tests measures each package's performance on functions specific to the software category.



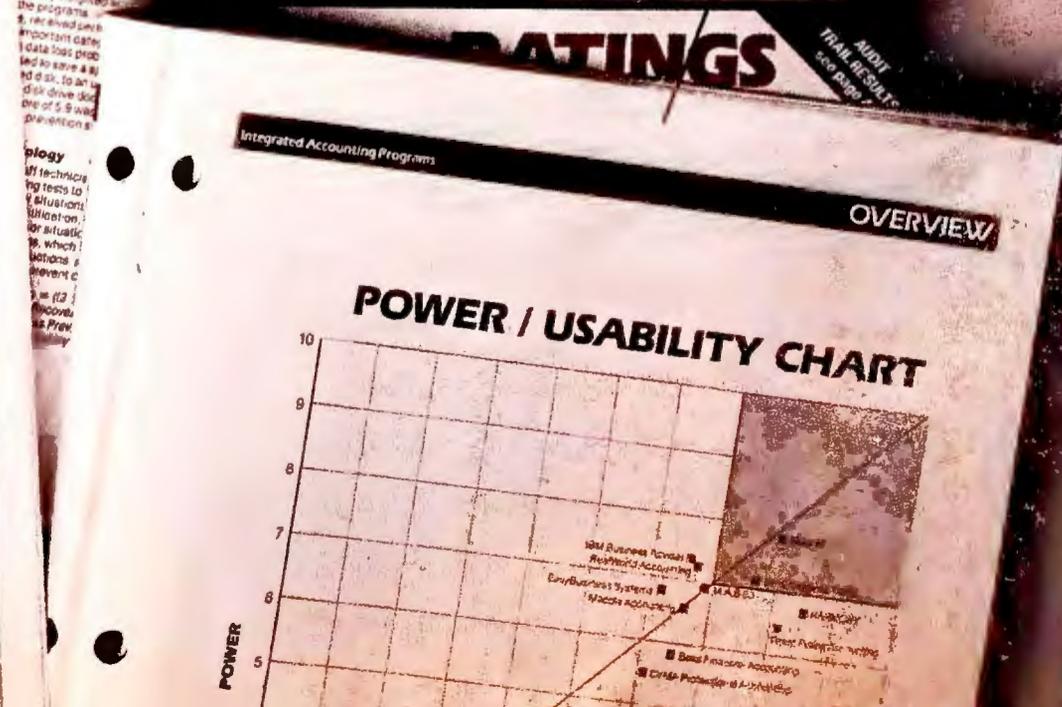
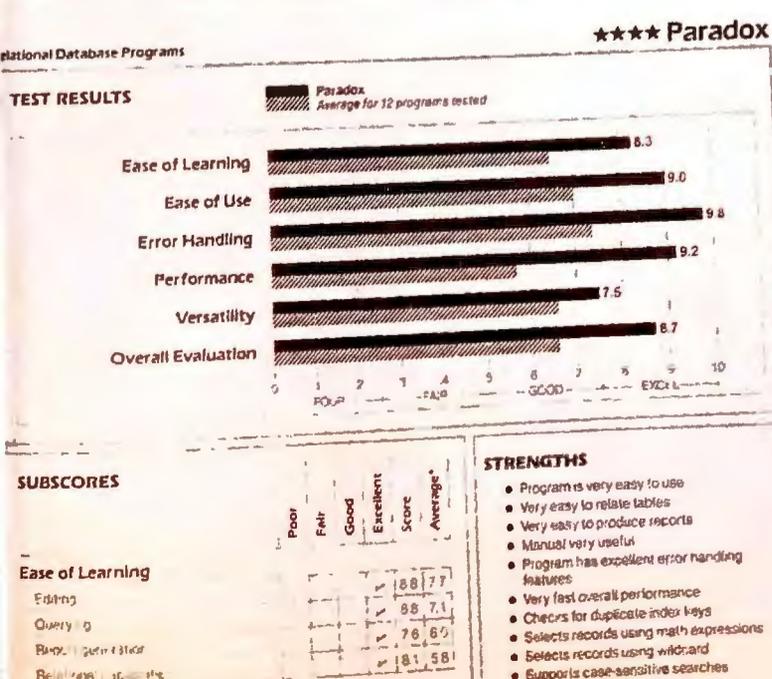
## ERROR HANDLING

Bar charts rate how well each package identifies mistakes and prevents data loss.



## POWER/USABILITY

A graphic matrix plots each package on a ten-point scale for speed, power and ease of use.



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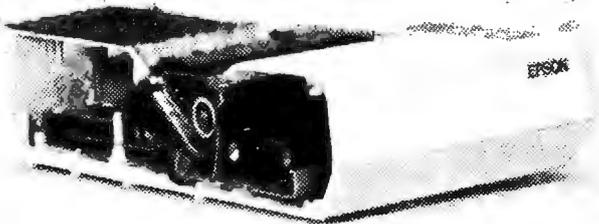
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Richard Landry

Nor will you necessarily have to buy the next generation to enjoy some of its benefits. The new class of high-performance 8086 computers is a good example of appropriate technology that's "last generation." These machines are as well-suited as the more expensive AT clones for stand-alone applications like word processing. And in a network environment, you can bet that you'll see a variety of methods by which the 8086 class of machines takes advantage of OS/2. One example is data base management. It's a fairly simple trick to devise a DOS front end that will allow users to formulate queries and reports to be processed on an OS/2 network server. Lotus is doing something comparable with 1-2-3 release 3. The software firm is deliberately designing its next-generation spreadsheet with similar functionality and compatible file formats in the DOS and OS/2 versions.

In the end, the real danger lies in looking too far down the road. Smart buyers who want to be on the right side of history worry about what the next generation will offer, so they push computer vendors to prove that their products will be part of it. Yet a next generation that includes a multi-user, multitasking version of OS/2 fully capable of using the 386 chip may be as many as three or four years away. Four years ago, the AT was nowhere in sight. Meanwhile, there are still many Osbornes and Morrows chugging away on desktops, and there are

(continues)

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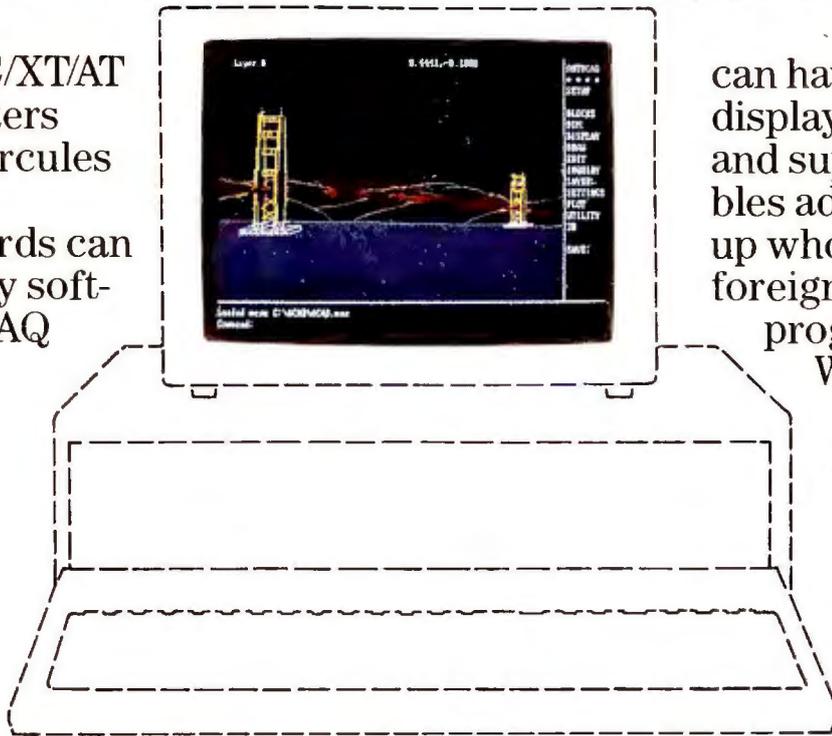
## Three Modes You Need for Your Software.

Both the Hercules Graphics Card Plus (for TTL monochrome monitors) and new Hercules InColor Card (for multi-sync and enhanced color "EGA type" monitors) contain the three modes you need to get the most out of software on your compatible. **High Resolution Graphics:** Your PC benefits from Hercules' crisp 720x348 resolution—the highest popularly supported standard—in monochrome, or up to 16 colors.

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Hercules 720x348 resolution and RamFont are now available in up to 16 colors on your multi-sync or "EGA Type" monitor.

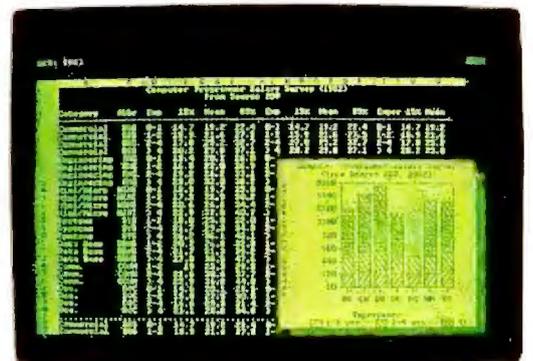
can have the true text speed display of italics, subscripts and superscripts. And, it enables add-on packages to open up whole new areas of font and foreign character display for programs like WordPerfect, WordStar, and Multimate; while providing powerful capabilities for software of the future.

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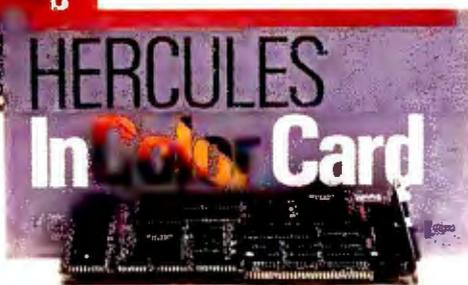
Hercules cards with RamFont let 1-2-3, and other popular spreadsheets, display nearly twice the data with no loss in scrolling speed.



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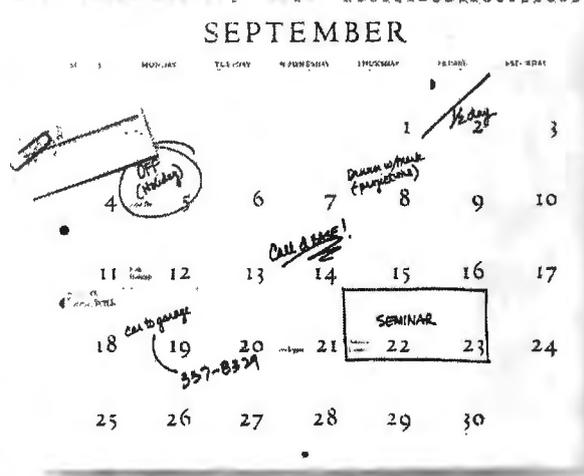
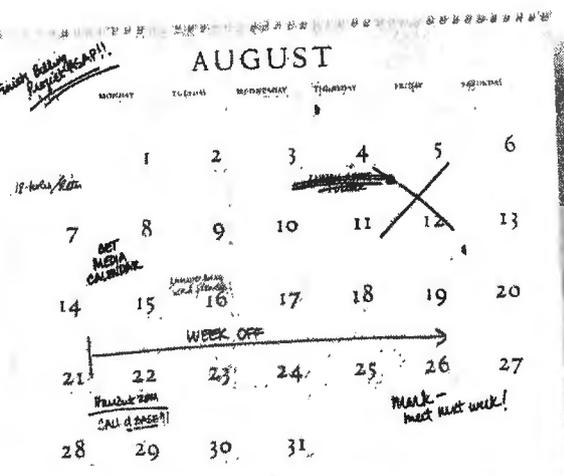
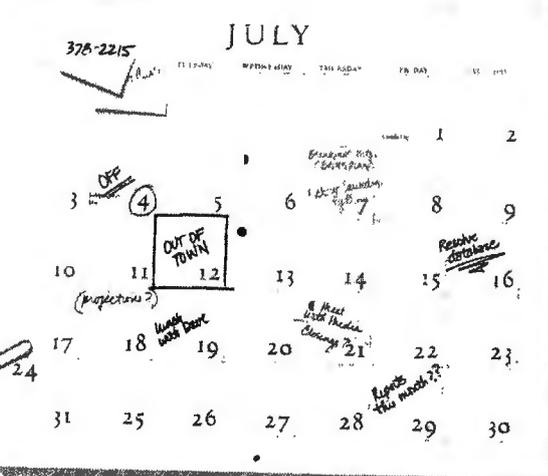
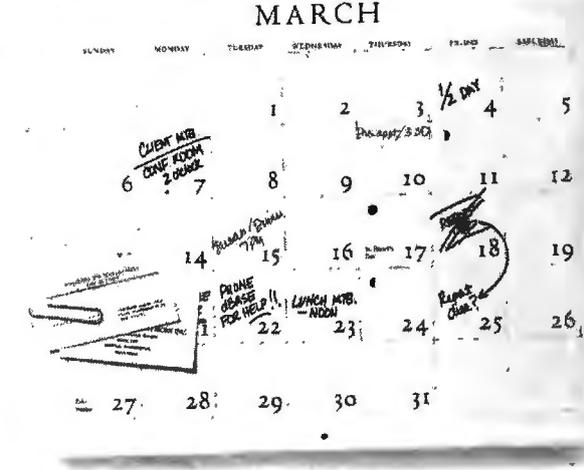
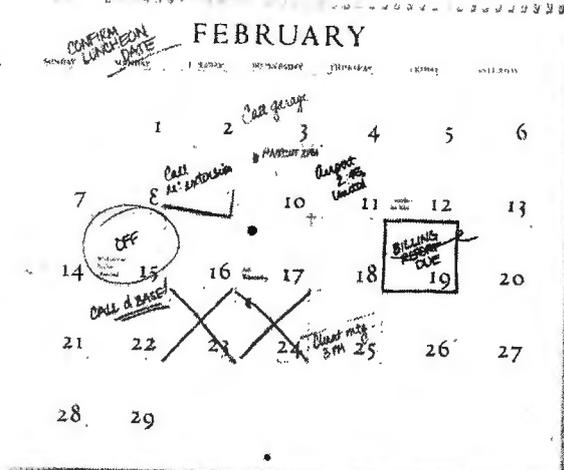
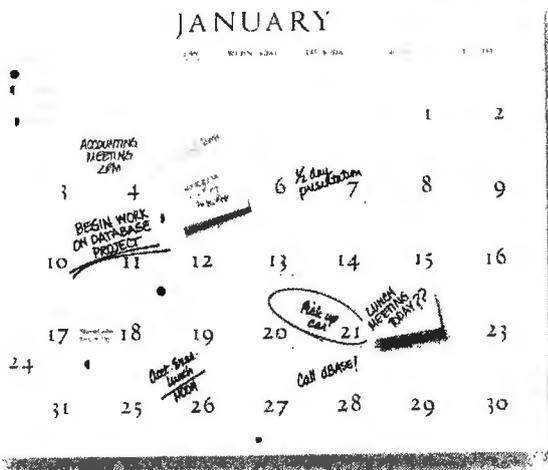
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# "I FLIPPED THROUGH PAGES TRYING TO



Choosing the wrong database management software can be like doing time.

Ask Harry Viens, the executive vice-president of an advertising agency.

Using a copy of dBASE®, he spent a year trying to learn its programming language to develop applications on the agency's PC to track income against forecasts.

But with dBASE, all he ended up with was wishing he'd used R:BASE® System V, the database software you don't have to be a programmer to use.

## "AFTER USING dBASE I HAD TO BE DEPROGRAMMED"

Viens knew his mini-computer was fine for bookkeeping, but wasn't capable of turning around management reports—critical for

making quick decisions.

"We've got to make decisions in real time, not wait a couple of months to find out what's happening today," Viens said.

"I tried to build this dBASE application nights, weekends and during holes in my schedule. But almost a year later, the miserable thing still wasn't done," Viens told us.

"The language is unnatural. I guess some people love writing code. For me, that's like trying to mow the lawn with nail clippers."

## "I SAW, AND I BELIEVED"

Being an advertising person, Viens actually reads ads. He saw our claim that you don't have to be a programmer to use R:BASE, and bought it.

Because of our EXPRESS System, he was



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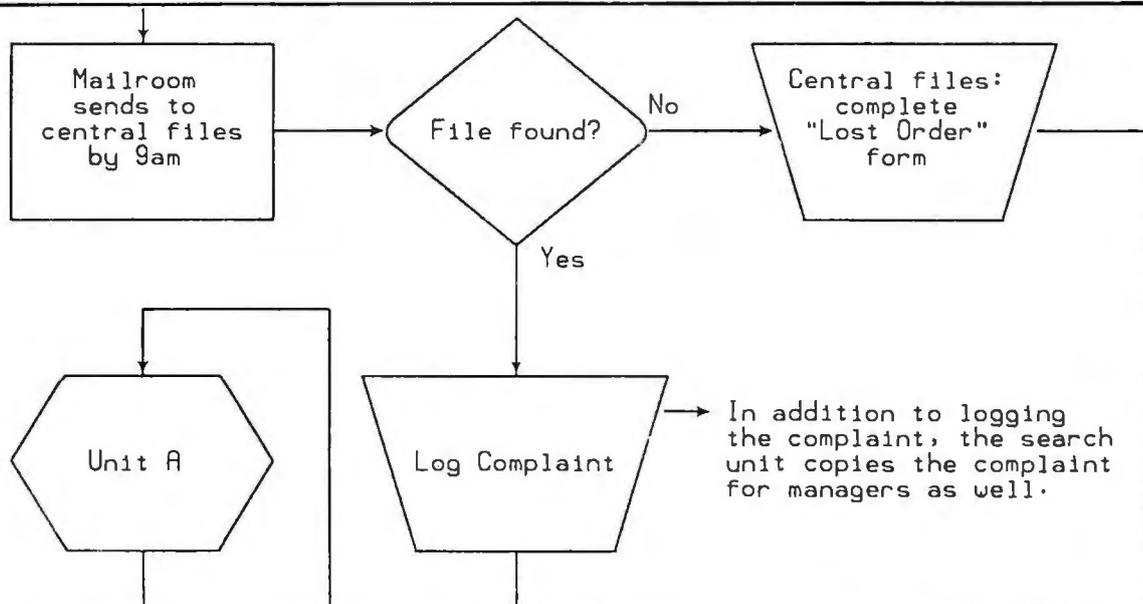
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\* March 10, 1987 issue, page 278.

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plenty of copies of 1-2-3 release 1A that nobody has found necessary to replace with release 2.01. Today's hardware and applications provide sufficient power to solve today's problems. Tomorrow's real solutions are still a long way off.

**T**his month is the first in which National Software Testing Laboratories of Philadelphia comes on board as *PC World's* exclusive test facility. To get a good sense of how NSTL's testing services will affect *PC World's* product coverage in the months to come, read Senior Associate Editor Eric Knorr's *REMark*, "Putting PC World to the Test." Let me say simply that we chose to work with NSTL because of its unique ability to focus on appropriate solutions. We're sure that the hard-nosed, applications-oriented testing that NSTL provides will make our product coverage more valuable to you than ever.

One of the greatest privileges of being editor of *PC World* is the opportunity for direct contact with readers. Please feel free to write me at *PC World*, 501 Second St., San Francisco, CA 94107; or send an MCI message to Richard Landry/301-3685. ●

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# The new Microsoft

Now it's not only polite to point in business. It's enlightened.

When you have your finger on a new Microsoft® Mouse, that is.

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With a mouse in your corner, you'll be able to use all the most advanced business software—like Microsoft Word 4.0, Pagemaker® and Microsoft Windows—the way nature intended. With a transparent, graphic interface that lets you spend more of your time working. And less of your time explaining to your computer what you want it to do.

In fact, over a half million serious PC users have already discovered how much more productive they can be with the help of a Microsoft Mouse—by far the most popular of its kind.

Which brings us to what makes this particular specimen the giant of its species.

Our smallest mouse ever has been redesigned to fit your hand more comfortably. At the same time, it gives you increased pointing accuracy with a significant decrease in wrist movement.

It even works without a pad. On virtually any type of surface. So you can go about your handiwork with a minimum of desk space.

Of course, the Microsoft Mouse has every business connection

# Mouse.



you could imagine.

Depending on your hardware, there's a mousetype that can connect via serial port, bus port or InPort.<sup>™</sup> As well as a configuration that's specifically designed for the IBM<sup>®</sup> PS/2<sup>™</sup> systems.

Once your mouse is plugged in, you can immediately start introducing it to your favorite programs. At last count there were over 250 compatible applications – including the biggest names in word processing, spreadsheets, databases, and business and presentation graphics.

And to make our new mouse even more appealing, we've combined it with three different software packages.

You get your choice of EasyCAD<sup>™</sup>, a powerful, easy-to-use computer-aided design program. Or Windows 2.0 and PC Paintbrush<sup>®</sup> for Windows. Or Mouse Menus and Microsoft Paintbrush.

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Like where they can get a Microsoft Mouse of their own.



CITIZEN

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Some nine-wire dot matrix printers hide from the competition. Not the new Citizen™ MSP-50.

With the ability to handle all types of paper, top or bottom feed, and a convertible push or pull tractor, it figured it was the best. However, another printer had designs on the title.

So the MSP-50 relied on its high speed, up to 300 cps, to crush the competition. But it wasn't enough. Feature by feature these two contenders battled. Quiet mode. 240 dpi graphics. Color capability. Choice of fonts. Front panel feature controls. Even compatibility with most major software. They were equal. Finally, the MSP-50 put its 80-column print width on the line. Unfortunately, the other machine offered 136.

What was the other machine? The new Citizen MSP-55. Which just goes to prove that if you want to be considered one of the best, you have to be a Citizen in good standing.

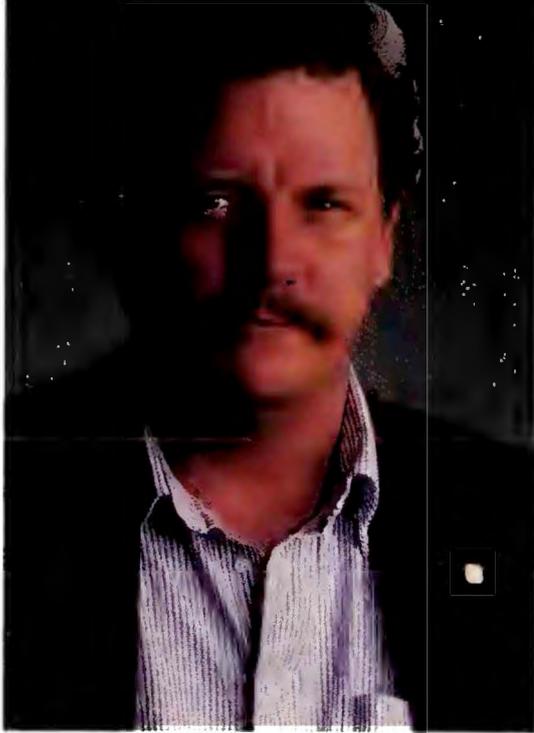
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# Laptop Fantasy



Stewart Alsop

An open letter in which a computer guru (and world-weary traveler) makes a plea to the powers that be for the perfect laptop computer

**D**ear Toshiba: I have this fantasy that someday some computer manufacturer will come along and build the right kind of laptop computer for me. I'm writing to you because I haven't been able to get Tandy, the originator of laptops, to understand what I'm talking about, and you seem to have come closer to understanding the problem than anyone else.

What's most frustrating is that virtually any company that calls itself a computer manufacturer could build my fantasy computer right now without much of a stretch. You do, of course, have to take my fantasy with a grain of salt. One thing I've discovered is that everyone has a different opinion about how laptop computers should be designed. But I'm a PC guru, and I write this column, so for now, you're stuck with my fantasy.

My fantasy primarily involves two things: weight and convenience.

It used to be that PC gurus would sit around smoke-filled rooms and talk about how the perfect portable computer would

be something like a Compaq Portable after it had been put on a serious diet. You introduced that kind of computer—a 10- to 12-pound “laptop”—early last year in the form of your T1100 and the improved T1100 Plus, which were joined by similar machines from Zenith and NEC, among others. As it turned out, the gurus were wrong: Sales of laptops didn't suddenly take off after the machines slimmed down.

There's always a chance that people just don't want a computer they can carry around with them, of course. But I happen to think that the computers still aren't good enough to get people to rush out and buy them in big numbers. The reason they aren't good enough is actually fairly obvious. I travel a lot, sometimes as much as two weeks a month. A couple of weeks ago, for example, I spent one night each in four different hotels in four different cities. You can figure out how many airplanes and rental cars that involved.

*(continues)*

With travel like that (and most of my travel is like that), how much a traveling computer weighs becomes much more important than you might think. I usually travel with 4 to 5 pounds of clothes and another 2 to 3 pounds of paper, books, and other stuff. The

around. My NEC MultiSpeed hasn't seen an airplane since. (I'm sorry, Toshiba, for not showing faith in your abilities, but I got a better deal on the NEC than I could get on the T1100 Plus.)

Now I see that you are getting much closer to solving this

soft's *Works*, and I have enough program to do whatever I want and enough disk space to hold virtually anything I might create on a two- or three-day trip. Putting DOS in ROM showed real insight, since you must have realized that nobody carting around a 6-pound computer is going to worry about having the latest version of DOS. (But please don't put any application software in ROM the way NEC did. No matter how smart you might be, you won't choose the applications I want to use.)

You haven't solved all my problems yet, though. It's interesting that you chose not to use the latest display technology. I suppose a backlit screen (such as those featured on the Zenith Z181, the IBM Convertible 3, or the Tandy 1400LT) would have put too much drain on the internal battery. The T1000's screen is pretty readable, but I worry that I'll end up waiting for the same flight in Seattle. And you still insist on a screen that flips up. The T1000 is pretty short from front to back, but for every inch you take off the computer, the airlines take another from between the rows in coach. I'd really appreciate it if you would just build the screen into the top of the T1000 the way Tandy does with the Model 100. Then I wouldn't have to give up computing every time the guy in front of me takes a nap.

I also wish you had designed the T1000 as though it were clearly a second computer. In other words, I wish you would buy the rights to Traveling Software's

*(continues)*

*When you travel, adding 10 or 12 pounds and another briefcase-size thing to carry might seem a reasonable thing to ask. But in reality it's a big hassle.*

clothes are in either a garment bag or a small overnight case, and the other stuff is in a canvas briefcase (which is lighter than leather).

When you travel, adding 10 or 12 pounds and another briefcase-size thing to carry might seem a reasonable thing to ask. But in reality it's a big hassle, particularly if you end up unhappy with what that 10-pound, briefcase-size machine gives you. For instance, try doing a little computing in the airport boarding area after your flight has been delayed for another hour and the sun also happens to be setting. No matter which way you sit—choices are limited since most airport chairs don't move—you can read the screen only by bending over so far that it's impossible to use the keyboard at the same time. After 2 hours in the Seattle-Tacoma airport, I decided that 10 pounds was indeed too much extra weight to carry

weight problem. You recently introduced a new laptop computer, the T1000, that weighs only 6.4 pounds. This is great! The T1000 just about fits into my briefcase. (It's a bit long, but I can pull the zipper around it.) That means that I don't have an extra thing to lug around, and it only increases the weight of my usual stuff by 6 pounds.

This leads me to the other half of my fantasy: convenience. I really have to compliment you on your past efforts. You were smart to introduce the feature that lets me turn an external, 5¼-inch drive into the start-up drive (so that I can use copy-protected software) just by flipping a switch. And your newest innovation—putting DOS 2.11 in the ROM of the T1000—is simply brilliant. It means the computer boots up quickly without having a disk in the drive, and it means I don't have to cart my DOS disk around. All I need is a single disk with something like Software Publishing's *pfs:first choice* or Micro-

# UNLEASH YOUR 80386!

Your 80386-based PC runs at least twice as fast as your old AT. This is good, but not great. The products described below will unleash the true potential of your 80386, giving you 4 to 16 times the power of your old AT. These new MicroWay products include a family of 80386 native code compilers and the mW1167 numeric coprocessor.

Examples of the increases in capacity and performance include:

- Programs compiled with MicroWay

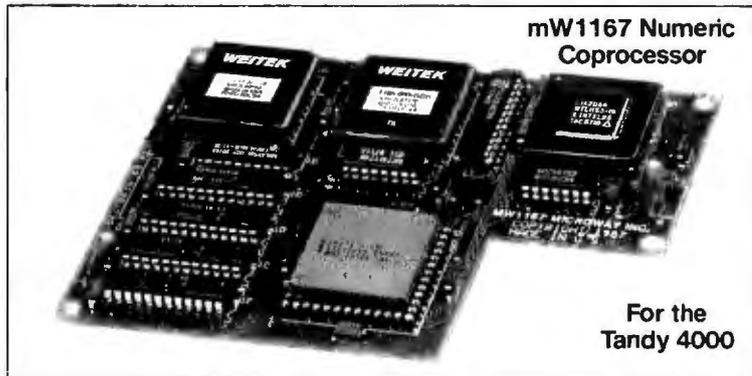
NDP Fortran-386 execute 2 to 8 times faster than those compiled with existing 16-bit Fortrans. NDP Fortran-386 can also address up to 4 gigabytes of memory instead of the standard 640 kbytes. MicroWay's NDP compilers and the programs they generate run on MS-DOS or Unix V.

- NDP Fortran-386 generates code for the 80287, 80387 or MicroWay's mW1167. The mW1167 has a floating point throughput exceeding 2.5 mega-

flops, which is 4 to 5 times the throughput of an 80387 and is comparable to the speed achieved by the VAX 8600.

Equally important, whichever MicroWay product you choose, you can be assured of the same excellent pre- and post-sales support that has made MicroWay the world leader in PC numerics and high performance PC upgrades. For more information, please call the Technical Support Department at

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## MicroWay® 80386 Support

### MicroWay 80386 Compilers

NDP Fortran-386 and NDP C-386 are globally optimizing 80386 native code compilers that support a number of Numeric Data Processors, including the 80287, 80387 and mW1167. They generate mainframe quality optimized code and are syntactically and operationally compatible to the Berkeley 4.2 Unix f77 and PCC compilers. MS-DOS specific extensions have been added where necessary to make it easy to port programs written with Microsoft C or Fortran and R/M Fortran.

The compilers are presently available in two formats: Microport Unix 5.3 or MS-DOS as extended by the Phar Lap Tools. MicroWay will port them to other 80386 operating systems such as OS/2 as the need arises and as 80386 versions become available.

The key to addressing more than 640 kbytes is the use of 32-bit integers to address arrays. NDP Fortran-386 generates 32-bit code which executes 3 to 8 times faster than the current generation of 16-bit compilers. There are three elements each of which contributes a factor of 2 to this speed increase: very efficient use of 80386 registers to store 32-bit entities, the use of inline 32-bit arithmetic instead of library calls, and a doubling in the effective utilization of the system data bus.

An example of the benefit of excellent code is a 32-bit matrix multiply. In this benchmark an NDP Fortran-386 program is run against the same program compiled with a 16-bit Fortran. Both programs were run on the same 80386 system. However, the 32-bit code ran 7.5 times faster than the 16-bit code, and 58.5 times faster than the 16-bit code executing on an IBM PC.

NDP FORTRAN-386™ .....\$595  
NDP C-386™ .....\$595

### MicroWay Numerics

The mW1167™ is a MicroWay designed high speed numeric coprocessor that works with the 80386. It plugs into a 121 pin "Weitek" socket that is actually a super set of the 80387. This socket is available on a number of motherboards and accelerators including the AT&T 6386, Tandy 4000 and MicroWay Number Smasher 386 (Jan. '88). It combines the 64-bit Weitek 1163/64 floating point multiplier/adder with a Weitek/Intel designed "glue chip". The mW1167™ runs at 3.6 MegaWhetstones (compiled with NDP Fortran-386) which is a factor of 16 faster than an AT and 3 to 5 times faster than an 80387 .....\$1495

Monoputer™ - The INMOS T800-20 Transputer is a 32-bit computer on a chip that features a built-in floating point coprocessor. The T800 can be used to build arbitrarily large parallel processing machines. The Monoputer comes with either the 20 MHz T800 or the T414 (a T800 without the NDP) and includes 2 megabytes of processor memory. Four or more Transputers can be easily linked together to form a Quadputer. A single T800 is comparable in speed with an mW1167-equipped 80386. The compilers to drive one or more Monoputers include Occam, C, Fortran, Pascal and Prolog.

Monoputer T414-20<sup>1</sup> .....\$1495  
Monoputer T800-20<sup>1</sup> .....\$1995  
Biputer™ T800/T414<sup>2</sup> .....\$4995  
Quadputer™ T414-20<sup>2</sup> .....\$6995

<sup>1</sup>Includes Occam    <sup>2</sup>Includes TDS

### 80287 ACCELERATORS

287Turbo-10 .....\$450  
287Turbo-12 .....\$550  
287TurboPlus-12 .....\$629

### 80386 Multi-User Solutions

AT8™ - This intelligent serial controller is designed to handle 8 users (16 with two boards) in a Xenix or Unix environment with as little as 3% degradation in speed. It has been tested and approved by Compaq, Intel, NCR, Zenith, and the Department of Defense for use in high performance 80286 and 80386 Xenix or Unix based multi-user systems .....\$1299

MicroPort Unix 5.3 is a port of the new Unix 5.3 to the 80386. MicroWay NDP-386 compilers currently run on this version of UNIX.

MicroPort Unix 5.3 .....from \$399

PC-MOS-386™ is an 80386 operating environment that turns an AT with an AT8 into an MS-DOS multi-user system. The system makes it possible to run applications such as Lotus 1-2-3 on terminals. The operating system also has a Phar Lap compatibility mode that runs programs developed with the Phar Lap versions of MicroWay's compilers .....from \$199

Phar Lap™ created the first tools that make it possible to develop 80386 applications which run under MS-DOS yet take advantage of the full power of the 80386. These include an 80386 monitor/loader that runs the 80386 in protected linear address mode, an assembler, linker and debugger. These tools are required for the MS-DOS version of the MicroWay NDP Compilers. Phar Lap Tools .....\$399

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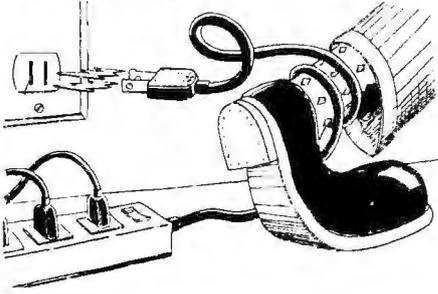
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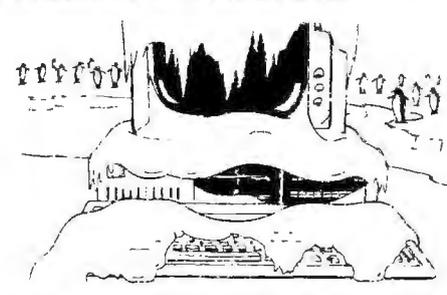
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*Stewart Alsop is editor and publisher of P.C. Letter and a Contributing Editor for PC World.*

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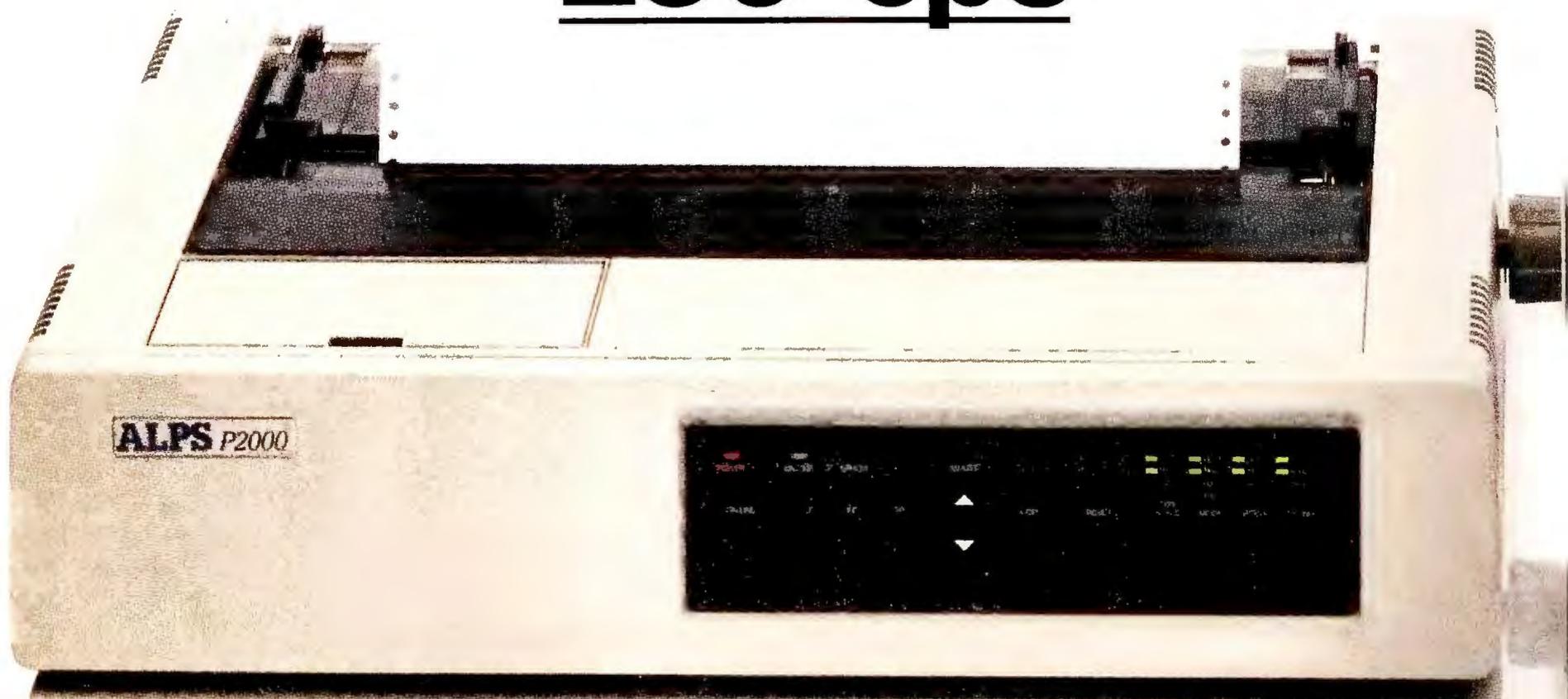
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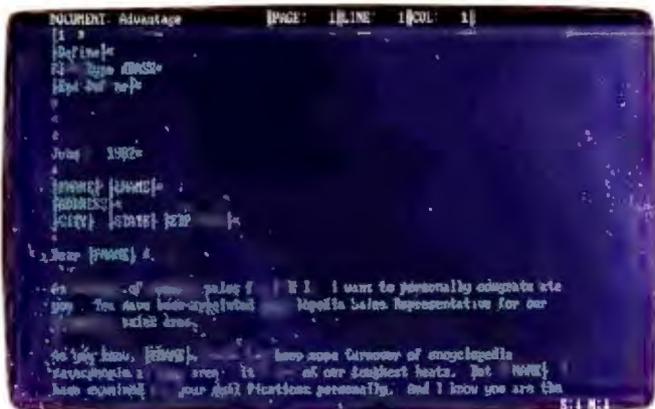
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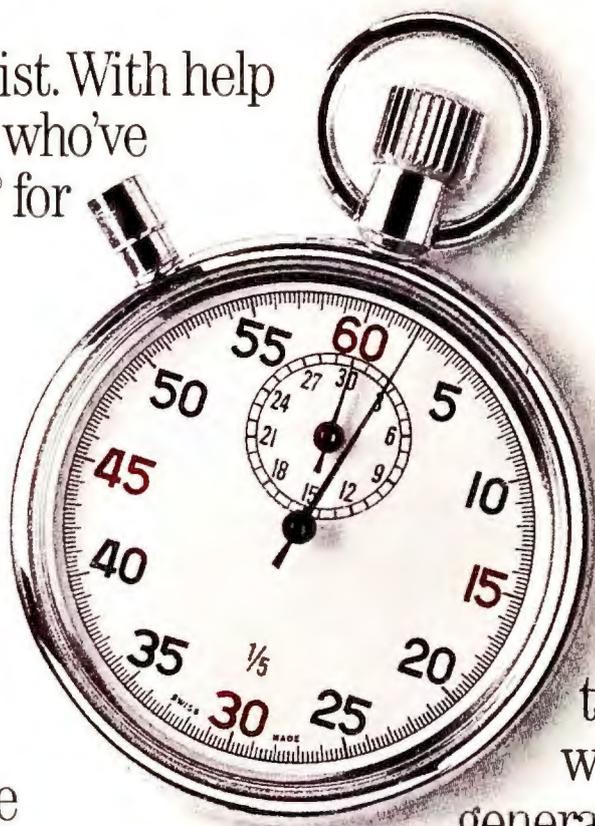
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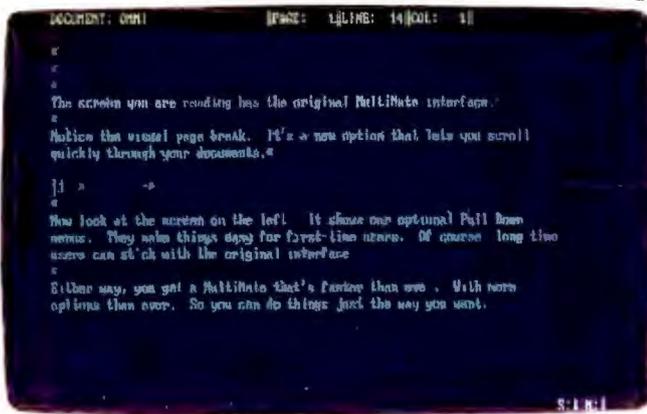
  
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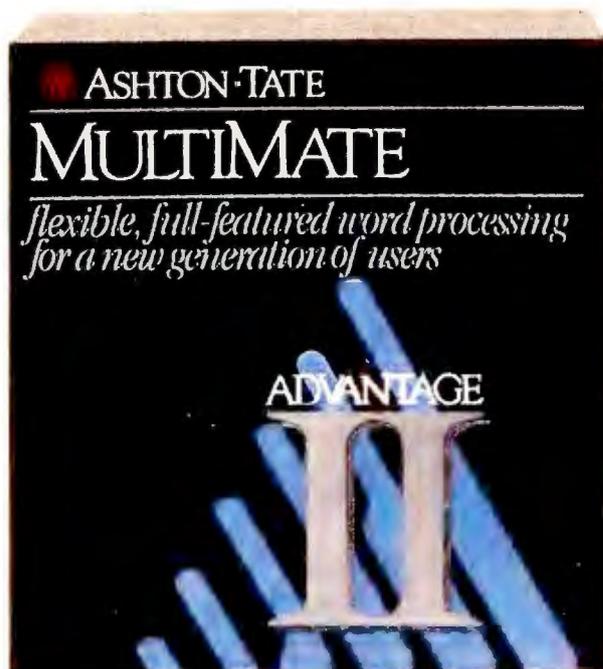
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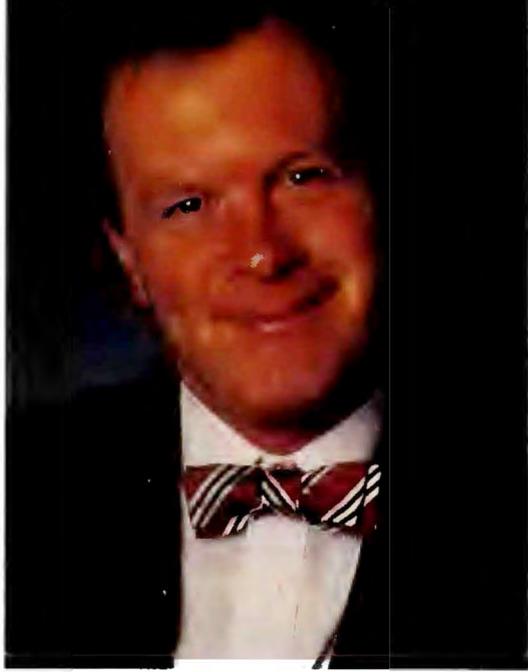
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# On IBM: Does OS/2 Extended Lock Out Clones?



William F. Zachmann

Is OS/2 Extended Edition just another operating system, or will it close the door on the open system forever? PC World columnist William F. Zachmann takes a look.

IBM seems to be sending two almost contradictory messages about its PS/2 line of computers. First, IBM wants everyone to know that the PS/2 is an "open system" in the same way that the earlier IBM PC, XT, and AT models were. Second, IBM wants everyone to believe that unless they get on the PS/2 bandwagon, they are in danger of being unable to take advantage of all the good stuff IBM will do in the future.

IBM's OS/2 Extended Edition version 1.1 is the most tangible example of what that good stuff is supposed to be. For those who prefer not to buy a PS/2, the best way to assess what you might miss is to examine the OS/2 Extended Edition. Before that, however, we need to sort out the apparent contradictions in IBM's representations about the PS/2 and OS/2.

Everyone knows that nearly all software written for the IBM PC, XT, and AT models also runs on highly compatible systems. And everyone knows that nearly all add-in boards built for the IBM PC, XT, and AT models also work

on highly compatible systems. Examples include personal computers from Compaq, Dell Computers, NEC, Wyse, and TeleVideo, to mention only a few I happen to use.

While no system is 100 percent compatible, these and other systems are, in effect, 99 and <sup>44</sup>/<sub>100</sub> percent pure. Most of the third-party software and add-in boards developed for IBM personal computers work on compatibles, and most compatibles run IBM's own releases of PC-DOS without difficulty. I am currently running straight IBM PC-DOS 3.30 on all the compatible systems that I use.

So if IBM's new PS/2 personal computers are open systems in the way that earlier personal computers from IBM were open systems, how can anyone possibly be left out in the cold? In the first place, according to IBM even OS/2 Extended Edition 1.1 will run on IBM's earlier systems that are based on the Intel 286 (the AT and the XT/286). And even if later releases of OS/2 were specific

*(continues)*

to some PS/2 models, wouldn't there be PS/2 compatibles just as there were PC, XT, and AT compatibles?

Not necessarily. The trick is in IBM's definition of *open system*. For IBM, open system means that third parties can write software for it and that third parties can build add-in boards for it. For IBM, open system does not mean that third parties can build effectively compatible systems. Or as Michael Maples of IBM's Entry Systems Division puts it, *open* does not mean *clonable*. Incidentally, this happens to be the same definition of open that Apple is using for the Macintosh II. For Apple as for IBM, open definitely does not mean clonable.

In fact, in a lengthy conversation not long ago, Mr. Maples sought to correct my impression that the PS/2 was not open the way earlier IBM personal computers were, and he quite explicitly distinguished between open and clonable. In so doing, he stated that the PS/2 was not clonable because other vendors could not legally include a Micro Channel Architecture (MCA) bus in their systems. He maintained that IBM had sufficient legal basis to prevent that and would do so.

Mr. Maples also actively sought to dissuade me from concluding that because OS/2 Extended Edition 1.1 would run on IBM AT and XT/286 models, it would therefore run on AT- and XT-compatible systems. He strongly implied that device drivers for OS/2 Extended Edition will eventually be specific to IBM hardware requiring the MCA.

If it is not legally possible to build systems with a bus that accepts boards built for the IBM MCA incorporated in the PS/2 (other than Models 25 and 30, which don't have the MCA—they have the old XT-style bus), then there is no question that IBM could establish a link between its software such as OS/2 Extended Edition and its add-in boards. Given IBM's definition of open

OS/2 Standard Edition 1.1 also includes an improved version of *Microsoft Windows*, called the OS/2 Presentation Manager.

All the kernel code for OS/2 Standard Edition will be identical in both IBM and non-IBM versions. Only the device drivers (software required to support certain add-in boards and peripherals) will be specific to IBM systems. Unless IBM deliberately in-

*It is with the IBM OS/2 Extended Edition 1.1 that proprietary linkages to specific IBM hardware begin to be possible.*

system, the possibility of the company imposing proprietary features or capabilities that can't be duplicated on competitive systems cannot be dismissed. Despite press reports to the contrary, so far IBM has strongly denied that it will license the Micro Channel.

If we assume that Mr. Maples' view is correct and that other vendors will not be able to offer systems that accept MCA boards, what then might be the types of features or capabilities that IBM could offer that would be unavailable on competitive systems? OS/2 Extended Edition 1.1 offers possible answers to this question.

IBM's OS/2 Standard Edition, of course, will be essentially identical to the OS/2 that Microsoft will license to all the other system vendors. Released in two stages, OS/2 Standard Edition 1.0 includes the multitasking kernel that provides access to the 16MB of addressable memory in the Intel 286 microprocessor (and the 386 running as a 286). The complete

includes code to prevent it, even the IBM OS/2 Standard Edition versions 1.0 and 1.1 will probably run on AT compatibles in much the same way that IBM PC-DOS releases have done in the past.

It is with the IBM OS/2 Extended Edition 1.1 that proprietary linkages to specific IBM hardware begin to be possible. OS/2 Extended Edition consists of what amounts to two applications packaged with the basic operating system: a communications package and a relational data base management system. Both offer IBM opportunities to make use of proprietary hardware.

IBM communications boards talking to IBM software already represent one of the most likely problems for users of compatible systems. Terminal adapters and local area network adapters (both

*(continues)*

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### ZSoft Announces New Windows Products

PC Paintbrush® and PC Paintbrush+, ZSoft's best-selling freehand graphics paint programs are now also available as applications running under Microsoft's Windows Operating Environment.

PC Paintbrush for Windows offers all the features of the industry-standard PC Paintbrush program, including cut-and-paste, freehand draw, flood fill, lines, circles, boxes, text, and more. PC Paintbrush+ for Windows has all the capabilities of PC Paintbrush for Windows and adds image scanner support.

PC Paintbrush for Windows is available immediately from ZSoft. PC Paintbrush+ for Windows is scheduled for release in August.

Both products run in any color and monochrome graphics modes supported by Windows.

Pictures created with the two Windows products are completely compatible with all of the DOS versions of ZSoft's graphics packages, including Publisher's Paintbrush.

### IBM PS/2 Fully Supported

The entire line of ZSoft's freehand graphics software: PC Paintbrush, PC Paintbrush+, and Publisher's Paintbrush now feature full support for IBM's new Personal System/2 line of microcomputers.

The PS/2 Model 30 is supported in both its 640x480 2-color and 320x200 25-color modes. The Model 50 and Model 60 are also supported in 640x480 4 and 16-color modes.

Publisher's Paintbrush supports the new 8514A display adapter for the models 50, 60, and 80 in 640x480 256-color and 1024x768 256-color modes!

The PS/2's graphic modes are of special interest to desktop publishers. The 640x480 resolution modes produce square pixels on the screen. When the pictures are printed on a 300 dpi printer such as a laser printer, "What You See Is What You Get", round circles on the screen are really round circles on the printout too.

PC Paintbrush, PC Paintbrush+, and Publisher's Paintbrush are all available on either 3.5" or standard 5.25" diskettes. Give us a call if you need to upgrade your current version or would like more information.

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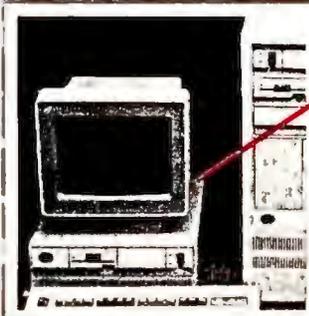


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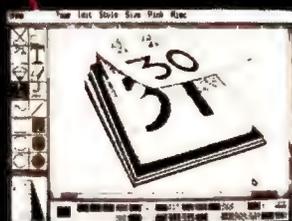
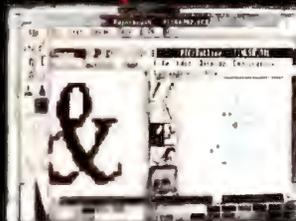
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extremely timing-sensitive, especially at high speeds) are generally a lot fussier than other add-in hardware.

IBM communications adapters built for the PS/2 MCA give IBM a prime opportunity to create

them into the PS/2 corral. But I don't think that's likely. Were IBM making all this up, competitive vendors would probably have grounds for legal action. With this much smoke, I have to believe there's also some fire.

personal computer like *Oracle* and *Ingres*; and newer products yet to be announced from a variety of other vendors.

Based on its history, there is no compelling reason to expect that IBM's new communications and data base software will be a stunning success just because it's bundled with the operating system. IBM's track record in personal computer applications software is little better than its stats for larger systems. Except for a modest (and fading) success in word processing software, IBM has not done well with personal computer applications or operating systems.

IBM's OS/2 Extended Edition 1.1 Communications Manager and Database Manager are merely horizontal applications that will ultimately stand or fall on their own merits. Like *TopView*, they may prove once again that being big and having lots of resources does not necessarily mean you can write great software that users want.

Even if IBM does succeed in its latest attempt to crack the market for personal computer applications, users will have plenty of time to decide whether they need proprietary IBM hardware to run their applications. The mere possibility of that is hardly a basis for rational people to buy systems they wouldn't otherwise buy today. ●

||| *William F. Zachmann is vice president of research at International Data Corporation.*

*It is possible that IBM has simply sought to spread fear, uncertainty, and doubt, playing on buyers' anxieties to herd them into the PS/2 corral.*

proprietary linkages with its software. If compatible systems cannot include the MCA, then IBM can link device drivers to OS/2 Extended Edition applications program interface extensions that would run only on IBM PS/2 systems.

Similarly, IBM could bundle proprietary data base management capabilities into PS/2 hardware tied to Extended Edition 1.1 or later versions if the unannounced features of the more intelligent disk controllers in the PS/2 or the even "smarter" disk controllers work as promised. It would be possible, for example, to produce what amounts to on-bus data base machines for the MCA. These would be, in effect, super-smart disk drive controllers that provide data base management functions to the system.

None of this, of course, is certain to happen. It is possible that IBM has simply sought to spread fear, uncertainty, and doubt, playing on buyers' anxieties to herd

Even assuming that IBM can create proprietary linkages between its software and add-in hardware through the MCA, the most important question remains: Will users really miss something important if they don't commit to buying MCA Personal Systems/2? The answer hinges on how important IBM applications software will be to them.

The IBM OS/2 Extended Edition 1.1 Communications Manager is basically just a communications software application that will compete wholly or partially with products from vendors like DCA, Hayes, Novell, and 3Com. Yet another alternative, in fact, will apparently be provided by Microsoft's own OS/2 LAN Manager, to be developed jointly with 3Com.

The IBM Database Manager, in turn, will compete with the wide array of established personal computer data base management systems like *dBASE III*, *R:base*, *Paradox*, and *Condor*; flat-file data managers like *Q&A*, *Reflex*, and *pfs:file*; minicomputer DBMS products recently ported to the

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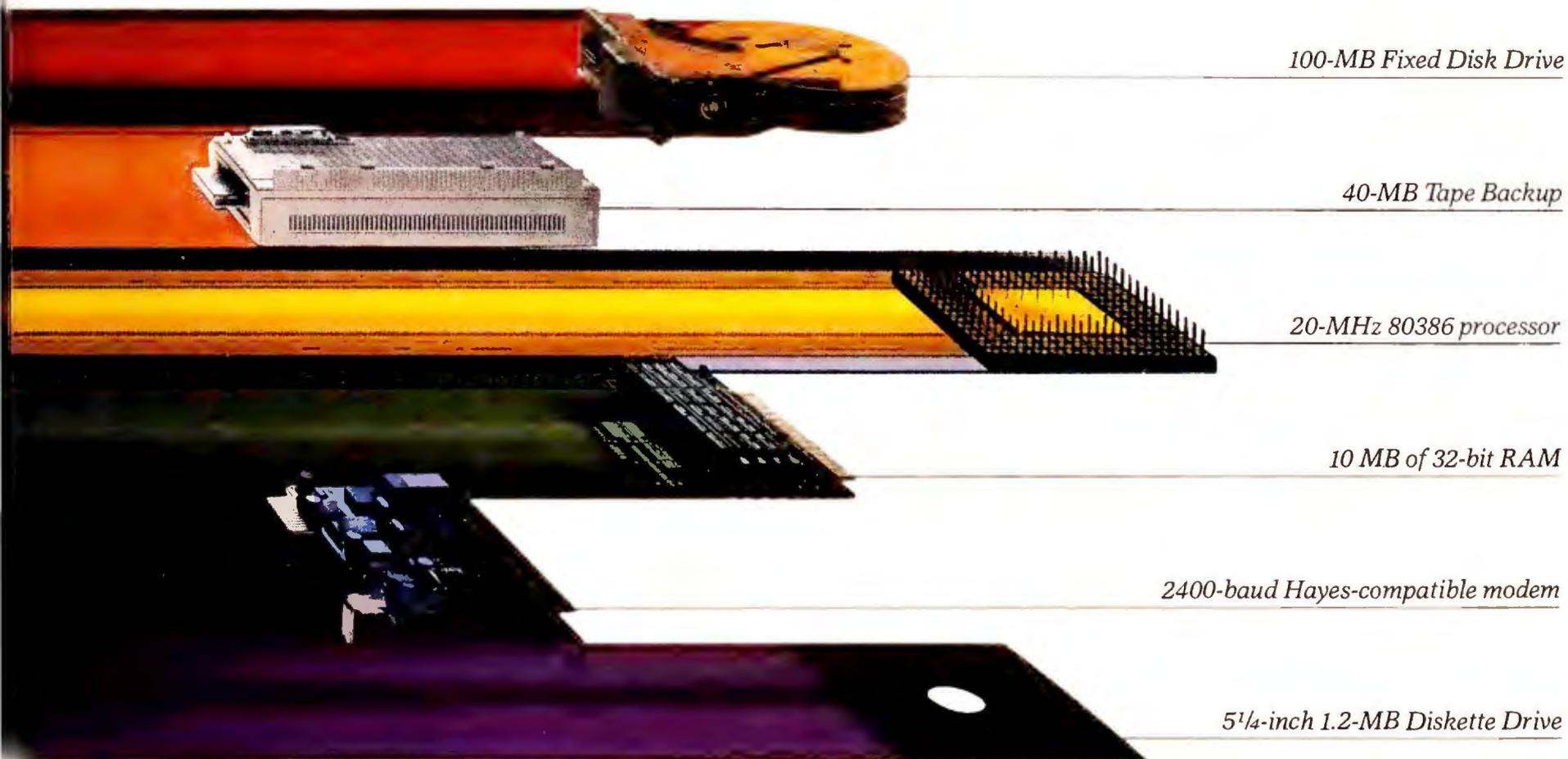
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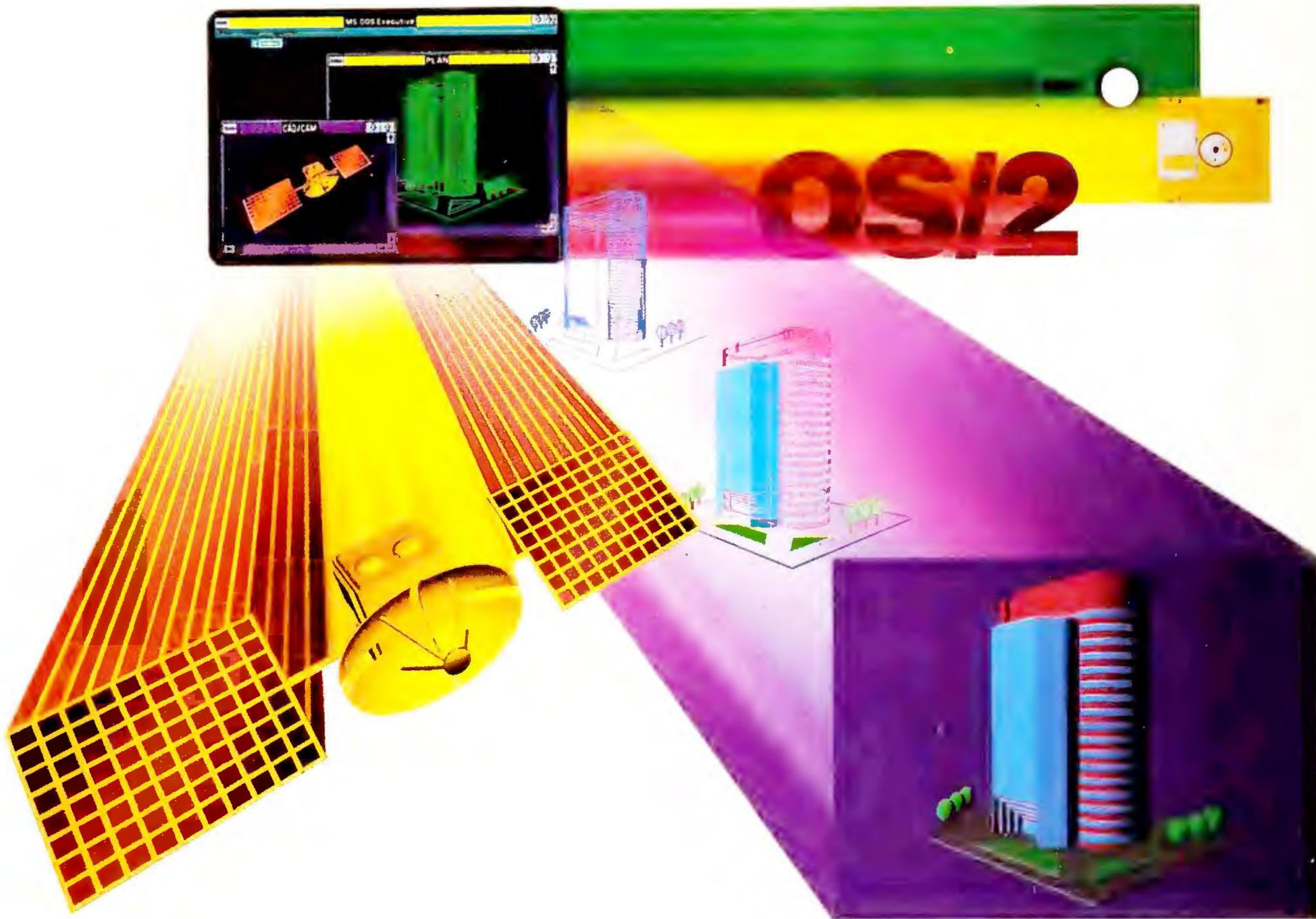
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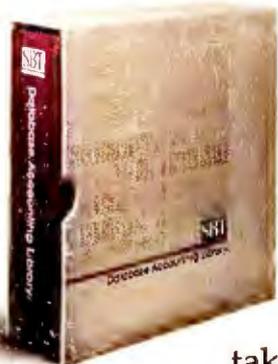
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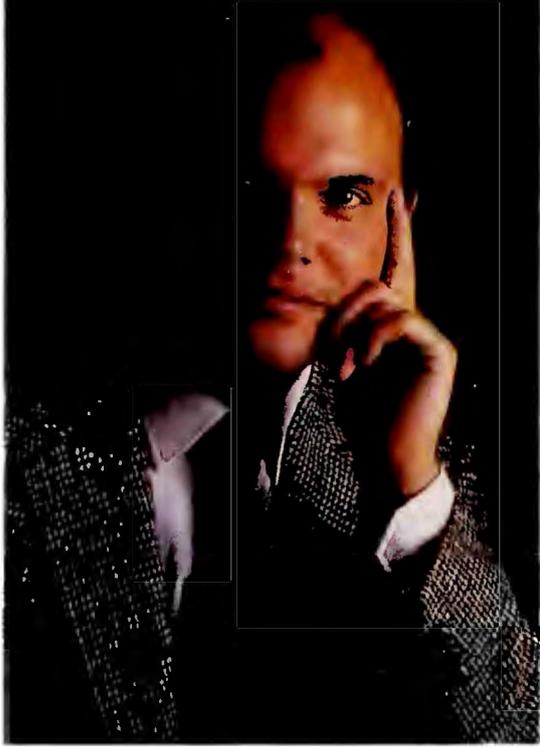
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Circle 163 on reader service card



Eric Knorr

This issue marks the beginning of a new era for PC World product reviews. Alongside our usual narrative, you'll find test information from National Software Testing Laboratories, the most respected independent testing organization in the industry.

# REMark: Putting PC World to the Test

**P**C World has always been a reader advocate. Recently, we've reaffirmed this commitment. Anita Amirrezvani's *Consumer Watch* helps resolve disputes between vendors and their customers. And Robert Luhn's *Upgrade Path* suggests common-sense strategies for beefing up your hardware, rather than urging you to dump your machine for the latest screamer.

Now we're adding a busload of value to our product reviews. Beginning with this issue, *PC World* is proud to include benchmarks and evaluations from the industry's leading source of unbiased product information—National Software Testing Laboratories (NSTL).

Since its inception in 1983, NSTL has earned a reputation as the Underwriters Laboratories of the PC industry. Renowned for its exacting, objective methodology for testing software and hardware, NSTL currently provides contract testing services for end users, developers, and manufacturers. In addition, the company publishes two respected newsletters, *Software Digest* and *PC Di-*

*gest*, neither of which accepts advertising. From here on, NSTL will apply its rigorous testing methods to products reviewed by *PC World*.

The alliance between *PC World* and NSTL springs from a common philosophy. We believe that benchmark tests should show how a product will affect your work life—not how fast a guy in a white lab coat can run a dhrystone. From the beginning, both *PC World* and NSTL have used off-the-shelf applications to test hardware, and real-life tasks to test software. Adding NSTL's evaluations to our reviews reinforces *PC World's* primary function: delivering comprehensive, meaningful product information.

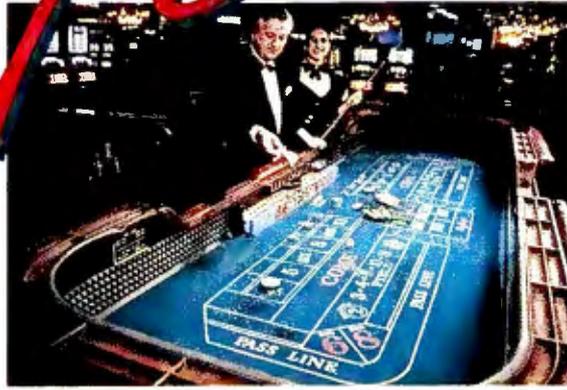
Take system benchmarks. You can, if you wish, run a floating-point calculation to time the CPU's processing speed and a BIOS disk seek to gauge the hard disk's average access time. But there's no guarantee that the test programs will reflect the performance of actual applications.

*(continues)*

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Circle 168 on reader service card

To clear this technofog, NSTL puts computers through their paces using popular software packages. NSTL's 1-2-3 test, for example, uses a 1-2-3 macro to perform a series of recalculations within a 50-by-50-cell matrix. If you're a 1-2-3 user, the test results should give you a good idea of how fast the machine will complete your own 1-2-3 jobs—even if you ignore the comparisons with industry-standard machines (which both NSTL and *PC World* routinely include).

Of course, clear-cut information is useless if you can't trust the source. NSTL's solid reputation has been built by a staff as fastidious as a team of wary tax auditors. Reliable, impartial testing methodology is NSTL's only product; without the hard-earned trust of the industry, the reason for NSTL's existence would be called into question.

NSTL's compatibility testing provides a graphic illustration of the company's exhaustive approach. In *Software Digest*, you'll find a table indicating a given software package's compatibility with no fewer than 78 PC compatibles. And for NSTL to certify that a clone can run a program, NSTL doesn't merely boot up a package, it tests every aspect of program operation.

That type of thoroughness inspires confidence. One sign of the industry's faith in NSTL came

(continues)

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from IBM: Big Blue had NSTL test the PS/2 Models 30, 50, 60, and 80 months before the machines were publicly introduced. The results were published in the April 1987 issue of *PC Digest*, which quickly became the most sought-after source of information about IBM's new line.

Despite backing from an independent organization, don't imagine that *PC World's* editors will end up sitting on their hands. We'll continue striving to present technical product information in readable, useful form. Rather than overpower product reviews with specs and speed tests, we'll present the most significant NSTL information in a format that will illuminate rather than confuse the issues underlying product selection. Meaningful benchmarks are invaluable for comparing products, but evaluations of reliability and ease of use are just as important.

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Eric Knorr is a Senior Associate Editor for *PC World*.

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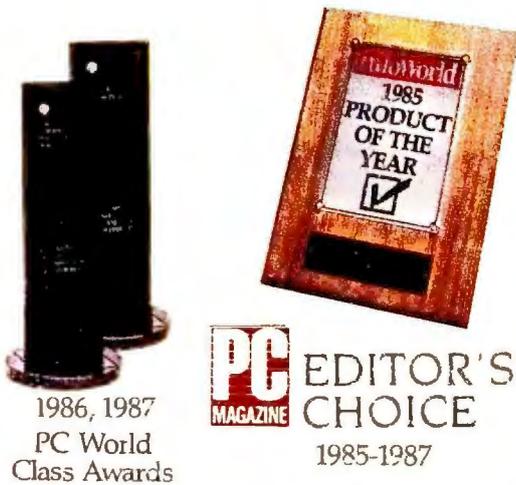
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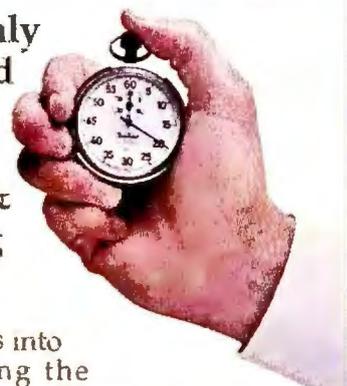
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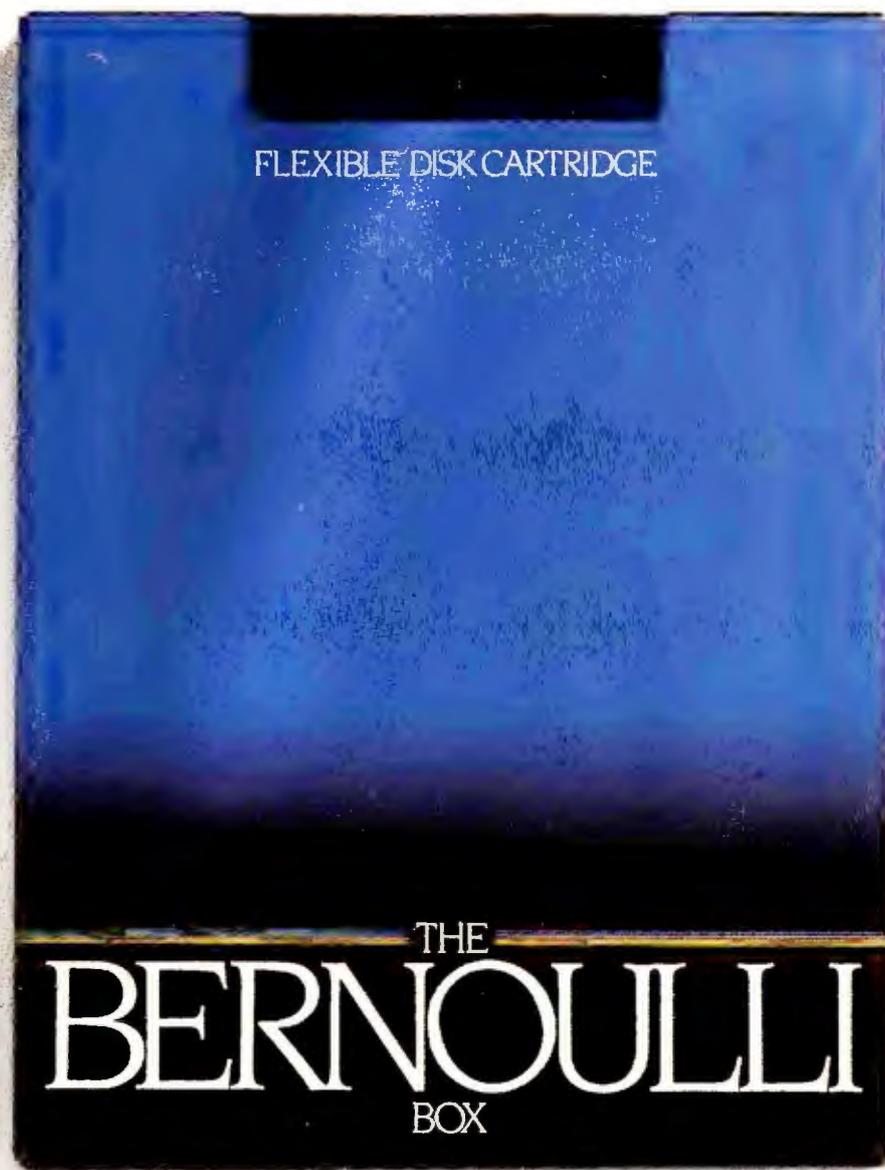
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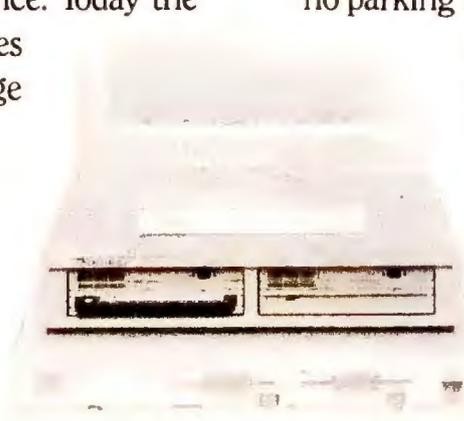
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# Top of the News

## Compaq Plays a Pair of 386s

Reasserting its claim to performance leadership, Compaq Computer has introduced two new high-end 80386-based computers—a lunch-box-style totable and a desktop model. Both run at 20 MHz with no wait states and use 1.2MB 5¼-inch floppies instead of the 3½-inch disks that IBM and Tandy are promoting. The Compaq Deskpro 386/20 includes the Intel 82385 cache controller chip to provide a 25 percent speed increase in memory operations over non-cached machines. It also has a dual-bus architecture that can

handle 32-bit, 20-MHz memory calls without sacrificing compatibility with AT peripherals. The Deskpro 386/20 comes with 1MB of 80ns 32-bit RAM expandable up to 16MB on its system board and room for four half-height storage devices. It includes one floppy drive and a choice of three hard disks. The 60MB hard disk version sells for \$7499; the 130MB and 300MB hard disk versions go for \$9499 and \$12,499, respectively. Meanwhile, Compaq's Portable 386 is a

formidable competitor in the portables arena (see *Product Outlook*, "Portable Punch," in this issue). It shares the profile of Compaq's 80286-based Portable III, equipped with the same 10-inch gas plasma display and weighing the same 20 pounds. But its speed, memory options, and price make it clearly a power user's machine. Nota bene: Compaq will discontinue the original Portable and the 70MB- and 130MB-equipped models of the 16-MHz Deskpro 386, in part because of the new introductions.

## Expanded Memory Spec Expands

The Lotus/Intel/Microsoft expanded memory specification (EMS) has been revised to include support for multitasking, expansion of the 8MB memory limit to 32MB, and the ability to execute program code from expanded memory. Additionally, AST Research executive vice president Tom Yuen has agreed to drop the competing enhanced expanded memory specification (EEMS) now that EMS version 4.0 supports context switching (the simplest form

of multitasking). EMS 4.0 is downwardly compatible with EMS version 3.2 expanded memory hardware and software. But many of EMS 4.0's benefits will be realized only in future products. For example, memory resident programs will run entirely out of expanded memory, thereby reducing the drain on main memory. Families of products such as 1-2-3 add-ins will be able to share data in expanded memory. The specification

will support larger and faster spreadsheets, RAM disks, print buffers, and disk caches. Intel Personal Computer Enhancement Operation and AST are expected to introduce new expanded memory boards that exceed the current 4MB capacity of Intel's AboveBoard and AST's Rampage and Advantage boards, but neither company will confirm this. Intel will provide a new EMS 4.0 device driver free to AboveBoard users who call 800/538-3373.

## Software Publishing Updates pfs:first choice

Software Publishing has added graphics, enhanced file transfer, and a 20,000-word thesaurus to its best-selling integrated package for new users. *pfs:first choice 2.0*, which began shipping in mid-October, adds presentation-quality graphics to four other modules—word processing, spreadsheet, file manager, and telecommunications. Software Publishing has enhanced the

package's speed and added file-conversion facilities for accepting data from other *pfs* programs, 1-2-3, and *dBASE III* as well as from ASCII files. Other additions include a pop-up calculator with 35 functions, a sorted mail-merge capability, and the ability to print multiple-across labels or 250-character-wide output. The original *first choice*, which has sold more than 100,000 copies and established

a new market for entry-level integrated software, has recently been challenged by *WordPerfect Executive* and *Microsoft Works*. The new *first choice* will carry its namesakes' \$149 price tag, although the original package has been widely discounted to below \$100 since its introduction.

### Microsoft Takes On Lotus With Excel

With a spate of new product announcements threatening an all-out spreadsheet war, Microsoft is launching what could be the most daunting challenge yet to Lotus Development's *1-2-3*. The Redmond, Washington, giant has embarked on a risky strategy that relies on the much greater speed, memory and disk capacity of today's hardware as a platform for delivering what may be the most powerful

spreadsheet to date. *Excel*, a \$495 PC version of Microsoft's best-selling Macintosh spreadsheet, requires at least an 80286-based IBM compatible with a hard disk and an EGA, VGA, or Hercules Graphics Card. The program and its utilities require a minimum of 640K of memory and 3MB of hard disk storage. One of the first core PC applications married to the *Windows* environment, *Excel* includes a run-time version of *Windows 2.0* for context-switching between worksheets. Unlike those in *1-2-3*,

multiple *Excel* worksheets can be displayed in on-screen windows and cells linked so that changes in one cell carry through to the appropriate cells in others. *Excel* worksheets can measure up to 256 columns by 16,384 rows, roughly twice the size of *1-2-3* worksheets; and its smart recalc function limits recalculations to cells where changes occur. *Excel* also has a *1-2-3*-like file manager and a gallery of 44 bit-mapped charts, compared to 5 for *1-2-3*.

---

### WordStar Vet Joins the Spreadsheet Fray

Seymour Rubenstein—godfather of *WordStar*—has thrown a new spreadsheet of his own into the ring, a speedy *1-2-3* clone with a windowed interface. *Surpass*, from a Rubenstein start-up of the same name, includes a spreadsheet, a flat-file manager, graphics, and text-editing capabilities. The *Surpass* Visual File Manager offers exten-

sive directory utilities and windowing. While *Surpass* has the same 256 columns by 8192 rows as *1-2-3*, the user can keep several spreadsheets open simultaneously in overlapping windows and join them by means of hot links that transfer data between their cells. *Surpass* enables the user to build a macro library worksheet that also works via hot links. *Surpass* is keystroke

and file compatible with *1-2-3* release 2.01, uses *1-2-3* commands in pop-up dialog boxes, and can execute all *1-2-3* release 2.01 macros. It has data base management and graphics functions comparable to *1-2-3*'s and requires only 512K of RAM and 1MB of disk space.

---

### Lotus Fights Back

As if anticipating the struggle to come, Lotus Development has let slip (directly and indirectly) a feature or two of the upcoming *1-2-3* release 3, scheduled to debut this winter. Release 3 will be able to link megabyte-size spreadsheets that are entirely resident in expanded memory, reports Lotus vice president David Reed. Release 3 will also run under DOS as well

as OS/2, says Reed. Furthermore, this latest version of the best-selling spreadsheet will not be copy protected. Although Lotus would not confirm it, the new release is expected to include a smart recalc function like that found in *Excel*, *Surpass*, and Borland's upcoming *Quattro*. It is also rumored that release 3 will have the *HAL* natural language interface bundled in. And it will include the Lotus Extended

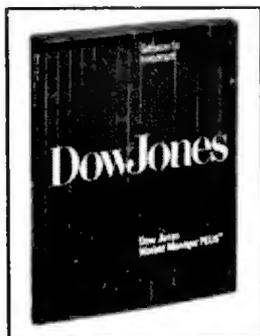
Application Facility (LEAF), which will replace current Lotus development tools and provide better links between *1-2-3* add-ins, whether in main or extended memory. Lotus refuses to say how much release 3 will cost or to get more specific about when it will be available. *1-2-3* recently passed the 3 million mark in units sold.

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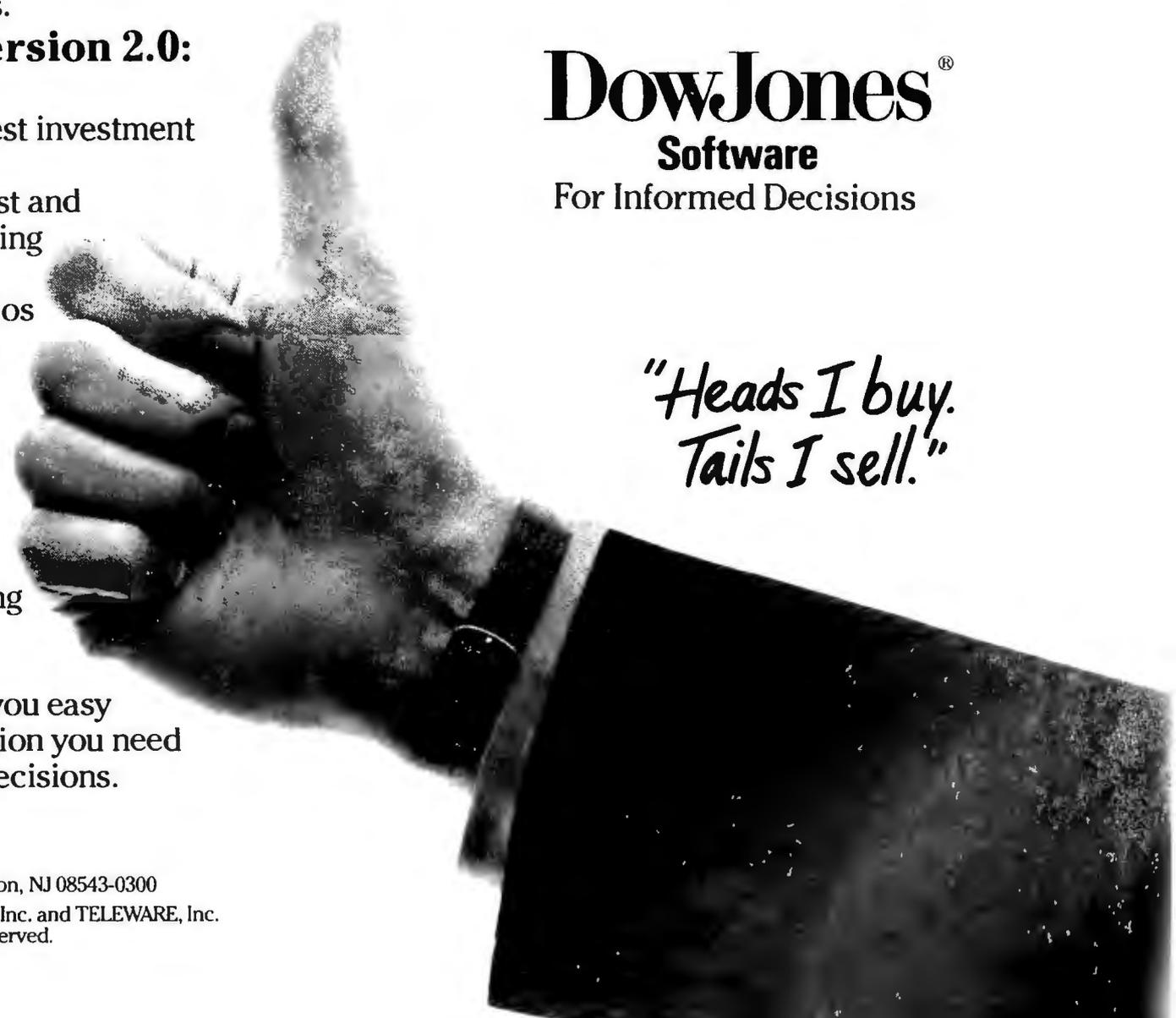
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### Blyth Launches PC Data Base

Macintosh data base publisher Blyth Software has announced its first offering for the PC environment, a relational data base to be called *Quartz*. The company, which has sold 50,000 copies of *Ommis 3* for the Macintosh, will incorporate a run-time version of *Mi-*

*crosoft Windows* in *Quartz* in order to achieve a similar user interface and context-switching capabilities. *Quartz*, which offers the user a choice of a relational or hierarchical file structure, can maintain 60 files with 2.5 gigabytes of data open simultaneously. For the sake of faster performance, it employs fixed data fields with a maximum length of 2400

characters, rather than variable-length fields. *Quartz* will ship in the fourth quarter as a single-user product and will be priced higher than *dBASE III* at either \$795 or \$895, says Blyth director of marketing Lori Thomas.

### Unisys Makes PC Push

Mainframe manufacturer Unisys has introduced an 80386 and two 80286 computers that will replace current offerings and provide greater connectivity to Unisys mainframes. The most powerful of the new Personal Workstation/2 line, the Series 800 comes with an AT-compatible bus and either a 16-MHz or a 20-MHz processor, both with one wait state. The Series 500/12, a replacement for both the PC/IT and PCmicro/IT,

features a user-selectable CPU speed of 6 MHz, 8 MHz, or 12 MHz with one wait state. The Series 300/10 replaces the 8088-based PC/HT. It has an 80286 CPU that runs at 6 MHz, 8 MHz, or 10 MHz. A range of floppy and hard disks are available for the systems. A \$9 billion company with a reputation for high-quality microcomputer products, Unisys wants to extend its share of the desktop computer market to 5 percent within the next three years, says Trevor Dodd, program manager for personal computers. He expects more

than half the new computers to be sold through retail outlets, although the new systems also are intended to help the company's \$450-million workstation business and enhance PC access to Unisys mainframes. The new computers will take advantage of numerous Unisys software and board products for synchronous and asynchronous communications between PCs and mainframes.

### Computer Associates Introduces Add-In Data Base

Computer Associates has announced *Silverado*, a data base add-in for its *SuperCalc 4* spreadsheet and for Lotus's 1-2-3. Designed by Eric Michaelman, the creator of *Reflex*, *Silverado* is a full relational data base with extensive analytic capabilities. It is intended as a personal tool rather than as a company data base, explains Michaelman, who describes *Silverado's* forte as the quick generation of re-

ports in outline format from worksheet column-and-row totals. *Silverado* employs hot links to transfer data and formulas between worksheet cells and data base fields without reformatting and accepts both text and numbers in a data base field. The user can move between different levels of the report outline; for example, from an annual budget total, the user can step down one level to monthly totals, or down another level to individual department totals, and then back up. Compatible

with 1-2-3 release 2.0 or later versions, *Silverado* reads .WK1 and .PRN files but not .WKS files; it also reads *dBASE III* files. *Silverado* uses overlays and takes advantage of its host's screen-writing and other services so that only 110K of its 275K worth of code need be memory resident at any one time. It will sell for less than \$200. ●



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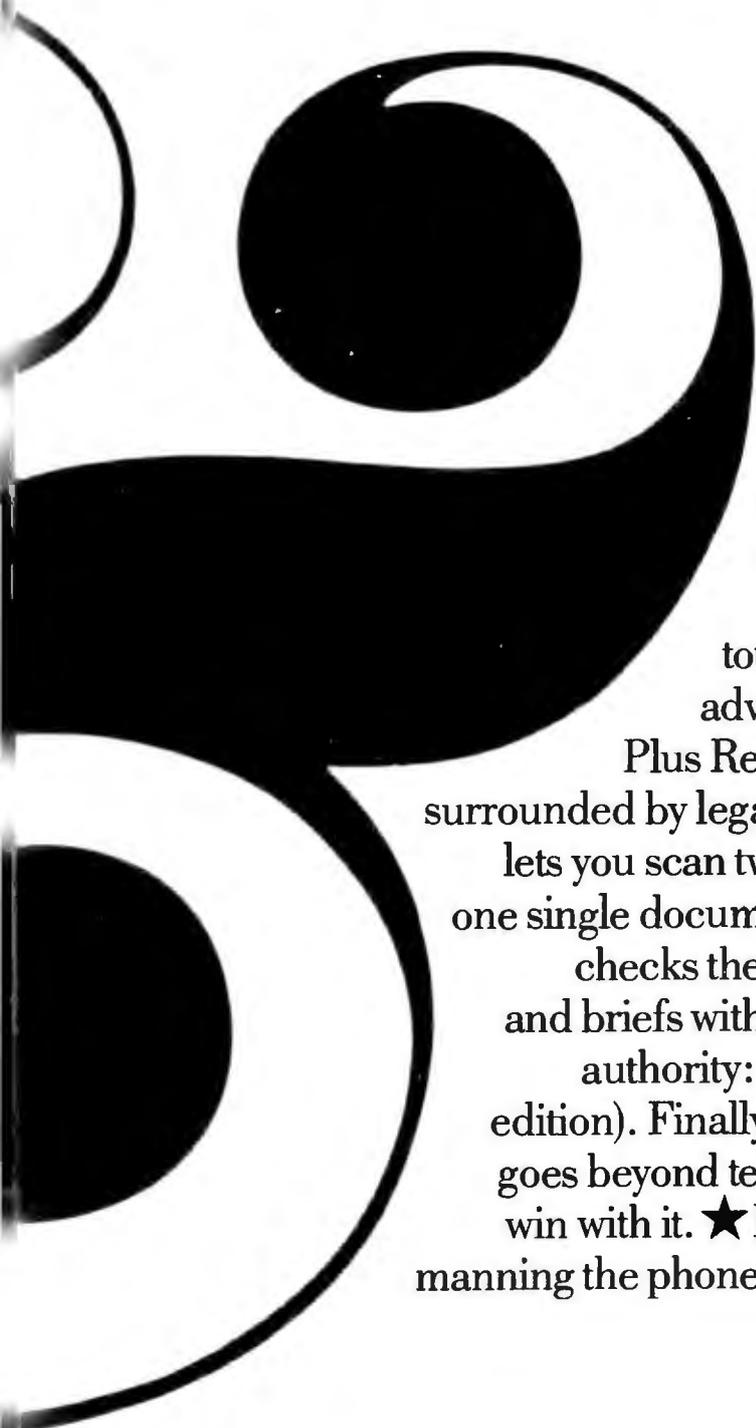
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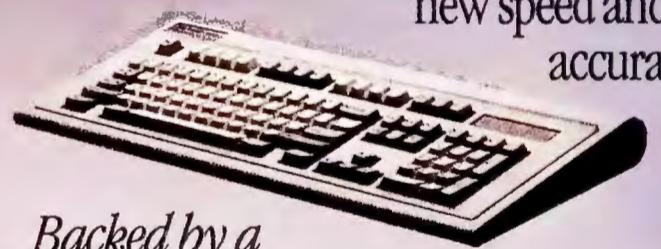
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# Industry Outlook

Edited by Eric Bender

## STANDARD EQUIPMENT

Despite the ostentatious yawns with which they greeted IBM's Personal System/2 line last spring, it looks like most big PC suppliers want to be the first (or at least the second) to offer a PS/2 compatible.

"Every major manufacturer who's currently in the market will spend R&D dollars on PS/2 compatibility in anticipation of a green light," says Rich Levandov, marketing vice president at Phoenix Technologies in Norwood, Massachusetts. "They'll all tiptoe to the line. I'm not sure what the starting gun will be." Gordon Campbell, president of San Jose, California-based Chips & Technologies, puts it even more vigorously: "I don't get the idea that anybody's holding back—it's more like a race to see who's first."

Product announcements could come as soon as this month's COMDEX Fall show, Levandov says. Most such unveilings will take place early next year, though, and volume shipments probably won't begin until mid-1988. "There'll be a lot of theater going on between now and June," he adds. Campbell predicts that deliveries of Model 50 and 60 compatibles could begin late this year, with Model 80 work-alikes following in midyear.

Component suppliers like Phoenix and Chips & Technologies may demonstrate some PS/2-style wares at COMDEX. Phoenix plans to run its emulators for the PS/2's two BIOS chips and Video Graphics Array in IBM machines at the show. "Should there be silicon available, we'll show them with silicon as well,"

Levandov says.

Chips & Technologies, which is already delivering chipsets for 80386-based AT compatibles and for AT compatibles running at an un-AT-like 16 MHz, will build on that base for corresponding PS/2 products. Support for Micro Channel



Marc Rosenthal

functionality is a given, Campbell says. Half a dozen other silicon suppliers have similar moves in the works.

Technically, "There's no barrier that can't be overcome by the people in silicon," Levandov says. "Legally, it's a whole other can of worms. IBM has made the law firms of ma-

ior vendors fairly sober. Nobody's going to do it cavalierly.

"From what we can ascertain, since 1981 IBM has given the message to the marketplace that it doesn't mind if it sets standards and people emulate them." In Levandov's opinion, what IBM does mind, and litigate against, is "actual theft of code." Companies like Phoenix and Chips & Technologies painstakingly document their engineering efforts to avoid any such charges.

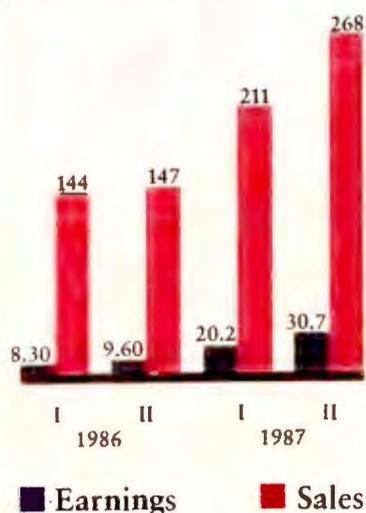
Still, uncertainties remain about where IBM might draw the line on the patents that are presumably pending. The waters have been further muddied by trademark suits against AST and Orchid Technologies, although those raise different issues.

"The good news is that IBM looks like it will license," Campbell says. "The bad news is that no

(continues)

## COMPAQ FINANCIALS

Compaq  
Financial Results  
(in millions of dollars)



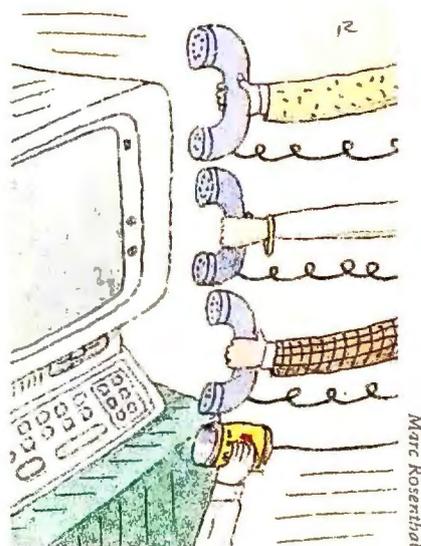
Despite IBM's launch of the Personal System/2 line in April, Compaq Computer posted strong financial results during the first half of this year. Both sales and earnings rose to record heights in the quarter ended June 30, and annualized sales crossed the billion-dollar barrier.

## MODEM MADNESS

This is a great time to buy a cheap modem, but that's bad news for the mainstream modem manufacturers. "The market isn't profitable enough, especially for the mainline companies," says Dataquest analyst Larry Cynar. "Cloning and offshore imports have hurt a lot. If people need a modem, they don't care whether it's Hayes or Hayes compatible anymore."

As the market floods with cheap chipsets that form the modem's heart, prices are being slashed for 1200/300-bps modems. Casey Dworkin, general manager of Personal Technology Research of Waltham, Massachusetts, cites an average street price in the \$100 range for a Hayes-compatible internal 1200-bps modem. Cynar places typical prices for a knock-off 2400-bps modem at \$300 or less.

Dworkin estimates that Hayes continues to hold on to 40 percent of the market's dollar value, with U.S. Robotics and Microcom at 10 percent each and the remaining 40 percent fragmented. But Hayes is seeing slow growth in overall sales dollars, he suggests. And when compatible products are selling as low as \$59, "how much profit can there be?" "Right now," says Jack Freeman, senior analyst at The Yankee Group, "every time Hayes develops a Cadillac product, the clone makers come out and kill them. The modems are getting awfully reliable. In



the area of 9600-bps communications and below, your only purchase criterion should be price."

The established modem manufacturers now are looking toward 9600-bps devices, although the high-speed modem market has already been staked out.

"Either way, we'll see 9600-bps modems making a big splash in the PC market within 12 months," Freeman posits. "We have a good solid technology at 9600, and we have enough people making the chipsets to make it affordable. It wouldn't surprise me if a year from now you could get a good 9600 plug-in modem for about \$795." Cynar cautions, though, that "there's a limit on what users will spend on a peripheral. For most people, 2400 is fast enough." Line problems and error correction, he says, inhibit the wider use of quicker devices. "Why pay for a 9600-bps modem if it's always running slower?" But down in the bps basement, analysts agree, con-

sumers can feel reasonably safe about some bargains. Unless you're a corporate computer user who needs ironclad error correction and high levels of service, Cynar suggests that you "buy cheap." —Daniel J. Rosenbaum

## STANDARD EQUIPMENT

(continued)

one understands what it's licensing, what the license will be, or when IBM will do it. If any of us knew that, we'd feel a lot more comfortable."

Campbell, whose firm is negotiating with IBM, expects Big Blue to license functional patents—in short, allowing competitors to build products that work like IBM products. What IBM won't license are design patents, which contain detailed software and hardware specifications. Ironically, says Campbell, companies like Chips that strive to add value beyond IBM's silicon don't want to copy such details.

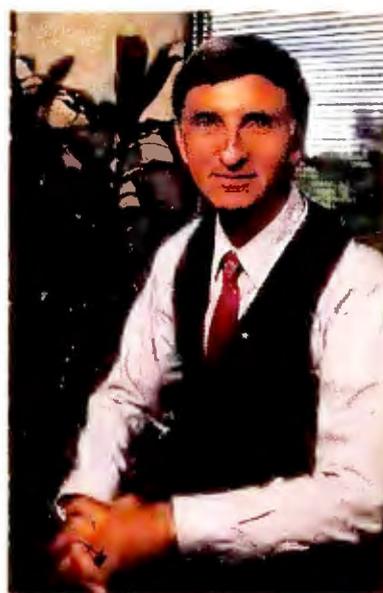
To keep a standard strong, IBM needs allies, and in some sense makers of compatibles fill that role, Campbell adds. For that reason, he doubts any major players will get slapped with a lawsuit. "From a strategy viewpoint," he says, "I can't imagine IBM doing it." As it is, IBM will enjoy a one- to two-year lead before PS/2 compatibles arrive in substantial numbers, much as it did with the PC. —E. B.

## PROGRESSIVE VOICE

The largest demonstration of speech recognition began last year when Xerox decided to take stock of itself. "Xerox has 15,000 sites in this country, ranging from warehouses to service reps' vans," says Janet Baker, president of Dragon Systems in Newton, Massachusetts. "For a new inventory control system, it needed to count everything."

Working with Dragon, within a month Xerox created an inventory-counting application, added Dragon's Voicescribe boards to slightly more than 100 PC compatibles, and shipped them out to regional offices.

"Two months later, Xerox



Michael Tomasic: on the brink of large-vocabulary speech recognition.

had counted 2.2 million pieces by voice," Baker reports. Inventory personnel

(continues)



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# EXPRESS TRAINING

David Barber, president of Interactive Training Systems (ITS), describes his client Fred Smith, founder of Federal Express, as a businessman with an offbeat mind. "Would *you* think of buying a bunch of planes and competing with the post office?" asks Barber. Today Smith's quest for perfection within his huge package-delivery service includes a crusade for "a new era in labor relationships," Barber says.

The Federal Express pay-for-performance scheme calls for setting salaries based on how workers perform on job competence tests, Barber explains. That calls for uniform training and testing for the firm's 23,000-plus field employees, and so Interactive Training Systems is building an ambitious training effort around interactive video that will be delivered on PCs.

Within two years, more than 6000 customer-service agents and 17,000 couriers will be exposed to the comprehensive program at their branch offices. A single videodisc typically offers half a day's training; the Federal Express program includes 17 videodiscs for customer-service personnel and a similar number for couriers. In addition to in-depth material on the company's service offerings, the training will provide step-by-step instruction for using Federal Express's on-line data base, one of the world's largest. Test results will be automat-

ically supplied to the employee and the corporation's personnel department. If more study is needed, individually tailored courses will be provided. Because the system is at the job site, "you can do training two hours a day, two days a week, and still do your job," Barber says. "You can take



David Barber: new roles for interactive video.

that course as many times as you want. You can promote yourself."

Plowing well over \$20 million into the effort, Federal Express is making a uniquely large investment in interactive video, but other ITS customers tend to belong to the Fortune 500. "This technology is expensive—really good, but expensive," Barber says. The cost

*(continues)*

## PROGRESSIVE VOICE

*(continued)*

learned to use the gear in an average of 22 minutes, and they overwhelmingly preferred voice to keyboard entry.

At the opposite extreme in PC-based speech recognition are the dozens of radiologists working with Kurzweil Artificial Intelligence's VoiceRAD system. Examining X-ray results, a radiologist speaks fewer than a dozen words into a microphone. Each word is translated into appropriate phrases, and a complete report prints out in well under a minute.

Such specialists represent a perfect target for speech recognition, says Kurzweil AI president Michael Tomasic. Their time is expensive, they're familiar with dictation, and they want very quick turnaround on reports. And skilled medical secretaries are expensive—if available at all. These two cases give practical examples of what speech-recognition systems

can do. Now "the industry is on the brink of releasing systems that can recognize very, very large vocabularies," Baker says. Within a few months, Kurzweil, Dragon, and others expect to offer systems comfortable with up to 20,000 words, throwing open the doors for new tasks.

Kurzweil, which is based in Waltham, Massachusetts, began delivering its 1000-word VoiceSystem two years ago, priced at \$7500. Last December the company shipped beta units of a 20,000-word system. This comes in a fair-sized box, costs a hair under \$14,000, and "we guarantee you will find bugs," Tomasic says. The company expects to release an on-board version this fall that plugs into 80386-based PCs and costs much less.

Dragon, which sells the 1000-word Voicscribe for \$1195, also has achieved 20,000-word capability in the lab. Other entrants may come from Speech Systems in Tarzana, California, or from IBM.

Commercial systems won't necessarily hit the 20,000-

word mark. ("We have yet to find anyone with a vocabulary exceeding 10,000 words," Tomasic explains.) They will require each speaker to "train" the equipment. Most will handle discrete rather than continuous speech, so that users must pause very slightly between words or phrases, although Speech Systems reportedly will offer continuous speech.

Everyone's looking for generic success stories, and Dragon's Voicscribe works right out of the box with 1-2-3 and a few other favorites. However, a Kurzweil demo shows that substantial benefits really pile up when the system is tailored for the customer—for example, tapping into a word processor's macros to save letter-writing time.

Most people aren't expert typists, and that's not going to change, Baker notes. "Speech recognition is going to give the professional the capability to get something out the door, in reasonable time, without depending on somebody else." —E. B.

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## A CLEAN SHEET

In July 1984, one month before the AT debuted, the late Philip "Don" Estridge held some brainstorming sessions with his staff and emerged with a string of product ideas. "He pointed at me and said, 'You go work on a whole new line,'" Dennis Andrews recalls. "Because clearly we understand now where this industry is going. We're in the business of building business machines, not just workbench machines." "We started with a clean sheet of paper," says Andrews, head of PS/2 development at Entry Systems Division's Boca Raton laboratories. "First thing we did was say, wait a minute—we're not in the PC business anymore. So we trained ourselves not to say *PC*; we said *workstation*." That terminology lasted until around October 1984, when *micro business system* seemed to describe it better. Andrews started work with roughly 20 people, studying customer requirements and available technology, and came up with some clear directions. First off, "We couldn't start a product line with a single machine. That doesn't work. We knew we had to make building blocks that we could use in multiple machines. We hadn't done that before. "We knew the bus had run out of gas. Nobody could understand how you could

introduce a different bus, however.... We knew that it was a 32-bit world. That was obvious." So were higher-resolution graphics with square pixels, and 3½-inch floppies—whose main justification was reliability. "We had to take a quantum leap in reliability. You can't test that in; you have to design it in."

As production neared, IBM made some choices that would later draw criticism, one being a rather slow hard disk for the Model 50. Andrews defends the decision on manufacturing grounds: "We had to launch a whole

new line of products. If we lean into the wind in too many areas and then we can't supply, we haven't helped anyone.

"I had about 350 people in the development organization when we shipped, but that's peanuts compared to the people who were in gear around IBM Corporation," he says. And once the PS/2 line was launched, the working pace didn't slacken quite as expected. Andrews quotes Ed Kfoury, Entry Systems Division's vice president for development during the PS/2 project: "We went through all this work and all this sweat just to get to the starting block."

—E. B.

## EXPRESS TRAINING

(continued)

of a complete delivery system with PC and videodisc player has dropped to \$8000, but producing two discs with a day's worth of training will set you back roughly \$250,000. Live training typically costs \$200 to \$400 per student per day, and Barber figures that a large company might recoup its video investment in 1000 student-days.

"A small company can't play in that game," he acknowledges. But as Barber points out, "the second copy of this \$250,00 disk costs \$12." Mass production is the key to lower costs, so ITS is producing horizontal products, including a 1-2-3 videodisc tutorial. If this package educates a dozen users annually and sells at \$2000, the numbers begin to look feasible.

Down the road, production expenses will be cut through the use of all-digital video, audio, and graphics. And in the long run, the compact disc, in the form of the PC-readable CD ROM, may be the cheapest vehicle for video-based training. "The CD ROM will push this technology into small companies," Barber predicts. As CD players become standard PC accessories, "the delivery cost will drop to match the price of the PC." —E. B.

## A FEW MINUTES WITH...

*Sign in the office of Danny Hillis, founder of Thinking Machines:* "I want to build a machine that's proud of me."

*Robert Shostak, cofounder of Ansa Software:* "When I first heard the phrase *terminate and stay resident*, I thought it referred to a program that had just crashed."

*Jim Archer, head of OS/2 development at IBM:* "The problem I hear most when I talk to people trying to run multiple applications is, 'I have to put the data in two or three times.' We've got to have applications that allow the user, not the application, to own the data. That's a shift in philosophy."

*Harry Lasker, vice president, Interactive Training Systems:* "Video brings a lot to the table; we didn't evolve on the planet reading green screens and print."

*Don McLagan, vice president, Lotus's Information Services Division:* "Hypertext raises the same problems as expert systems—what if I don't agree with your interpretation?" ●

|| Daniel J. Rosenbaum writes regularly on computers and communications. Mike Hogan is PC World's News Editor.

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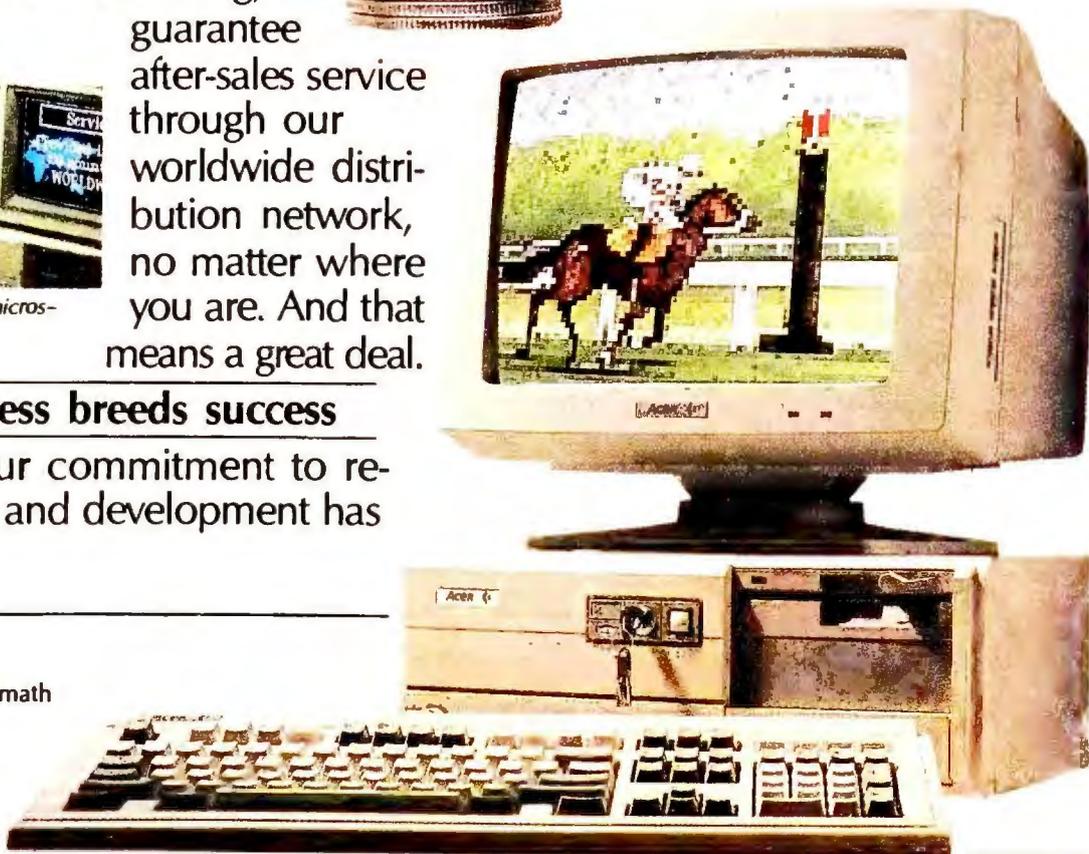
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**FIRST PRIZE** (3 winners) choose any one of three (3) vacation packages for two including airfare A) One week Caribbean cruise departing from San Juan; B) One week in Honolulu; C) One week in Acapulco.

*But we said everybody's a winner!!*

**EVERYBODY WINS** a \$100 TravelDollars certificate\*, redeemable on any vacation package, including air and ground accommodations, from a printed brochure. Just go to any travel agent and find a vacation package that most appeals to you, and bring the printed brochure home with you. Then call the telephone number on the back of your TravelDollars certificate, explain what you wish to do, and the reservations will be made. It's that simple!!

*Oh!! One more thing —*

**EVERYBODY WINS** a \$10 Logisoft discount coupon, good towards your next Logisoft purchase. So now not only have you entered this stupendous sweepstakes, but you're getting an additional \$10 off Logisoft's already low prices on their entire inventory; and you still get their 30 day money-back guarantee!! Whatta deal!!  
You receive both the TravelDollars certificate and the Logisoft coupon when you receive your order, the same order that entered you in the sweepstakes.

### SO, C'MON, CALL LOGISOFT NOW, AND LIVE LIKE ROYALTY!!

TravelDollars certificates can be used with any vacation package of \$500 or more per person including air and ground accommodations from a printed brochure. Certificates cannot be combined for use on a single trip.

#### OFFICIAL SWEEPSTAKES RULES

1. No purchase necessary. For every product ordered by phone or mail during the period September 1 through December 31, 1987, you will automatically be entered in the sweepstakes (i.e., 3 products = 3 entries). Phone and mail orders must be received by December 31, 1987. You also may enter by hand printing your name, address, telephone number, and "Logisoft Live Like Royalty Sweepstakes" on a 3"x 5" card and mailing it in an envelope, to: LOGISOFT SWEEPSTAKES, P.O. BOX 19-1764, MIAMI BEACH, FLA 33119, to be received by 12/31/87. Only one entry per envelope. Mechanical reproductions are not acceptable. Logisoft is not responsible for late, lost, or misdirected entries.

2. Winners will be selected in a random drawing by an independent judging organization about January 15, 1988. Winners will be notified by mail and may be required to sign an affidavit of eligibility and liability publicity release within 21 days of notification. Travel companions of winners will be required to sign releases. All taxes are the sole responsibility of winners. Odds of winning depend on number of entries. All prizes will be awarded. No transfers of prizes and no substitutions except by Logisoft due to prize unavailability.

3. PRIZES: One (1) Grand Prize of a one week (8 days, 7 nights) vacation for four people at a Caribbean island villa consisting of round trip air travel from any international airport

in the continental United States. \$1,260 cash allowance for meals and beverages, the services of a cook, maid, and gardener at the villa, use of a jeep and a cash allowance for fuel, and \$1,000 cash (approximate retail value \$15,000). Three (3) first Prizes: Choose from any of these vacation packages: a) One week Caribbean cruise departing from San Juan, b) one week in Honolulu, c) one week in Acapulco; all packages are for two persons and include round trip air from major gate ways, 7 night accommodations, taxes, tips, and other extras as described in the tour operator's brochures. Cruise also includes food. (Approximate retail value of the first prizes are \$4,700.00). ONLY ONE PRIZE PER PERSON.

4. Sweepstakes open to legal residents of the U.S., age 21 or over, except employees and their families of Logisoft, Inc., its affiliates, subsidiaries, and advertising agency, and Lexington Promotions, Inc. Void in FL and where prohibited or restricted by law. By participating you agree to these rules and the decisions of the judges.

5. For a list of major prize winners, send a self-addressed, stamped envelope to: LOGISOFT SWEEPSTAKES, P.O. BOX 19-1764, MIAMI BEACH, FLA. 33119 (by 2/15/88).

**LOGISOFT**<sup>®</sup>  
A MSC INTERNATIONAL COMPANY  
110 Bi-County Blvd., Farmingdale, NY 11735

**YOU ARE ENTERED AUTOMATICALLY** every time you place any order (i.e., 3 products=3 entries!) — each product ordered enters your name for all drawings. So, every product you purchase will increase your chances of winning!!

TO ORDER AND WIN CALL:

CREDIT CARD HOTLINE ..... **1-800-645-3491**

For instant processing of your credit card orders.



TERMS HOTLINE ..... **1-800-431-9037**

Our terms customers can be assigned a personal account executive and may qualify for special corporate considerations.

PURCHASE ORDER  
\_\_\_\_\_  
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TOTAL \_\_\_\_\_

# GUARANTEE

## IBM

Color Monitor 8513  
.....LOWEST PRICE CALL  
Monochrome Monitor 8503  
.....LOWEST PRICE CALL  
Enhanced Color Display  
.....LOWEST PRICE CALL

## LOGICSOFT

★EGA .....\$375  
★RGB 14" .....\$275  
★Mono 12" .....\$79  
★Multi-scan .....\$409

## NEC

Multi-sync color .....\$559

## PRINCETON GRAPHICS

LM 300 .....\$559  
RGB HX-12 .....\$449  
RGB SR-12 .....\$569  
Amber Mzx 12 .....\$149

## MITSUBISHI

Diamond AUM 1371A ...\$629

## THOMSON

12" MONO .....\$95  
14" CGA .....\$315  
14" EGA .....\$385  
14" ULTRASCAN .....\$539

## MULTI-FUNCTION BOARDS

### AST RESEARCH

Six Pack Premium  
512K) .....\$199  
Six Pack Plus (384K) ....\$199  
Rampage w/256K .....\$259  
Rampage 286 w/512K ...\$399  
Advantage (128K) .....\$349  
I/O Mini II .....\$115

### BOCA RESEARCH

BOCARAM/AT  
(w/128K) .....\$165

### COMPUTER PERIPHERALS

Half Pint I/O .....\$105  
Overachiever 512K .....\$349

## LOGICSOFT

★ AT w/128K .....\$179  
★ PC/EMS .....\$129  
★ 286 EMS .....\$139  
★ PS/PC EMS .....\$139  
★ PS/286 EMS .....\$149  
★ Multi w/384K .....\$155  
★ RAM 1/2 Card  
★ w/OK .....\$39  
★ w/384K .....\$109  
★ w/576K .....\$139  
★ I/O Mini 1/2 Cd. ....\$75

## QUADRAM

Quadboard (384K) .....\$149  
Silverboard (384K) .....\$375

## INTEL

Above Board Series  
(PC) w/64K .....\$239  
PS/PC) w/64K .....\$259  
(286) w/512K .....\$349  
(PS/286) w/512K .....\$379  
8087-2 Math  
Co-processor .....\$169  
80287 Math Co-processor  
6MHz .....\$195  
80287 Math Co-processor  
8MHz .....\$249  
80287 Math Co-Processor  
10 MHz .....\$329

## TURBO CARDS

## INTEL

Inboard 386/AT .....\$1249

## LOGICSOFT

★ Accelerator 286 .....\$249

## MAYNARD

Surprise 286 .....\$105

## ORCHID

Tiny Turbo .....\$379  
Turbo EGA .....\$459

## GRAPHICS BOARDS

### AST

3 G+ .....\$295  
Preview .....\$209

Six Pack Premium/EGA  
Series

.....LOWEST PRICE CALL

### ATI

EGA Wonder Board .....\$269

### HERCULES

Color Card .....\$155  
Graphics Card Plus .....\$189  
InColor Card .....\$299

### LOGICSOFT

Color Board .....\$75  
Mono Board .....\$79  
EGA .....\$149  
EGA 480 .....\$249

### NEC

GB1 EGA Board .....\$349

### PARADISE SYSTEMS

Auto Switch EGA .....\$219  
Auto Switch EGA 480 ...\$289

### QUADRAM

EGA Plus Graphics .....\$299  
Pro Sync EGA .....\$289

### STB

Chauffeur HT .....\$165  
EGA Plus .....\$249

### TSENG LABS

EVA 480 .....\$345

### VIDEO 7

Vega .....\$249  
Vega Deluxe .....\$299

## COMMUNICATIONS BOARDS

### AST

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5251-11 Plus .....\$629

### DCA

IRMA Board II .....\$749

## MODEMS

### EVEREX

Evercom II .....\$99  
Evercom 2400B Int. ....\$119

### HAYES

Smartmodem 1200 .....\$299  
Smartmodem 1200B

w/Smartcom II .....\$299

Smartmodem 2400 .....\$449

Smartmodem 2400B

w/Smartcom II .....\$449

### LOGICSOFT

★ 1200 .....\$129  
★ 1200B .....\$69  
★ 2400 .....\$229  
★ 2400B .....\$159

### MIGENT

Pocket Modem .....\$169

### PROMETHEUS

Pro-modem 1200 .....\$215  
Pro-modem 1200B .....\$145

### TOSHIBA

1200B Laptop Modem  
(T1100 Plus) .....\$299

## VEN-TEL

1200 Plus .....\$249  
PC Modem 2400B .....\$415

## ZENITH

1200B Laptop Modem ...\$299

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### MOUSE SYSTEMS

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### MICROSOFT

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(Serial) .....\$129

Microsoft Mouse  
(Buss) .....\$119

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### CURTIS

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Ruby .....\$59

### KENSINGTON MICROWARE

Masterpiece .....\$95  
Masterpiece Plus .....\$119

### LOGICSOFT

★ Spike Bar .....\$25  
★ Spike Block .....\$19

### NETWORX

Power Mouse .....\$119

### TRIPPLITE

Isobar 8-15 .....\$65  
Isobar 8-15 w/RM .....\$69

## KEYBOARDS

### KEYTRONIC

5151 (Deluxe) .....\$159  
KB 101-1 .....\$112

## MEMORY STORAGE

### IOMEGA

Bernoulli Box  
(10+10) .....\$1449

Bernoulli Box  
(20 Mb) .....\$1299

Bernoulli Box  
(20+20) .....\$1899

Bernoulli 10 Mb Cartdg.  
Tr .....\$169

Bernoulli 20 Mb. Cartd.  
Tr .....\$255

## HARD DISK DRIVES

### MOUNTAIN COMPUTER

Hard Drive Card  
(20Mb) .....\$499

Hard Drive Card  
(30Mb) .....\$579

MINISCRIBE Complete Line  
.....LOWEST PRICE CALL

### PLUS

Hard Card 20 Mb .....\$649  
Hard Card 40 Mb .....\$949

### SEAGATE

20 Mb H/Ht (ST225) ....\$329  
20 Mb F/Ht (ST4026) ....\$539

30 Mb H/Ht (ST238) ....\$379  
30 Mb F/Ht (ST4038) ....\$549

40 Mb H/Ht (ST251) ....\$559  
40 Mb F/Ht (ST4051) ....\$659

80 Mb F/Ht (ST4096) ....\$895

## CARTRIDGE TAPE BACK-UP

### SYSGEN

Image Tape Backup  
20 Mb Int .....\$599

## Image Tape Backup

20 Mb Ext .....\$699

## TECMAR

QIC 60 AT (Int.) .....\$1250

QIC 60 Ext Tape  
Backup .....\$1569

QIC Host Adapter  
Card .....\$125

## FLOPPY DISC DRIVES

Panasonic 360K 1/2 Ht ....\$109

Tandon TM-100 360K  
1/2 Ht .....\$99

Toshiba 360K 1/2 Ht. ....\$109  
Toshiba Ext 5.25 360K  
Drive .....\$389

## BACK UP POWER SUPPLIES

### DATASHIELD

200 Wt (PC) .....\$249  
300 Wt (XT) .....\$389

500 Wt (AT) .....\$565  
800 Wt (AT) .....\$619

### LOGICSOFT

325 Wt .....\$305  
450 Wt .....\$385

657 Wt .....\$549  
1000 Wt .....\$819



**LOGICSOFT  
CUSTOMER  
SERVICES**

## 30 Day Money-Back Guarantee

If you are dissatisfied with your order, simply call for an RA# for a full refund of product purchase price, replacement, or credit within 30 days of receipt of order. Product must be undamaged in original package and contain all documentation and its unexecuted warranty card. (Due to certain mfg. copyright restrictions, some items may not apply.)

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### ★ Items

Look for the ★ items; it identifies our Logic line of products. They are fully compatible with, but priced well below, the major manufacturers, and carry our 5 year replace or repair warranty. (You save—not by our use of inexpensive labor and parts—but through the state-of-the-art technology.)

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We carry a full stock of the most popular products—so we can ship the same day to get your order to you fast.

## Current Version Guarantee

We carry only the latest versions available and guarantee to ship the version quoted to you.

## Toll-Free Customer Service

One on-line mainframe allows instant access to customer and product information.

# We're Helping Deere



June 8, 1987 Vol 1 No 17  
**Observation Point:**  
**Deere Controls**  
 Deere & Company is calling on U.S. operations in South America to remain in the forefront of social and economic development.

**T**he John Deere Dubuque Foundry was the last "fire-and-brimstone" operation of its kind in the entire John Deere organization. All other foundry operations are now larger capacity electric melt facilities. The Dubuque Foundry cast all manner of parts for engines, transmissions, hydraulic control valves and axle housings, wheels, control levers and pedals, track components and a large variety of replacement parts for John Deere tractors long out of production. The Dubuque Foundry was a fascinating and often spectacular place.

Since its beginning in 1946, the Foundry came to represent some of the highest quality and productivity levels attainable in the Deere organization. It kept pace with changing technology and was considered the state of the art in the gray-iron casting process. But a changing economy and a company's need to consolidate foundry operations in its larger capacity facilities in Waterloo, Iowa, and Silvis, Illinois, necessitated the closing of the Dubuque Foundry. The Dubuque Foundry wasn't that old, and it wasn't antiquated. As it closed, Dubuque's facility was still one of the most productive and cost efficient operations in the chain. Unfortunately, it was too large enough, and increasing its capacity made no sense when the company was over capacity and under production.

Dubuque's was a 50,000 annual ton foundry, where Waterloo, for example, has a 175,000 annual ton capacity. The Dubuque Foundry closing represented the end of an era for Dubuque and for Deere & Company in the largest context.

Walking through the Dubuque Foundry, most visitors only saw the sights available at ground level. Few people, other than Foundry employees and maintenance personnel, saw the network of underground catacombs filled with a complex conveyor network for moving sand and scrap materials from work areas to reclaim points. Then there were the multi-storied cupola catwalks and the foundry sand delivery system. Each was accessible only by a series of narrow and steep stairways.

But the best view of overall Foundry operations had to be from the telfer cars, an overhead trainway traveled by operators driving electric cars on which ladles of molten iron were transported from the Ajax holding furnaces to the various production lines. It was really a monorail train system which required a high degree of operator skill. Many employees, who had the opportunity to learn how to operate the telfer cars during their careers,

A telfer car and pouring iron into a mold moving on a track accurately was iron occurred. In this case, the pour worker's Rick Meyer at the Foundry on the slinger. On the days Rick shakouit using castings on an overhead machine. During the last parts for old John Deere "Come and watch me hand pour molds. We do things here same way the Egyptians did 4,000 years ago."

enquiring photos of the Egyptians did these cores. The principles are the same. Rick's partner is the same age as Rick, according to Rick, a job requiring great skill to prove your skills. The slinger is a sand, packing it together, operated manually, remote control levers, and he had to be packed to maintain obsolete," says Rick. Just prior to the Foundry employees on the busy. The pair was longer in production.

PROGRAM DISK

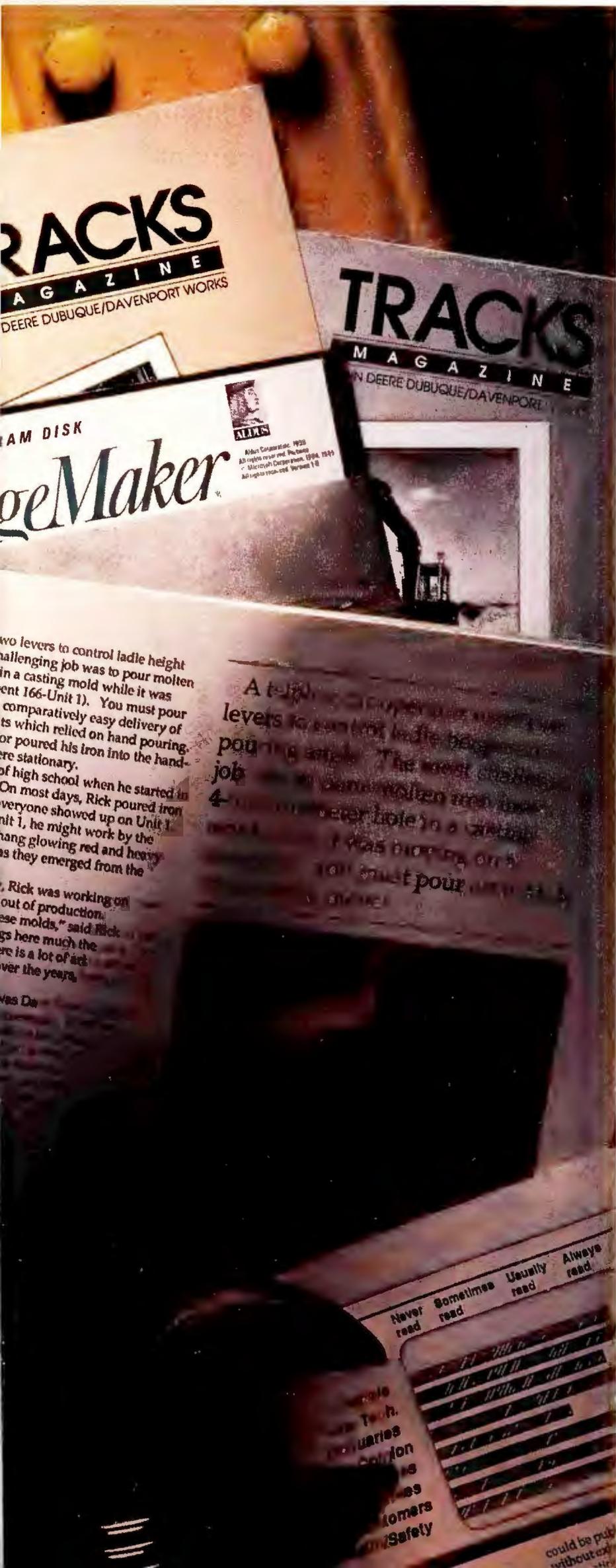
**PageMaker**  
 For use with the

**DUBUQUE WORKS**

ALICE  
 Please use insert box control disk drive



# ere Make Tracks.



John Deere's® Gary Olsen was in a quandary.

As editor of employee communications, he wanted to expand the newsletters and magazines he



produced for the people who build John Deere construction equipment at the company's Dubuque and Davenport Works. But he also needed to reduce his publishing expenses.

Then Gary Olsen heard about PageMaker® desktop publishing software.

Already he's using it to make *Tracks* magazine, a weekly newsletter, safety updates, business cards, posters—even a four-color book. All for a fraction of the cost of traditional publishing.

But that kind of success should come as no surprise when you consider that more businesses are producing more of their printed materials with PageMaker than with any other desktop publishing software.

So put PageMaker on your staff today. It'll improve your printed work by leaps and bounds.

**For a VCR Version of PageMaker,  
Call 1-800-33-ALDUS.**

To see a full demonstration of what PageMaker can do for you, order our 30-minute VHS tape for just \$9.95. Or visit your authorized Aldus dealer.

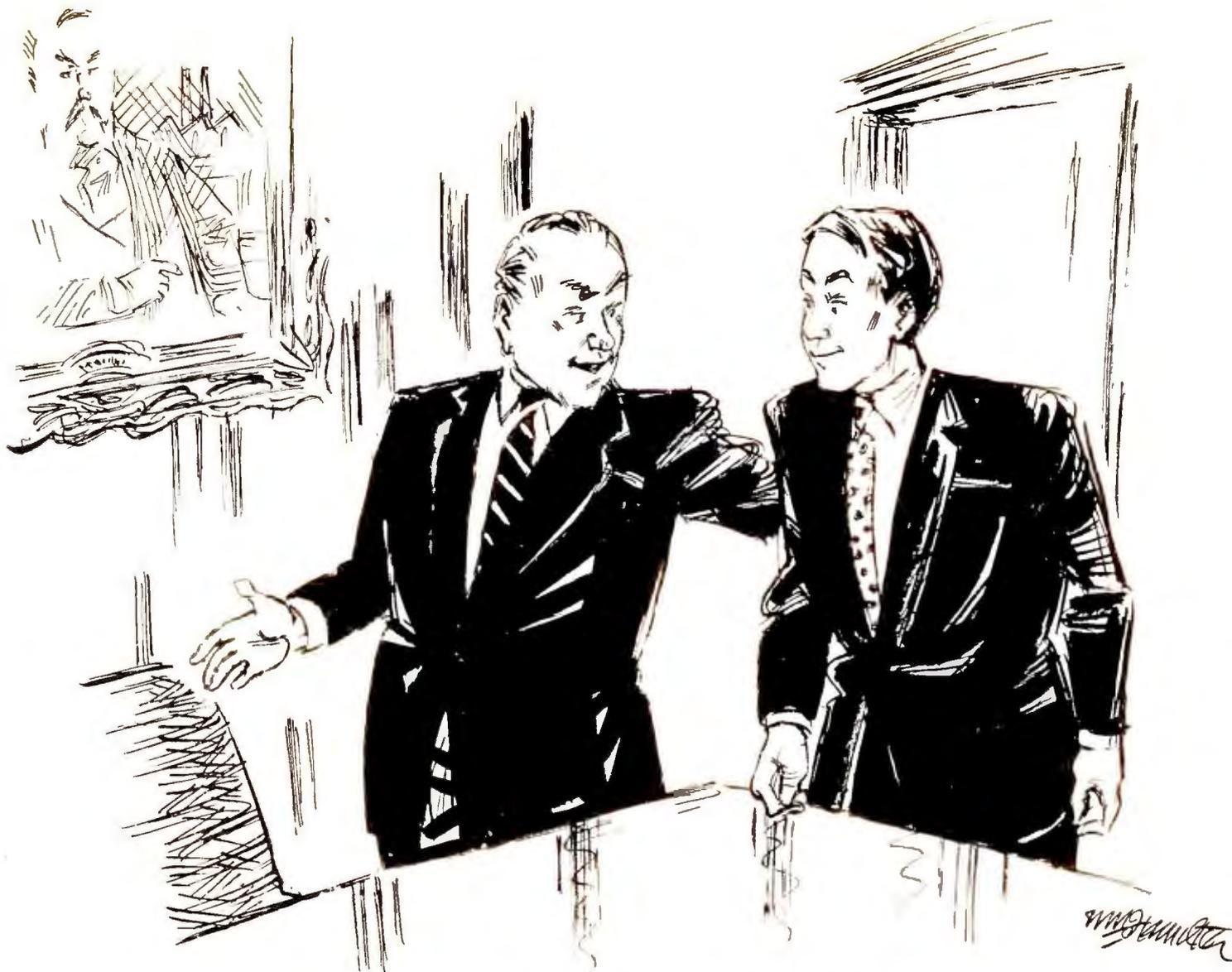


## PageMaker®

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Circle 8 on reader service card



*“Now that you’re in  
the executive suite, Dodds,  
you’ll have a company car,  
an unlimited expense account  
and Sony diskettes.”*

**W**hen you think about it, it's only fitting that leaders of industry insist on the leader in magnetic media: Sony.

Ever since the introduction of the first tape recorder in Japan, Sony has been perfecting high-density magnetic media.

That's why today Sony is a world leader in audio, video and computer magnetic storage media.

We even invented what is rapidly becoming the world standard: the 3.5" disk drive. As well as the 3.5" floppy disk.

So, naturally, we had quite a head start when the others finally decided on playing follow the leader.

And the same engineering and technology we applied to



create the finest magnetic media for our 3.5" floppies was applied to all of our magnetic computer media. So our 5.25" floppies are remarkably reliable, too.

That's why people who absolutely can't afford to lose their data insist on Sony.

But for those at the top, insisting on Sony disks isn't just a sign of high standards, it's also a sign that you've arrived.

**SONY®**  
THE ONE AND ONLY®

# Product Outlook

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News  
you can use  
about  
PC product  
announcements  
and upcoming  
releases

Edited by  
Mike Hogan

## Portable Punch

If you're a power user at the office, why give up that edge when you're on the road? Compaq figures that you don't want to, so it's pushing technology's limits again with a lunchbox-style totable that's a more powerful twin of the popular 80286-based Portable III. While the Portable 386 shares the III's profile and tips the scales at the same 20 pounds, it packs a far bigger punch, thanks to a 20-MHz, no-wait 80386 processor.

The standard Portable 386 comes with 1MB of 80-nano-second 32-bit RAM. It can be expanded to 10MB: 2MB on the system board and 8MB on an expanded memory specification (EMS) board that fits in a proprietary slot on the back of the unit.

Significantly, Compaq rejects IBM's drift toward the 3½-inch disk drive in favor of 1.2MB 5¼-inch floppies. You also have a choice of 40MB or 100MB hard disks with average access times of under 30ms and under 25ms, respectively.

The Portable 386 supports 640-by-400 resolution on its 10-inch gas plasma display and has all the

power a power user needs—160 watts. It comes with a parallel port, a serial port, an RGB video port, and a clock/calendar. Options include a 1200- or 2400-bps internal modem and an 80387 math coprocessor.

As on the Portable III, no internal I/O slots are available, but an external snap-on adapter with two AT-compatible slots accepts communications, graphics, or other boards for, say, local area networking. In fact, this machine is intended for use as an accountant's traveling LAN node. It also makes a practical data acquisition and analysis tool for scientists or a demo platform for software developers.

The new Portable 386's 101-key keyboard has been enhanced with 12 programmable function keys along the top, compared to the Portable III's 10. Cursor keys are housed on a numeric keypad.

The Portable 386 carries a heavyweight price—\$7999 for the 40MB version, \$9999 for the 100MB model. Prices for a dual-floppy model were not available at press time. Compaq Computer Corp., 20555 FM 149, Houston TX 77070.

## Excellence

More than most applications, the spreadsheet seems to keep pace with the leading computer of the time. *VisiCalc* rode the slow, floppy-based Apple II; *1-2-3* had the



Compaq's 20-pound Portable 386 has the same design and 10-inch gas plasma display as its Portable III, but with a 20-MHz CPU.

bigger, faster IBM PC. Now Microsoft has designed its DOS-based *Excel* spreadsheet to take advantage of the much greater speed, memory, and disk capacity of today's PC AT and PS/2.

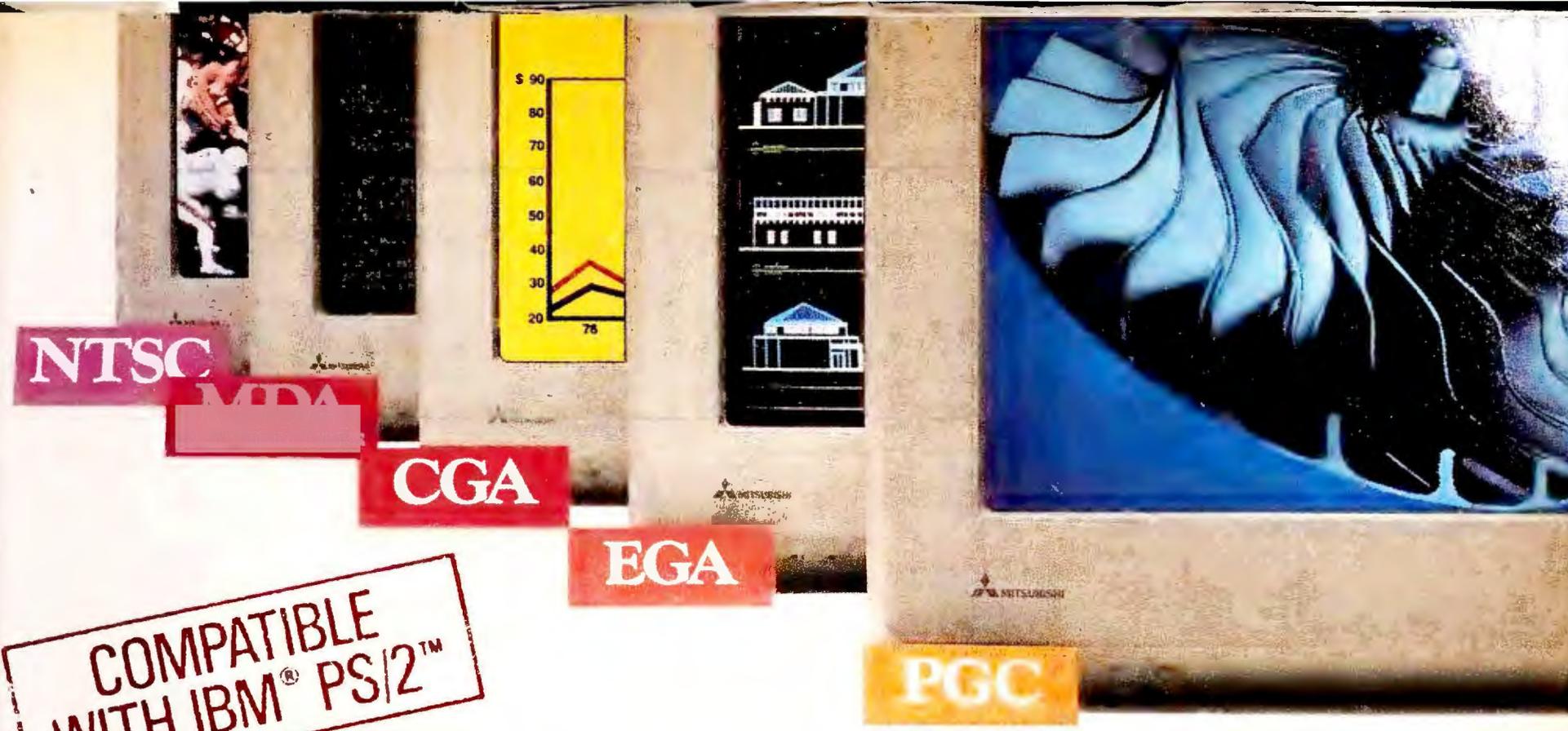
One of the first core PC applications married to the *Windows* environment, *Excel* is bigger and faster than most spreadsheets today and has more functions and greater ease of use. Its worksheets can measure 256 columns by 16,384 rows, roughly twice the size of *1-2-3*'s, and it outruns most other spreadsheets when called upon to recalculate every cell. But *Excel* also has a smart recalc function that limits most recalculations to those cells affected by changes. And *Excel* can link worksheets so changes in one are carried through to the appropriate cells in others.

Because *Excel* includes a runtime version of the new *Windows* 2.0, it can display linked and overlapping worksheets simultaneously. Worksheets are "piled" on the screen like overlapping papers on a desk; clicking the mouse

pointer on one pulls it to the top. *Excel* has copy, cut, and paste commands as well as a fill command to paste a formula into a range of cells. *Excel* cannot process different applications in *Windows* concurrently, but it does support the multiple fonts of the many *Windows*-compatible printer drivers and has a gallery of 44 bit-mapped charts. In addition to its pulldown menus, *Excel* will respond to *1-2-3* commands through its own set of macros.

Worksheet auditing, available only as an add-on in most spreadsheets, is built into *Excel*. So is the notation feature that allows you to attach comments to a spreadsheet cell and print them with it. *Excel*'s file manager resembles *1-2-3*'s. Worksheets support multiple data base tables, and there is a data-entry forms view.

*Excel* has complete file format compatibility with *1-2-3*, reading and writing .WKS, .WK1, and



**COMPATIBLE  
WITH IBM® PS/2™**

# Mitsubishi Diamond Scan.™ The New Standard In Multi-Application Monitors.

**Introducing Model AUM-1371A—The Single Solution Monitor Ideally Suited For Applications Ranging From Monochrome Text To Full-Color, High Resolution Graphics.**

Introducing the newest, most versatile high resolution color monitor in the industry today—Mitsubishi's Diamond Scan (Model AUM-1371A).

Actually five monitors for the price of one, the Diamond Scan delivers everything you'll ever need in a multi-application monitor. Including full compatibility with the IBM® PGC/EGA/CGA/MDA and Monochrome Hercules graphics boards. And for even greater flexibility, the Diamond Scan also accepts NTSC video input.

Exceptional design characteristics allow for a resolution up to maximum 800 horizontal dots and maximum 560 vertical lines on a 13V" viewing area. What's more, Mitsubishi's Diamond Scan incorporates proprietary auto-scan circuitry which automatically locks onto any horizontal frequency from 15.6KHz to 35.0KHz, and any vertical frequency from 45Hz to 75Hz.

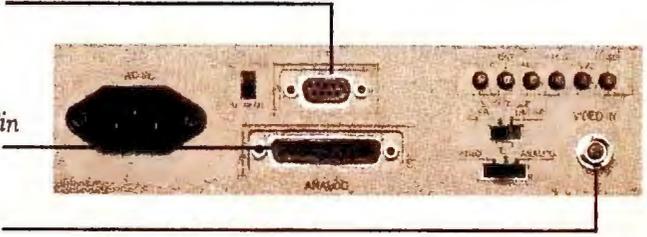


Other advanced design features include a high resolution CRT with .31 dot pitch, automatic screen image adjustment, super-high contrast panel glass for improved visibility and Diamond Matte® coating for maximum glare reduction. All packaged in a compact, ergonomically styled plastic cabinet.

*TTL Input D-9 Pin Cable Assignments and Signal Levels*

*Analog Input D-25 Pin Cable Assignments and Signal Levels*

*NTSC Video Input*



Move up to Mitsubishi's Diamond Scan—the new standard in performance and versatility by which all others will be compared.

For additional information and the location of your nearest distributor, call Mitsubishi today at 1-800-556-1234, Ext. 54. In California, call 1-800-441-2345, Ext. 54. Mitsubishi Electronics America, Inc., Computer Peripherals Division, 991 Knox Street, Torrance, CA 90502.

**NEW!**

**Graphic Board Compatibility\***

- |                                                             |                                                            |
|-------------------------------------------------------------|------------------------------------------------------------|
| <input checked="" type="checkbox"/> Quadram QuadEGA ProSync | <input checked="" type="checkbox"/> STB EGA Multi Res      |
| <input type="checkbox"/> Orchid Turbo EGA/Turbo PGA         | <input checked="" type="checkbox"/> Everex Micro Enhancer  |
| <input type="checkbox"/> Sigma Designs Color 400            | <input type="checkbox"/> Hercules                          |
| <input type="checkbox"/> Video 7 Vega-Deluxe                | <input checked="" type="checkbox"/> IBM VGA, PGC, EGA, CGA |
| <input checked="" type="checkbox"/> QDP VIVA 640/800/1000   | <input type="checkbox"/> AST Research AST-3G/Model 1       |
| <input type="checkbox"/> Paradise Auto SW EGA               | <input type="checkbox"/> ATI Graphics Solution/EGA Wonder  |

\*Partial List Only

**We've Got A Great Picture  
In-Store For You.**



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**Circle 126 on reader service card**

*dBASE* files. Its macro translator can convert most 1-2-3 macros into *Excel* macros. *Excel* requires at least an 80286-based IBM compatible with a hard disk and an EGA graphics board. The program and its core utilities require 2MB of hard disk storage. The suggested list price is \$495. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080.

## Tandymonium

The names have changed and so have most of the prices (downward); features and functionality have expanded dramatically, but Tandy Corporation's new line of IBM-compatible computers is still oriented toward budget-conscious home, education, and small business users.

Tandy has totally revamped its product line, adding an 80386-based computer, a new DOS-compatible laptop, three new versions of its AT compatibles, and a low-end PC that automatically starts up on a designated application. Tandy has also introduced several printers, including a laser printer. The 3 1/2-inch disk drive is now standard in all Tandy DOS-compatible desktops, as is the enhanced IBM 101-key keyboard.

Taking it from the top, Tandy's Model 4000 is a 16-MHz 80386 whose price without monitor or graphics adapter starts at \$2599.

The standard configuration includes 1MB of 32-bit RAM expandable to 8MB on the system board, one 1.44MB 3 1/2-inch floppy drive, and nine expansion slots. Hard disk storage options include a 65ms 20MB drive or a 28ms 40MB drive. Tandy targets this computer as an engineering workstation, a network file server, or a desktop publishing system.

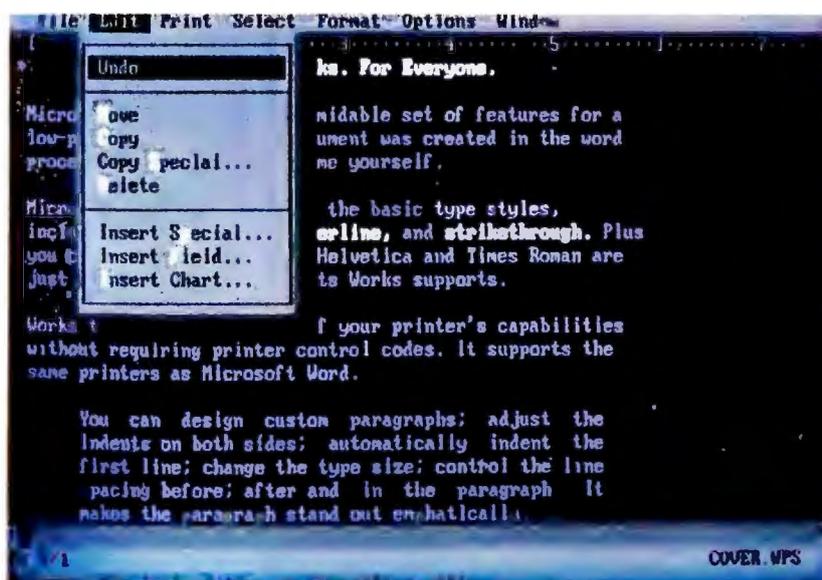
At \$1599, Tandy's first DOS-compatible laptop, the 1400 LT, occupies the low end of the laptop price scale. Weighing in at 13 pounds, it resembles the PC Convertible and comes with an Intel 8088-equivalent processor running at 4.77 or 7.16 MHz, 768K of RAM, and two 3 1/2-inch 720K floppies. The 1400 LT comes with a 25-line backlit Supertwist LCD with 640-by-200 resolution. The portable has a 76-key keyboard with 12 function keys and a rechargeable battery pack for 4 hours of use between recharges.

At the low end, Tandy hopes to ease the transition into computing for first-time users with its "instant on" 1000 HX, which automatically loads the user's predetermined application, stored in an

EEPROM chip, at start-up. Both DOS 2.11 and the core of Tandy's *DeskMate 2* productivity software are stored in ROM, while 1 of 20 user-selected start-up modes is stored in an EEPROM device. The 1000 HX comes with a dual-speed Intel 8088-2 processor, 256K of RAM expandable to 640K, and a single disk drive, all for \$699. Tandy's three new 80286-based computers start at \$1200, and its Model LP 1000 laser printer, which prints six pages per minute and has 1.5MB of RAM, sells for \$2199. Tandy Corporation/Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102.

## A Balanced Diet

If your software needs are broad but not deep, you may want to order the *Works*. Microsoft's new integrated productivity package addresses the needs of a growing number of users who want one from column A and one from column B but don't want a full course in any one application.



Microsoft Works features a Microsoft Word-like word processor and a character-oriented interface with pull-down menus.

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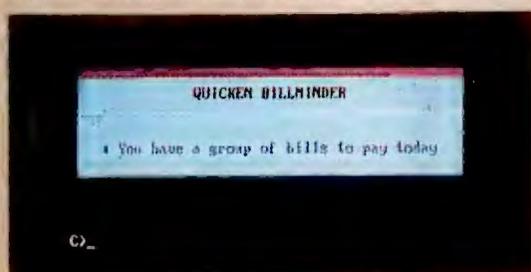
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your bills, print your checks, and update all records automatically. All you do is sign the checks.

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"I've never seen such an easy-to-use manual or software that's so simple to use." *Martin Blumenthal, in Cider Magazine*

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*Esther Dyson, Industry Analyst*

"Absolutely the best small accounting program made."

*Bob Schwabach, Universal Press Syndicate*

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**Intuit**

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*Microsoft Works* is a tasty blend of word processing, flat-file data base, spreadsheet, and communications. It also has reporting and charting modules. *Works* boasts an excellent character-oriented user interface, introduced in Microsoft's *Menu Manager*, but the program switches to bit-mapped graphics for charting. Make your command selections from a bar of *Windows*-like pull-down menus, or speed through the commands with the help of mnemonic keys. A quick summary of each command appears at the bottom of the screen, and on-line help is available.

*Works* is for a diverse group of first-time business and home users, executives, and other non-power users who want fully powered applications. *Works*' word processor, the most popular computer application and the package's most powerful module, has the same printer drivers and spelling checker as *Microsoft Word 2.0*.

*Works*' 256-column-by-4096-row spreadsheet has the functional capability of 1-2-3 release 1A and can import Lotus .WKS and .WK1 files. *Works* also includes a flat-file data manager that resides in memory for quick response. It has a form view for data entry and a list view similar to a spreadsheet.

Side dishes include a memory-resident macro utility and the ability to split the screen into four

windows. Eight graph types help turn worksheets into numbers with influence. *Works* is designed especially for new 8088-based machines like the Zenith PC Eazy. It fits on two 360K floppy disks or one 720K disk, making it ideal for disk-based portables. *Works* requires 384K of memory, DOS 2.00 or later; and CGA, EGA, or Hercules graphics. Its suggested retail price is \$195. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080.

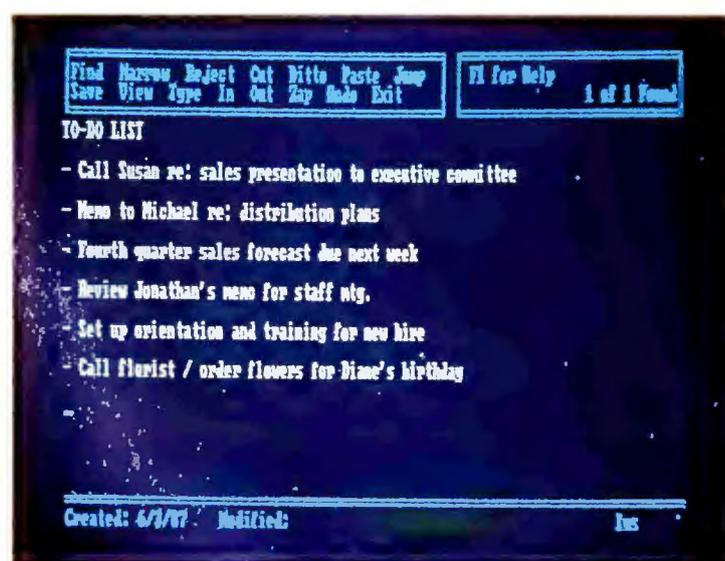
### Desk Drawer

Taking a cue from the familiar desktop metaphor, Brøderbund Software wants you to think of its new free-form data manager as a desk drawer. Throw all your random notes, addresses, to-do lists, and other such items into *MemoryMate*, and you'll find the one you want on top of the pile every time. There's no need to remember file names or designate keywords for later search with this \$69.95 data manager. Just type in

important but random thoughts using the built-in word processor. *MemoryMate* automatically indexes every word, phrase, and number you type in data base records (which can be 60 lines long).

*MemoryMate* can store 2MB of data on a hard disk and search 180K within 3 seconds. Using up to seven AND and seven OR qualifiers, it can search 72 characters per query. Since *MemoryMate* resides in memory, you can call it up at any time from the middle of your word processor, spreadsheet, or other application to retrieve or add information. You can also run it as a foreground application.

You can cut, copy, or paste among *MemoryMate* records and import and export these records in ASCII format to and from other files. An undo list saves the most recently changed records for recall. *MemoryMate*'s 15 commands appear on screen at all times, so there is nothing to memorize; help is as close as your <F1> key. A



*MemoryMate* automatically indexes every word of your random notes or to-do lists—up to 60 lines each.

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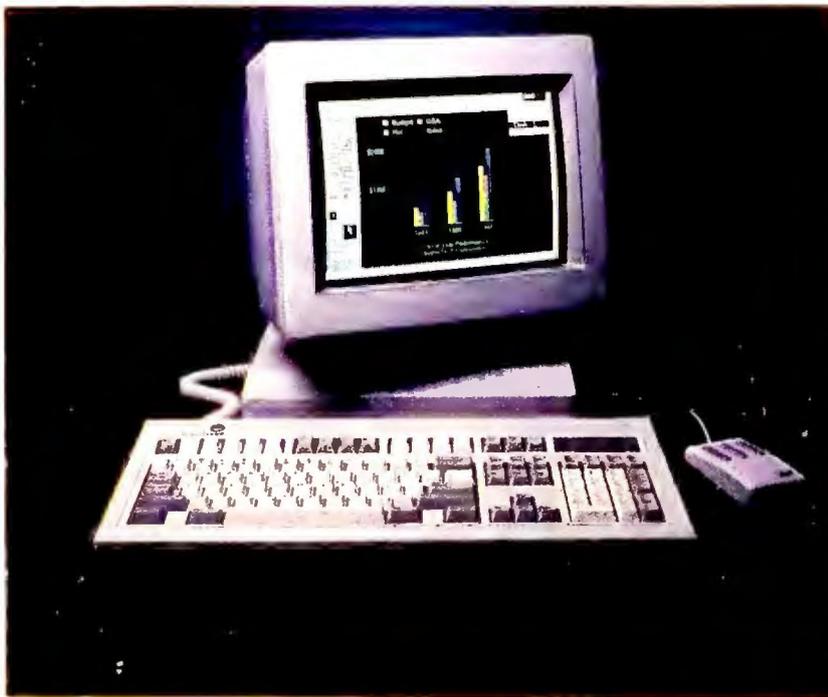
tickler feature automatically reminds you each day of deadlines, birthdays, or any other occasion you designate. Brøderbund Software-Direct, P.O. Box 12947, San Rafael, CA, 94913-2947; 415/492-3500.

### Speed of Light

Multiuser systems have long had special advantages for certain applications but have been too slow when implemented in the DOS environment. SunRiver Corporation has created a fast DOS multiuser system by employing the Intel 80386 microprocessor's virtual mode and moving data around at the speed of light.

The Cygna 386 system includes a set of dumb terminals that share the processor, memory, storage, software, and peripherals of an 80386-based host. A single CygnAdapter board in one of the computer's 8/16-bit I/O slots accommodates up to four terminals.

With the support of multiuser operating systems such as Software Link's PC-MOS 386 or Digital Research's Concurrent DOS 386, Cygna 386 can operate in the 80386's virtual 8086 mode, giving each terminal 640K of virtual memory. Data is exchanged with the host at 32 megabits per second over fiber optic cable. The wide data path of the cabling permits exchange of bit-mapped graphics with bandwidths of up to 250,000 pixels. This capability makes the Cygna 386 particularly well suited



SunRiver's Cygna 386 relies on an 80386-based host and fiber optic cables for fast multiuser operations.

for high-quality CAD, desktop publishing, and other graphics applications.

SunRiver sells four versions of its color terminals: a CGA for \$1599, and three variations of EGA color for \$1899, \$1999, and \$2299. Each terminal has an enhanced keyboard with 101 keys; two serial ports; and a parallel port for connecting a mouse, modem, or printer. Each also has a full-duplex fiber optic port. The half-size CygnAdapter supports four terminals and costs \$799. SunRiver Corp., P.O. Box 9367, Jackson, MS 39206; 601/957-0100.

### The Transformable Portable

A battery-powered portable on the road and an upgradable workstation in the office, Hewlett-Packard's new 17.6-pound computer is a great compromise. The HP Portable Vectra CS is a dual-

floppy machine designed for business travelers who need up to 10 hours of continuous computing between recharges.

Back at the office, users can turn the unit into a downsized workstation by removing its 12-inch diagonal Supertwist LCD and connecting a color or monochrome monitor via the display/printer board. Two other proprietary expansion board slots in the back of the machine accommodate a dual serial port/2MB EMS memory board or a 1200- or 2400-bps modem.

The Portable Vectra's full-size 101-key enhanced keyboard includes 12 function keys and a separate numeric keypad. The standard configuration is two 1.44MB 3 1/2-inch disk drives and 640K of main memory for \$2495. Up to 6MB of EMS RAM can be added. A socket for an 8087 math

## Case History #18048

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coprocessor, a battery module, and a recharger are also standard issue.

Based on an Intel 8086-compatible CMOS microprocessor, the Portable Vectra CS is the first of HP's new line of DOS-compatible computers. Others include a desktop 8086-compatible Vectra CS series and an 80286-based Vectra ES series running at 8 MHz or 12 MHz. An 80386-based line running at either 16 MHz or 20 MHz will be available in the first quarter of 1988, as will a 20MB hard-disk-equipped Portable Vectra CS Model 20. Hewlett-Packard, 19091 Pruneridge Ave., Cupertino, CA 95014; 408/725-8900.

### VP Plan B

When you buy a spreadsheet, you want to be in a spreadsheet, not in a menu or a data base. Paperback Software acknowledges this preference with a new iteration of *VP-Planner*, its 1-2-3 clone. *VP-Planner Plus* has the same 1-2-3-like features as the old version but provides a faster, easier way of accessing the program's unique multidimensional data base.

*VP-Planner Plus* boots up directly into a blank worksheet. The familiar slash commands are still operable, but a press of the slash key produces your choices on pulldown menus rather than aligned along the bottom of the screen. You needn't leave the spreadsheet format to enter the program's data base nor wrestle with data base configuration. A



Hewlett-Packard's Portable Vectra CS can be used as a desktop at the office with the addition of a full-size monitor.

ready-made *VP-Planner Plus* .WKS file lets you scroll through your data base configuration options.

After that you can move *VP-Planner Plus* worksheet ranges quickly and conveniently into data base DIF files from within the spreadsheet or dump data base field information into your worksheet. You can import *dBASE* .DBF files into either the data base or your worksheet, read the data base, or protect it with a read/write-access password.

Like its former incarnation, *VP-Planner Plus* supports all 1-2-3 release 2.01 functions, although it does not accept add-ins written specifically for 1-2-3. *VP-Planner Plus* has its own application program interface for Microsoft QuickBASIC add-ins.

The revised menu structure incorporates some new choices, including a moderately powerful text generator for writing reports and letters that are then stored in a column of the worksheet, as with Turner-Hall's *4Word*. The text generator accepts cell and

range data and data base information, plus graphs from an open *VP-Planner Plus* worksheet or a .PIC file on disk. The document can be saved as a single column of a worksheet or a separate ASCII file. Other added capabilities include a sideways printing function, support for math coprocessors, access to the extended ASCII character set for drawing lines and boxes, and some 1-2-3 release 2.01 macros.

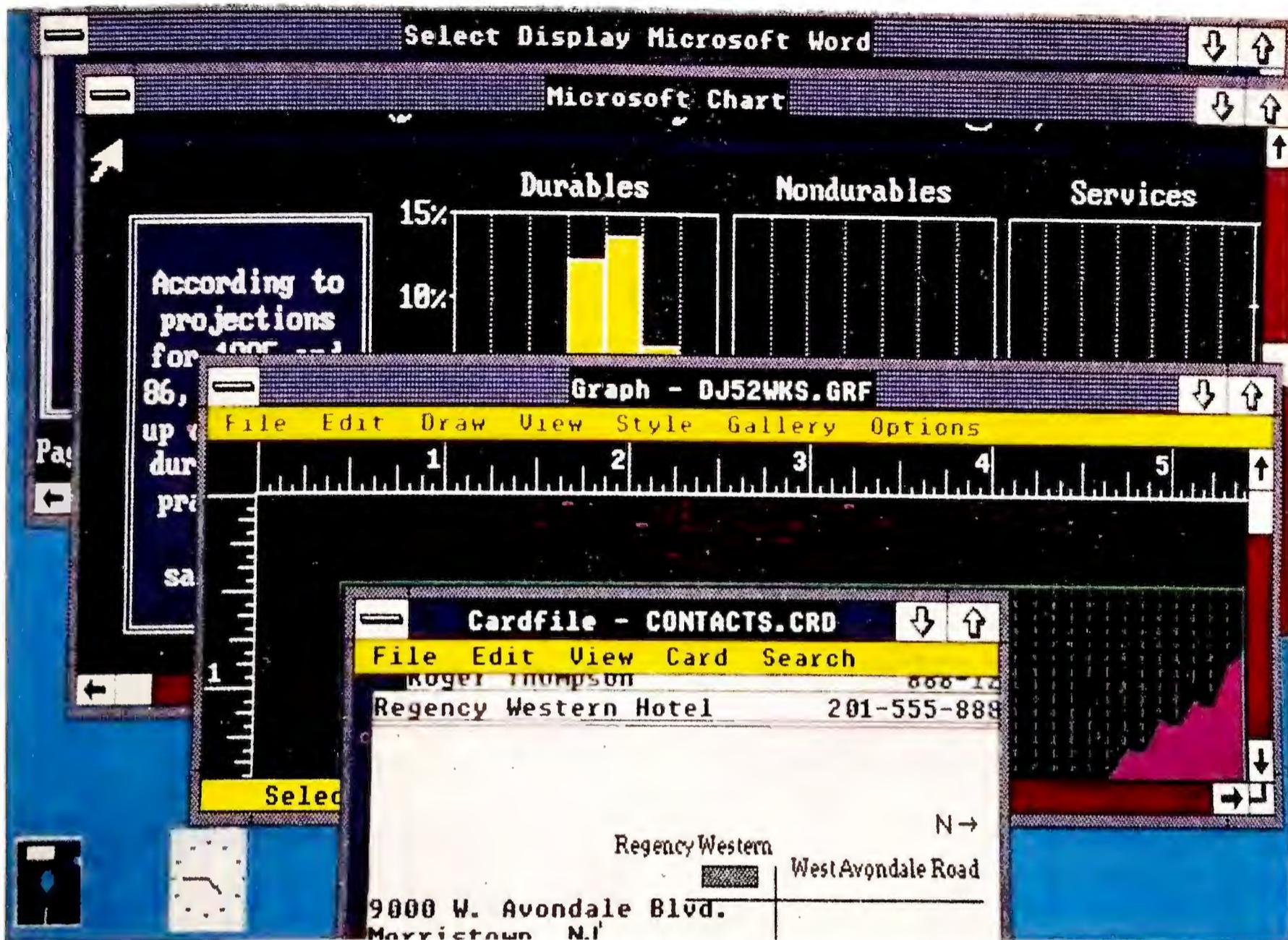
Paperback will continue to sell *VP-Planner* at its current \$100 price or lower. *VP-Planner Plus* costs \$179.95 (\$50 for current users who upgrade). It requires 384K of memory and DOS 2.00 or later. Paperback Software Int'l, 2830 Ninth St., Berkeley, CA 94710; 415/644-2116. ●

|| Mike Hogan is News Editor for || PC World.

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fastest, cleverest  
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lack one  
minor feature.

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the new  
machines.



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Print all information on a report or select a specific range of information for print out. A great feature for restarting long reports or partial printing of certain sections.

### ☑ Easiest Installation Ever.

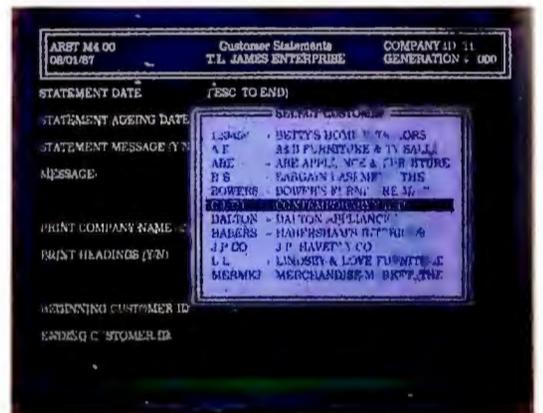
Enter your company's information once and it is reflected throughout the system. Complete II includes a separate Installation Guide, basic Accounting Primer, eight-volume Reference Library, and extensive Tutorials on each package—all at no extra charge!

### ☑ Ideal for Service Businesses.

Enter information free form on service invoices or store pre-defined paragraphs of up to 160 characters. Enjoy full editing capabilities at time of invoice entry.

The changes in Peachtree Complete II are clearly visible to the user. The system has a whole new look, with benefits that are more than just cosmetic. For example, windows and pop-up menus make it easy to see where you came from and what you're doing in each application.

Complete II is designed for user convenience. If you can't remember a customer or account number while using a program, simply open a window and scroll through your customer list or chart of accounts. Select the information you're looking for directly from the table!



Complete II includes eight software modules that may be integrated or installed individually and distributed among separate computers. Install the most critical modules initially; add others later.

### Eight Integrated Software Modules

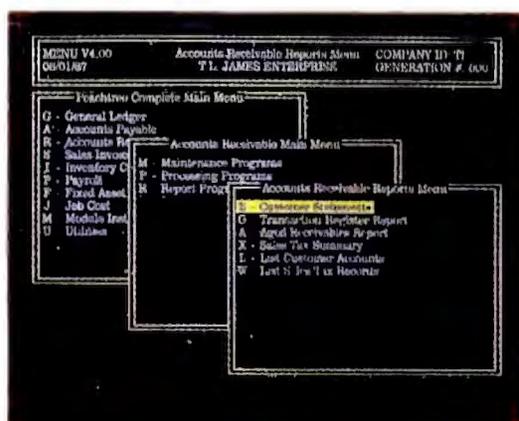
- General Ledger
- Accounts Receivable
- Invoicing
- Accounts Payable
- Inventory
- Fixed Assets
- Job Cost
- Payroll

### Buy Forms Direct from Peachtree

Enjoy the convenience and economy of buying your forms directly from Peachtree Software with guaranteed compatibility. Call 1-800-553-6485 to order forms. In Ohio, call 1-513-793-0110.

### Limited Time Offer: Special Upgrade for Current Customers

For 90 days (through December 1987) Peachtree Complete registered users can purchase a Complete II upgrade directly from Peachtree with all the new features and enhancements for only \$99.\* Call today with your Peachtree Complete serial number: 1-800-822-2821 or 1-800-247-3224.



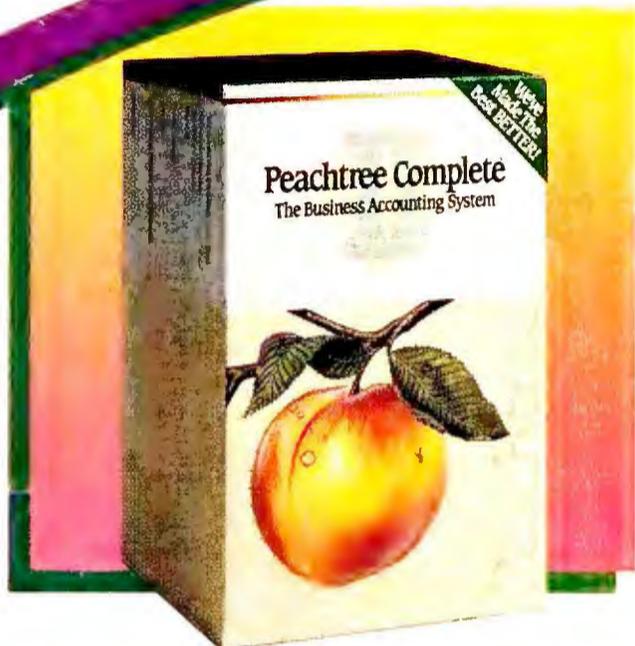
# BEST EVEN

# Better

## Accounting System

### Tabulous New System-Wide Features

- Pop-up menus for ease of use.
- Reference tables for looking up information while you're using the system.
- On-line context-sensitive help at both program and field levels.
- Over 450 Reports.
- Unlimited number of companies and consolidations.
- Automatic formatting, backup, and restoration of data files without leaving Peachtree Complete II.
- Menu-driven data file expansion program.
- Automatic menu-driven conversion of your existing Peachtree Business Accounting data files.
- Increased numeric capacities to \$999,999,999.99 in key areas.
- Directory and path support for data files.
- Easy exit to DOS and automatic return to Peachtree Complete II.
- Plain English error message handling.



### COMPARE FEATURE FOR FEATURE

#### General Ledger

- Chart of Accounts includes 76 suggested and up to 26,000 user-defined accounts.
- NEW I to 13 user-defined fiscal periods
- Supports up to 99 departments
- NEW Reversing journal entries
- NEW Consolidated financial statements for multiple companies
- NEW Financial statements displayed on screen or printed
- NEW Flexible financial statement set-up including user definable headers and footers
- Repeating journal entries
- NEW Financial Statement comparisons may include current period and year-to-date with budget and/or prior period comparison

#### Accounts Receivable/Invoicing

- Open item or balance forward customers
- Up to 14,400 customers
- Simultaneous updating of Inventory and A/R data files at time of invoice entry
- Supports partial payments
- NEW Service invoices
- NEW User-defined terms code
- NEW Automatic transactions with monthly, bi-monthly, quarterly, semi-annual, and annual frequency options
- NEW Enhanced county, city and state sales tax handling
- NEW User-definable aging periods for open item and balance forward customers
- Automatic calculation of finance charges.
- Invoices and statements printed on plain or pre-printed forms

#### Accounts Payable

- Selection of invoices for payment based on user-defined discount and due dates
- Up to 14,440 vendors
- NEW Partial payments of invoices
- Cash requirements forecasting by due date
- NEW User-defined billing cycle on automatic invoices
- Checks printed with detailed stub listing an unlimited number of paid invoices

#### NEW Ability to void checks

- NEW Optional reprinting of checks
- NEW Check printing from 9 different bank accounts
- NEW Prints monthly check register

#### Inventory

- Supports average, last purchase and standard costing methods
- Up to 19,500 inventory items (SKUs)
- NEW Automatic price change on multiple items by percent or amount
- Automatic pricing with 3 levels for each item
- Physical inventory worksheets and reorder and activity reports

#### Fixed Assets

- Handles 13,000 assets
- Flexible setups for tax, financial, and optional tax books
- NEW Updated to handle current tax laws
- 13 different methods of figuring depreciation

#### Job Cost

- Tracks costs and profitability on a job-by-job basis
- Compares estimated costs with actual costs for specific tasks
- Automatic interface with Accounts Payable, Accounts Receivable and Payroll

#### Payroll

- Built-in current year federal, state, city and county tax tables for all 50 states
- Automatic federal, state, city and county withholding calculations
- Automatic payroll processing supporting hourly, salaried, commission or draw-against-commission pay types
- NEW New tax laws incorporated into program
- Processes up to 3,900 employees
- NEW Supports Cafeteria Plan
- User modifiable tax tables with updates published regularly by Peachtree Software
- NEW Printed and magnetic media W-2s generated automatically

### Money-Back Guarantee

When you purchase Peachtree Complete II directly from Peachtree Software, you're protected with a 30-Day Money Back Guarantee. If you're not satisfied, simply return the complete product in saleable condition within 30 days and your purchase price will be promptly refunded. (A \$20 restocking fee will be charged if disk bag is opened.)

And, of course, Complete II is backed by Peachtree Software's famous technical support, labeled by *InfoWorld* as "the finest in the industry." Technical assistance is available for \$1 per minute with a 20-minute minimum via a toll-free telephone number. You only pay for what you need, without unnecessary support contracts.

#### Hardware Specifications

Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory and a minimum 10 MB hard disk. For use with the IBM® PC, PC XT, PC AT, Personal System/2™ and compatibles. 3½" media optionally available. IBM is a registered trademark and Personal System/2 is a trademark of International Business Machines. Not copy protected.

\* Plus \$12.50 shipping and handling. Money-back guarantee does not apply to upgrades.

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## Briefly Noted

### Windows 2.0 and Windows 386

Microsoft has speeded up its *Windows* multitasking operating environment, added overlapping windows, and made the interface consistent across *Windows 2.0*, *Windows 386*, and, Microsoft claims, the *Presentation Manager* in its yet-to-be-released OS/2 operating system. The new *Windows* versions are two to four times faster than *Windows 1.01*, depending on the application, and have better memory management. *Windows 386*, a superset of *Windows 2.0*, adds some functions unique to the Intel 80386 microprocessor for which it is intended. *Windows 386* enables you to tap the virtual 8086 mode of the 80386 chip so several applications can run concurrently, each with 640K of virtual memory. Because each application runs on its own virtual machine, different applications can run concurrently in different windows. *Windows 2.0*, which is designed for 80286 machines, lacks this capability; applications like *1-2-3* and *Microsoft Word*, which write directly to the screen, occupy the whole display and prevent windowing, although the user can still toggle between applications.

*Windows 2.0* requires 512K of RAM; DOS 3.00 or later; one high-capacity floppy drive; a hard disk; and a CGA, EGA, VGA or Hercules graphics adapter. *Windows 2.0* takes up 1MB of hard disk space and retails for \$99. *Windows 386* requires 1MB of RAM, DOS 3.10 or later, one high-density floppy, and a hard disk. *Windows 386* needs 1.5MB on a hard disk and an EGA, VGA, or Hercules graphics adapter. Its list price is \$195. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080.

### Javelin Plus

Data base management has come to the *Javelin* financial modeler in the form of *Javelin Plus*, making large financial models easier to track and manipulate. Now you can select and sort employee names and salaries, purchase orders, product names, or any data base record as part of your spreadsheet model. A cross-tabulation function enables you to summarize data base information over time.

Data is stored not in worksheet cells but as true variables in the program's central information base. The program offers 10 *views*, including a worksheet view, for entering, manipulating, and reporting on data. A variable

need be stored only once, no matter how many times it appears in a model.

Included with the new program are four application-specific add-ins for "what if" analysis, easy data-entry-form design, multiple regression, and histogram analysis. *Javelin Plus* imports data in the most common formats, including 1-2-3 .WK1 files. Suggested list price for *Javelin Plus* is \$249.95. System requirements include 512K of main memory, DOS 2.00 or a later version, and a hard disk. Javelin Software Corp., One Kendall Square #200, Cambridge, MA 02139; 617/494-1400.

### PreCursor 3.1

Menuing packages are not unobtrusive by nature, nor are they designed for power users, which is why *PreCursor 3.1* may take micro managers by surprise. The Aldridge Company's hard disk menuing system enables you to sidestep hard disk trauma, ease the burden of in-house support, and perhaps even justify your next round of PC purchases. The \$69.95 program includes a computer usage tracker—a comprehensive log of PC activity broken

down by program, user (or project), time, and date. The log is ideal for cost-justification studies, time and billing purposes, and work-load management.

*PreCursor's* treasury of features includes instant DOS access, password protection, subdirectory renaming, execution of nested batch files, and a file finder. With the program's Pathfinder facility, building menus is about as easy as making screen choices. The Aldridge Company, 2500 City West Blvd. #575, Houston, TX 77042; 713/953-1940.

## Quick Connect

Want to share the productivity benefits of computing with other members of your work group, but feel reluctant to take a large hit on your department's bottom line?

**Quick Connect** is a low-priced solution to multiuser computing. The Virtual Systems operating environment enables as many as 32 users to tap into the power of a single IBM-compatible host for considerable hardware savings. Within the Quick Connect environment, simple dumb terminals become the equivalent of intelligent workstations by sharing the processing power, main memory, application software (when licensing agreements permit), data files, and peripherals of an IBM XT, AT, or compatible or an 80386-

based machine. They are connected with simple serial cables and, where necessary, a multiport adapter.

Quick Connect divides main memory equally among those on the system and supports EMS.

Minimum system requirements include 640K of memory, DOS 3.10 or a later version, one or more PC or ANSI terminals connected via RS-232C serial cables, and a multiport adapter for two

runs on hard-disk-equipped IBM compatibles. *Artemis Project* is written in a fourth-generation language and supported by a data base that enables users to build customized applications via 45 menu options and 400 help screens. Pulldown windows allow you to graphically view and edit a project, while function keys let you check fields, browse through data, and obtain quick reviews of project status.

*Artemis Project is written in a fourth-generation language and supported by a data base that enables users to build customized applications via 45 menu options and 400 help screens.*

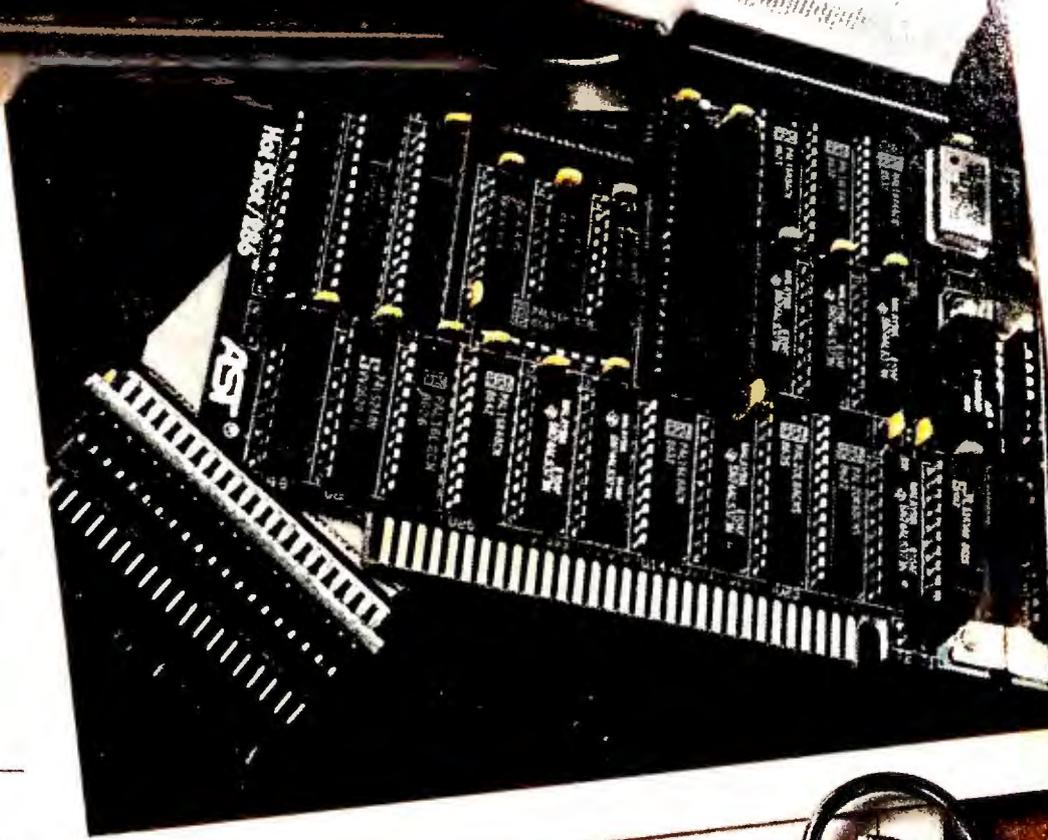
or more terminals. The software costs \$295 for three users, \$595 for up to seven, and \$995 for eight or more. An 80286-based system is recommended for more than three users, as is an 80386-based system for more than eight. Virtual Systems, 1500 Newell Ave. #406, Walnut Creek, CA 94596; 415/935-4944.

## Artemis Project

Metier Management Systems, a leading supplier of project management systems for mainframes, has taken its show into microcomputer code to make a high-end project management package that

*Artemis Project* integrates cost and action items with project schedules and accommodates thousands of activities with no limits on logical relationships. More than 50 different standard reports and graphs can be customized to your way of doing business. The program costs \$5000 and requires 512K of memory, a hard disk, and DOS 2.10 or a later version. Metier Management Systems, 2900 North Loop W. #1300, Houston, TX 77092; 713/956-7511. —Mike Hogan ●

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Here's a solid investment tip. For a great value in a quality PC compatible, you owe it to yourself to see Hyundai's new line of computers. Such as the 8.0Mhz Super-16T.

Its low price buys you standard features like 640KB RAM, six I/O slots, serial and parallel ports, and a real time clock with battery backup.

But that's just the tip of the iceberg. Because the Super-16T also comes with Electric Desk—the integrated software package that gives you all the programs you need on a single disk. Word processing, spreadsheet, data base, spellchecker, communications, plus 197 printer drivers.

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comes with the longest warranty in the business. And is serviced by a nationwide network of specially-trained Hyundai dealers. Just the kind of support you'd expect from a world class company that's \$14 billion strong.

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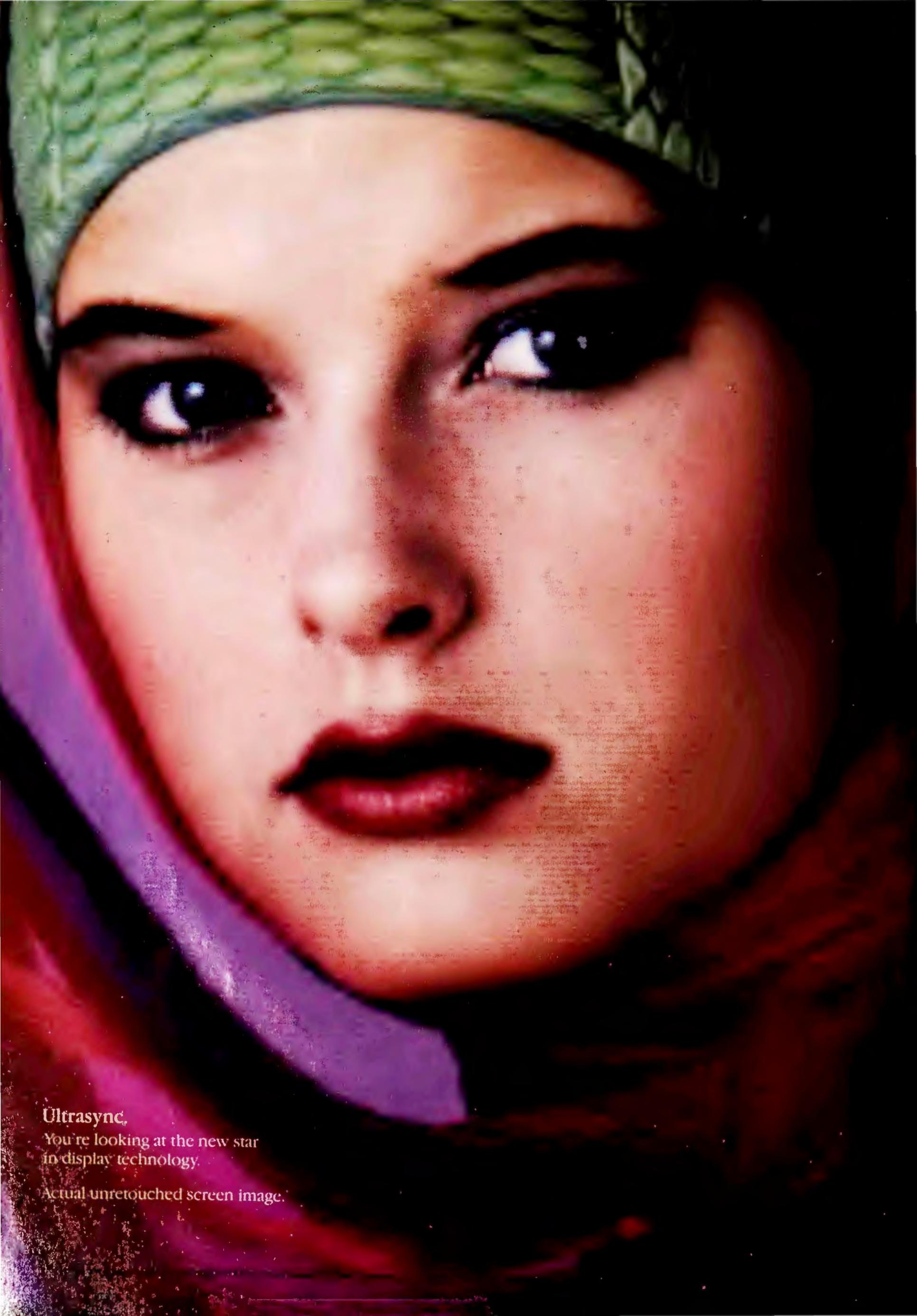


# the iceberg

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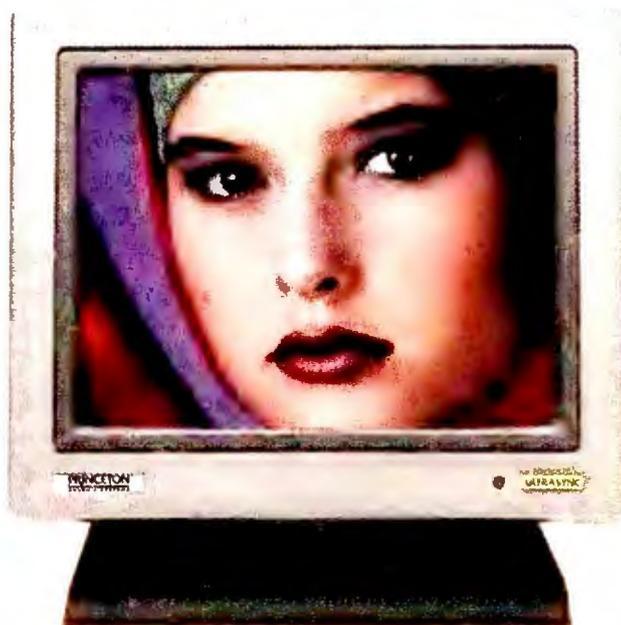
Introducing Ultrasync. The high-resolution, autosynchronous color monitor that's PC and PS/2 series compatible.

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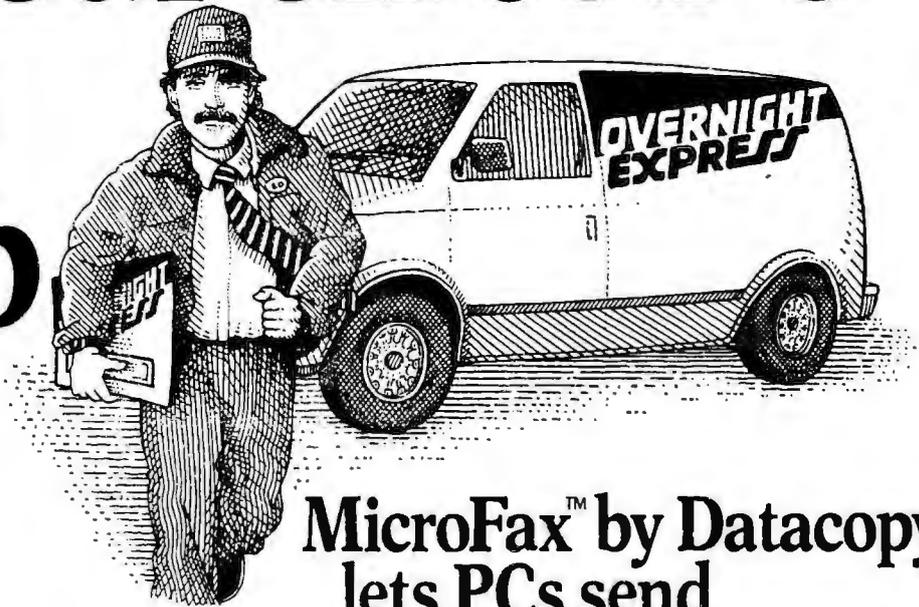
Plug Ultrasync into any IBM PC/PS series, Apple Mac II, or practically any computer system and it will adjust automatically to the standard you are using. There's no fiddling with switches or knobs. Our automatic picture sizing feature prevents display distortion and shrinkage. A simple built-in text switch is provided for your convenience. What's more, you'll enjoy the ease and comfort of Ultrasync's ergonomically advanced design.

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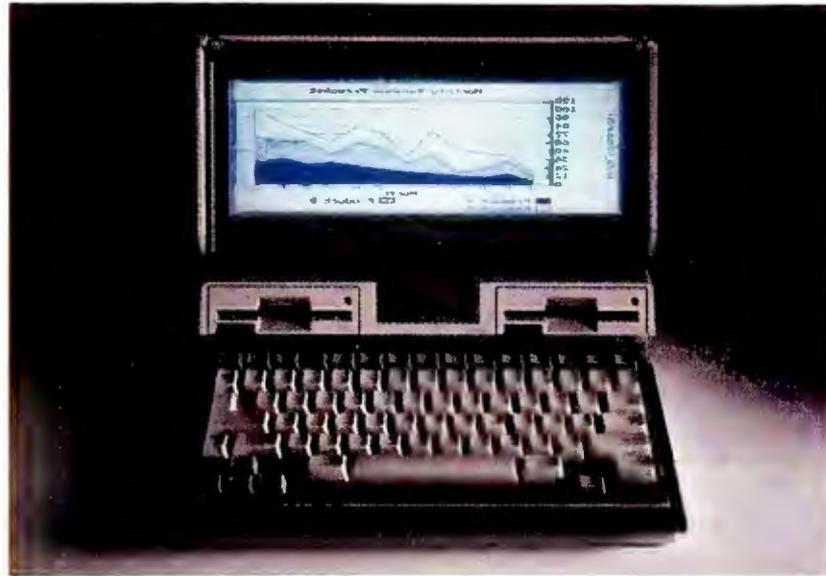
# Update

## IBM PC Convertible

IBM has made its PC Convertible lighter, more powerful, and easier on the eyes. The company has revamped the PC Convertible line by adding the Model 3, which, at 12.4 pounds, is lighter than the Model 2. More important, the Model 3 has been given a backlit Supertwist liquid crystal display and an enhanced power supply for up to 4 hours of operation between charges. Main memory now tops out at 640K of static CMOS RAM. The Model 3 has 3½-inch disk drives. Suggested list price for the Model 3 is \$1695; the Model 2's list price has dropped to \$1395. An upgrade kit that includes the new display and power supply is available for \$350. IBM, 900 King St., Rye Brook, NY 10573; 914/934-4000.

## Smartcom III

Hayes Microcomputer Products has added a flexible user interface and a menu-building facility to its popular *Smartcom* communications software. *Smartcom III* gives beginning users a menu-driven option for communications, with five levels of detail for



IBM's PC Convertible Model 3 is lighter and has better screen resolution than the Model 2.

different requirements. All menu items have key equivalents that provide quick access for experienced users, who can also take advantage of Hayes's new Simple Communications Programming Environment (SCOPE) to automate repetitive tasks and enhance unattended operations. A SCOPE user has access to the *Smartcom III* interface tools as well as to associated data, keyboard, and communications primitives. You can create your own custom menus to automate repetitive functions like log-on or unattended communications.

*Smartcom III* supports simultaneous communications through two different COM ports and has an integrated text editor, file compression/scrambling, and a peruse buffer. The program emulates TTY, VT 52, VT 102, and ANSI terminals and supports XMO-

DEM and Kermit file transfer protocols. The suggested list price is \$249. Upgrades of *Smartcom II* are available from Hayes for a nominal fee based on the original date of purchase. *Smartcom III* requires DOS 2.00 or a later version, a minimum of 512K of memory, and a hard disk. Hayes Microcomputer Products, P.O. Box 105203, Atlanta, GA 30348; 404/441-1617.

## PMS-II

The *PMS-II* project management system goes on line in its version 8. This new edition of the project manager from North America

MICA adds speed and several on-line capabilities to enhance ease of use and performance. Version 8 includes an interactive on-screen logic diagram and several bar charts for showing a project's progress. It also includes an on-line diary and an on-line technical reference manual.

*PMS-II* version 8's new Selection Query Language can sort activities by three conditions. A linear bar chart arranges activities end to end along the fewest number of lines and into basic groups based on float. A milestones chart depicts pending and current milestone activities. The network capacity of *PMS-II* has increased to 3000 activities, and a pop-up calculator and a global editor have been added. *PMS-II* version 8's single-user list price is \$1295; current users can upgrade free. Requirements include 512K of memory and 2MB of storage. North America MICA, 5230 Carroll Canyon Rd. #110, San Diego, CA 92121; 619/458-1327.

## Logitech Mouse

Logitech has announced a version of its mouse compatible with the IBM Personal System/2. The Logitech Series/2 Mouse plugs directly into the PS/2's special mouse

port and is compatible with both hardware and software on the new systems. Included in the \$99 list price is Logitech's Plus Package, which provides both a *Microsoft Windows* driver and a

strings to programs. It offers IF...THEN...ELSE conditional operations, conditional file operations based on file attributes, GOTO statements, WHILE loops, command chaining, multiple input

*Muscle development system can be used to customize individual or multiple 1DirPlus menus on a network for personalized colors, menus, and embedded command sequences.*

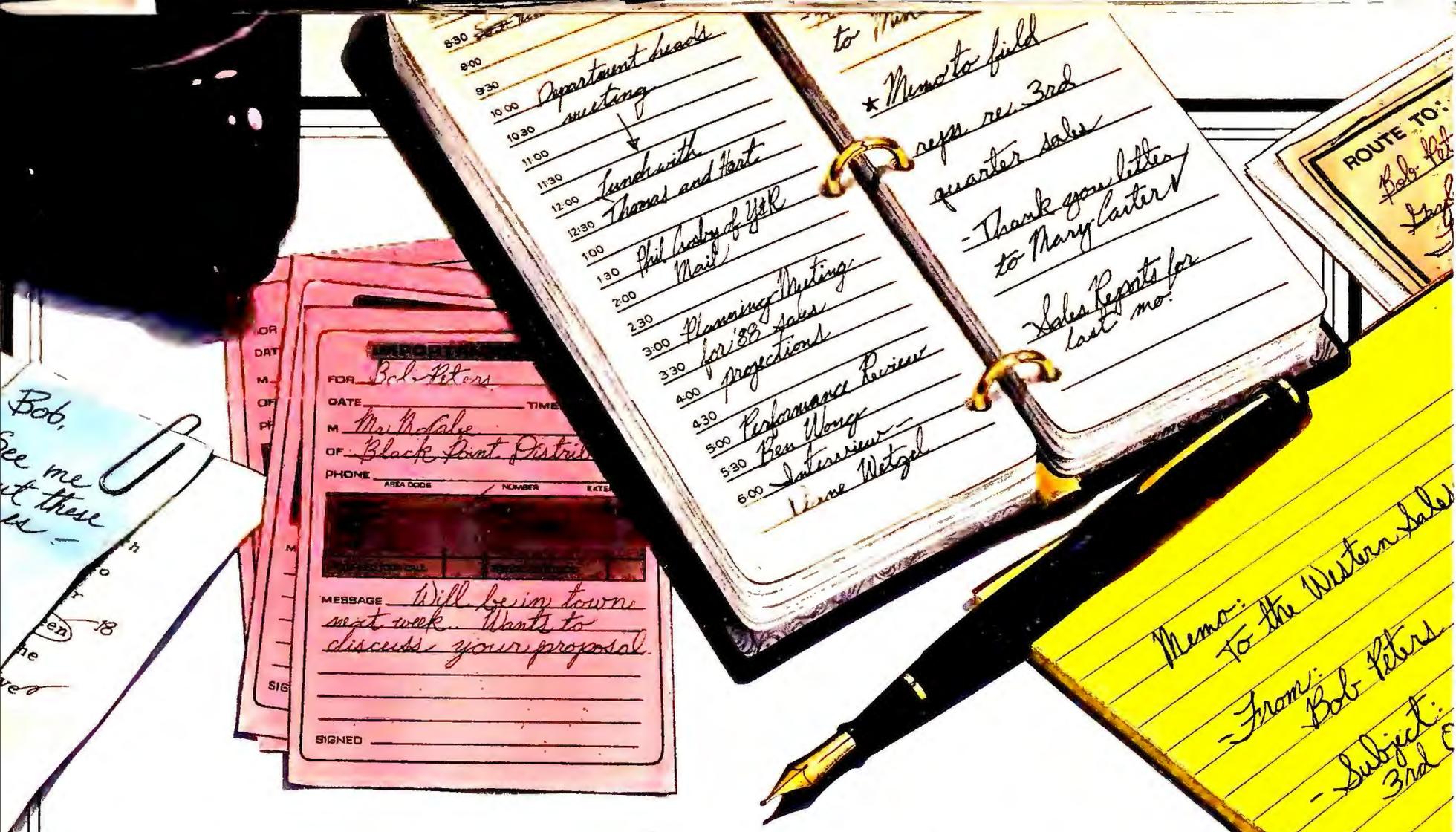
Microsoft-compatible mouse driver, a pop-up menu construction system, automatic configuration, and a text editor. Owners of existing Logitech serial mice can use them in PS/2 serial ports. Logitech will supply Plus Package to registered users for \$10. Logitech, 805 Veterans Blvd., Redwood City, CA 94063; 415/365-5051.

## 1DirPlus/Muscle

DOS menu manager *1DirPlus* is getting buffed out with a new menu command customizer called *Muscle*. This language-like development system can be used to customize individual or multiple *1DirPlus* menus on a network, giving each user a screen full of personalized colors, menus, and embedded command sequences. *Muscle* recognizes a variety of programming commands and terms and can pass character

prompts, and multiple parameter passing.

You can build your own command prompts, with conditional branching based on different user responses. A network system can also have its own command library, from which users can select commands built by others on the system. *1DirPlus* retails for \$95; *Muscle* has a memory overhead of 27K and sells for \$50. Bourbaki, 615 W. Hays, Boise, ID 83701; 208/342-5849. —Mike Hogan ●



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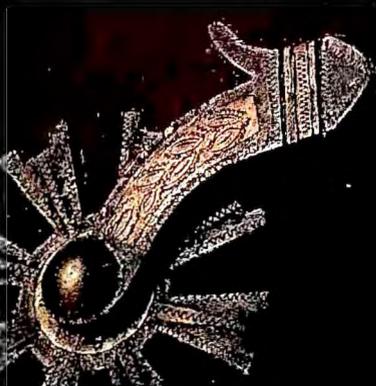
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IBM PROFESSIONAL SOFTWARE

FILE  
FORMAT  
RESULTS







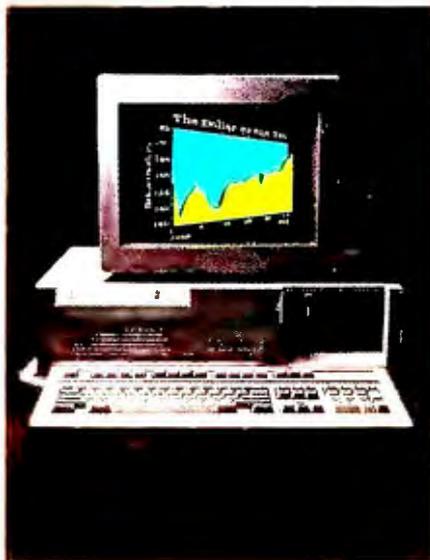
A U S T I N T E X A S

# THE 286<sup>12</sup> SYSTEM

*Our 286/12 system is recognized as one of the highest performance personal computers available. Its high speed operation is ideal for software development, local area networks, CAD/CAM and desktop publishing applications, as well as business office operations. The 286/12 is compatible with industry standard software and will run MS-OS/2™ when it becomes available.*

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Intel 80286 running at 12 MHz,  
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640 KB of RAM, expandable  
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Floppy and hard disk controller.  
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# THE 286<sup>8</sup> SYSTEM

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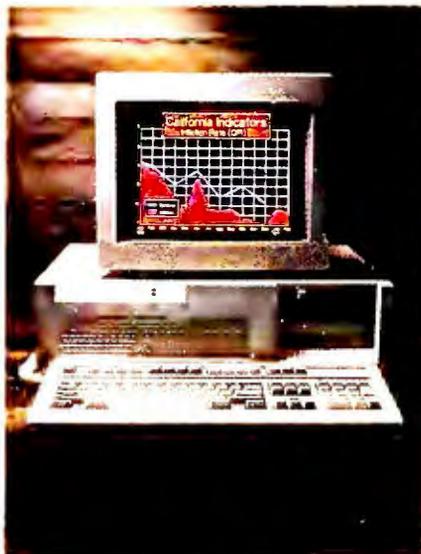
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192 watt power supply.

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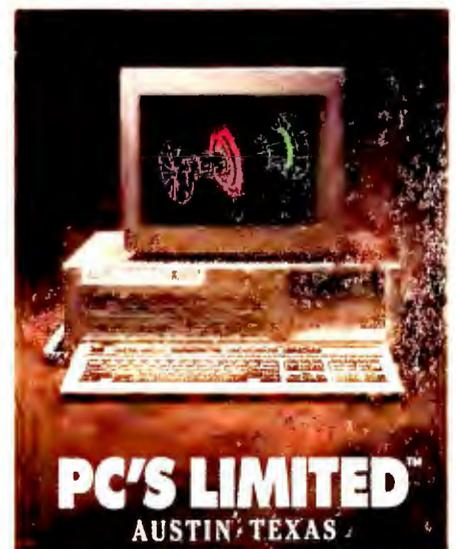
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AUSTIN, TEXAS

Quick Paint

Relations

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Security

Indexing

Key Disable

"Quick painting method when the dictionary is already d

Invoice Entry Window

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CUSTOMER.NO

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Revelation  
Prompt Options

Option

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- 2 Remove Prompt
- 3 Drag Prompt
- 4 Reorder Prompts
- 5 Edit Dictionary
- 6 Edit Help Record
- 7 Hide Settings

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New York Times, Diment

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Hackensack, New Jersey 07602

## REVIEW

# Beware the Cutting Edge

### *This Month*

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The PC's Limited 386<sup>16</sup>, the Acer 1100, and the Kaypro 386E all offer 16-MHz 80386 processing power for considerably less money than Compaq's Deskpro 386. But are their acts as polished?

*Edited by Eric Knorr*

|||| Life used to be predictable. It went like this: Intel designs the microprocessor, IBM unveils the first machine, and—a year or so later—major computer manufacturers release more-or-less compatible imitations of IBM's latest model. Then the no-name clone makers get into the act.

With the 80386, it went like this: Intel designs the microprocessor, and an obscure clone maker called Advanced Logic Research (ALR) introduces the first machine. No wonder IBM came up with the Micro Channel.

Although ALR's Access 386 beat everyone to the starting line, Compaq's Deskpro 386 followed close on its heels, setting the pace for the new generation. Like Compaq's machine, the three computers reviewed here—the PC's Limited 386<sup>16</sup>, the Acer 1100 (manufactured by Multitech), and the Kaypro 386E—breeze through processing tasks at a brisk 16 MHz.

Aside from the usual clean, reliable Compaq design, the Deskpro 386's suggested configuration included an EGA display and a 40MB hard disk. Any less storage and graphics seemed a waste of a cutting-edge computer (unless you plan to use it as a file server, in which case you'd need more storage and no graphics). Consequently, the PC's Limited, Acer, and Kaypro machines all offer a 40MB model as their lowest-capacity hard disk and an EGA display as standard equipment (except for the Kaypro 386E, which doesn't include a display in its base price).

Compaq isn't known for having cut-rate prices, so it's no surprise that the three clone makers

Charly Franklin



sell their 80386 machines for less. In the case of the Acer 1100 and the PC's Limited 386<sup>16</sup>, that's about \$3000 less when EGA capabilities and a 40MB hard disk are nudged into each system.

What do you sacrifice for this monster savings? On close inspection, not much in the performance category: The Deskpro 386's superior speed on most of the National Software Testing Labs (NSTL) benchmarks is due to the disk caching software that now comes with the machine. Odds are that if PC's Limited, Acer, and

They may have a shortcoming here or there, but the Kaypro 386E, the Acer 1100, and the PC's Limited 386<sup>16</sup> all provide an inexpensive step up to 16-MHz 80386 computing power.



Charly Franklin

The PC's Limited 386<sup>16</sup> uses static RAM and streamlined architecture to boost its speed. The LED readout on the front of the system unit displays valuable diagnostic information.

Kaypro bundled a disk caching program with their units, the machines would exhibit comparable times. In the 1-2-3 benchmark, which emphasizes processing speed instead of disk access, the Deskpro 386 falls somewhere in the middle of the field.

The real trade-off involves an intangible: peace of mind. The Deskpro 386 arrived glitchless at *PC World's* offices late last year; each of the three machines reviewed in this article had at least one problem. The PC's Limited 386<sup>16</sup> arrived with the low-level formatting knocked off the hard disk, a more-or-less routine shipping complication. The Acer 1100 suffered from difficulties harder to diagnose—loose memory chips and a faulty video board (the company says that only about 200 units contained the offending board). And the Kaypro came

without coprocessor support (only a few hundred were shipped that way, Kaypro claims). Whether or not these problems were truly confined to the first machines off the line, you should still try before you buy.

#### ■ The Work Life of Your Machine

Though it's less of an issue than it used to be, the first thing you want to know about any computer is whether it will run your software. NSTL tested the three machines with *Microsoft Word*, *1-2-3*, *dBASE III Plus*, *Crosstalk XVI*, and *MS-DOS 3.30*. The lab ran through every aspect of these programs' operation and detected no compatibility problems. Keep in mind, however, that having to downshift your system's processing speed for older—and especially copy-protected—software is quite likely when you're running at 16 MHz. Fortunately, all of the machines have switchable clocks.

On the minds of many purchasers is whether a machine will run Microsoft's OS/2, the long-awaited operating system that promises to tap the protected-mode potential of Intel's 80286 and 80386. Since a final version of OS/2 has yet to be released, there was no way for NSTL to test it. PC's Limited claims OS/2 compatibility, while Acer and Kaypro are evasive.

One thing is certain: OS/2 and the applications that run under it will require a healthy chunk of at least 16-bit RAM—and, preferably, fast 32-bit RAM. The maximum amount of 32-bit RAM these machines hold varies substantially (see Table 1). Moreover, the sudden proliferation of 80386 systems is showing signs of straining the supply of fast RAM chips. PC's Limited, Acer, and Kaypro all claim that they have available—or will have available by the time you read this—enough fast RAM (in chip or proprietary-module form) to max out their systems. Whether these manufacturers can live up to this claim depends on the relationships they've established with chip suppliers.

#### ■ PC's Limited 386<sup>16</sup>

In a fast-moving compatibles market, PC's Limited is one of the most ambitious and nimble-footed players. The company began as an expansion board reseller but quickly moved into putting together—and subsequently designing—its own systems. Last year, the small Texas firm broke new ground by producing the PC's Limited 286<sup>12</sup>, the first 12-MHz AT compatible (see "An AT by Any Other Name," *PCW*, December 1986).

As early as COMDEX Fall 1986, PC's Limited was showing off the motherboard for its 386<sup>16</sup>—even though the machine itself didn't ship until June of this year. The company is proud of the machine's architecture, and for good reason.

To begin with, there's sheer elegance of design. Whereas Intel's motherboard has 163 chips, PC's Limited's uses only 32, a factor that helps keep supply and manufacturing costs down. Moreover, you won't find 90-degree bends in any of the motherboard traces—use of 45-degree bends is the rule, reducing the reflection problems of high-speed signals and resulting in decreased RF emission. This enabled the company to obtain an FCC class B license without spending a bundle on expensive shielding for the system unit. The combination of fewer chips and no right-angle bends reduces the distance that electrical impulses must travel, a small but significant performance factor at high clock speeds.

More important to the speed of the PC's Limited 386<sup>16</sup> is its use of static RAM. Static RAM chips mean faster performance, because they hold their charges without the refresh cycle required by standard, dynamic RAM. With dynamic RAM, the more memory the microprocessor has to address, the longer it takes to refresh it. Thus, the relative speed advantage of static RAM increases as you add memory.

Fast static RAM chips of any kind are expensive, but PC's Limited has still managed to keep

down the cost of its pride and joy. With 1MB of 32-bit static RAM, a 28ms 40MB Magnetic Peripherals hard disk, a 1.2MB floppy, an EGA board and monitor, plus one parallel and two serial ports, the PC's Limited 386<sup>16</sup> weighs in at \$4999. The BIOS, which had no problems with NSTL's compatibility tests, was version 3.1 from Dell Computer (aka PC's Limited).

"Smaller, faster, cheaper," sums up the PC's Limited creed, but the 386<sup>16</sup> clearly violates the first of those tenets. Like its two competitors, it's an AT-size box with no respect for your desk space. Although it takes up more real estate, the PC's Limited 386<sup>16</sup> offers a slot mix identical to that of the Deskpro 386: one 32-bit slot (dedicated to memory), five 8/16-bit slots, and two 8-bit slots. The video board occupies one 8-bit slot, while the I/O board and floppy/hard disk controller each take up an 8/16-bit slot. That leaves enough room for one 8-bit and three 16-bit expansion boards.

The controller handles up to two hard and two floppy disk drives. The computer theoretically accommodates five half-height devices, but as with most compatibles, you'd have to add a second controller and splice into a power cable to add the fifth. PC's Limited offers a cornucopia of options; packaged mass storage deals of 70MB and 150MB result in total system prices of \$5399 and \$6499, respectively.

As with the Deskpro 386, all of the 32-bit RAM for the PC's Limited 386<sup>16</sup> fits on a single, proprietary expansion board. The memory board holds up to 24 memory modules; each module in turn has 256K of chips, yielding a total 32-

bit memory capacity of 6MB—3MB less than the Acer 1100 and 4.5MB less than the Kaypro 386E. Considering the cost of static RAM, however, the \$499-per-megabyte price for memory upgrades seems reasonable.

### *Executive Summary*

## **PC's Limited 386<sup>16</sup>**

80386-based computer

With static RAM to boost memory access, the cleverly designed PC's Limited 386<sup>16</sup> offers some of the fastest processing times of any desktop computer. LED diagnostics, a complete ROM-based configuration, and outstanding vendor support augur well for the machine's reliability. A 32-bit RAM limit of 6MB and support for the 80287 math coprocessor rather than the 80387 are the machine's biggest failings.

*Dell Computer Corp.  
1611 Headway Circle  
Austin, TX 78754  
800/426-5150*

*List price: with 1MB RAM,  
1.2MB floppy disk drive,  
40MB Magnetic Peripherals  
hard disk drive, EGA monitor  
and adapter, 101-key keyboard,  
one parallel and two serial ports,  
one year on-site support \$4999; each  
additional 1MB RAM \$499;  
with 70MB hard disk \$5399;  
with 150MB hard disk \$6499;  
MS-DOS 3.20 and GW BASIC 3.20 \$95*

## REVIEW: Systems

PC's Limited used to make its own EGA board and monitor, but those two products apparently didn't make the final cut. The Mitsubishi display and the Video Seven board that came with the test unit worked fine (frankly, it's hard to see much difference in image quality among EGA displays). The Fujitsu 101-key keyboard, however, was a clear winner. With a firm response and rugged construction, it ranks among the best.

Like many of the company's high-end machines, the PC's Limited 386<sup>16</sup> is equipped with a SmartVu LED readout that sits next to the keylock and the indicator lights. Among other things, this four-character display shows the RAM check, which cylinder of which drive you're on, and whether you're in 8088, 286, or 386 "compatibility modes" (that is, whether your 80386 is running

at 4.77, 8, or 16 MHz). Depending on your luck, it may also show one of a dozen error codes, the explanations for which are listed in the lucid and succinct manual. When you use SmartVu in conjunction with the machine's comprehensive ROM-based setup utility, you've got more configuration capability than most vendors include on disk.

As it happens, SmartVu proved quite useful. When the PC's Limited 386<sup>16</sup> arrived at *PC World*, the unit wouldn't recognize drive C:. A phone support technician guessed that the low-level formatting had been lost in shipping. With the aid of SmartVu's cylinder-tracking capability and the technician, the low-level formatting was restored.

For more serious snags, PC's Limited includes a year's on-site support from Honeywell Bull in the price of the computer. This is

the sweetest support deal offered by any computer vendor in the business.

Still, some problems seem built-in. CAD users may be disappointed that the machine supports the 80287 math coprocessor rather than the more powerful 80387. Even worse, because the non-removable drive cages hang over the socket, you must actually remove the motherboard to install the 80287. The biggest drawback, however, is the 6MB limit on 32-bit RAM. Of course, you can plug in enough standard expansion boards to add 10MB of 16-bit dynamic RAM, but that leaves the speed potential of large amounts of 32-bit static RAM untapped.

Admittedly, chiding PC's Limited for not supporting more 32-bit RAM is a bit like taking potshots in the dark. No OS/2 applications exist, so it's pretty tough to decide how much is not enough for peak performance. For the most part, the PC's Limited 386<sup>16</sup> is a classy piece of work with the benchmark times to vouch for its ingenious engineering. No matter what Microsoft does, spending less than \$5000 on a high-performance machine of this quality—especially when it's backed by such lavish support—is a low-risk investment. —E. K.



The Acer 1100 is the only one of the three machines reviewed to offer 80387 coprocessor support. At \$4895 for a unit with a 40MB hard disk and an EGA display, it's also the cheapest.

Charly Franklin

■ Acer 1100  
Multitech, Taiwan's largest PC manufacturer, is finally beginning to capture a share of the U.S. market. The effort began with a line of clones led by the well-engineered, AT-compatible Accel 900 (see *From the Hardware Shelf*, *PCW*, January 1987). Leading the latest offensive is the Acer 1100, an economical, 80386-based challenger marketed by Multitech's

new U.S.-based distribution firm, Acer Technologies.

The Acer 1100 is—to put it mildly—aggressively priced. With a 40MB Miniscribe hard drive, an EGA video board and monitor, and 1MB of 32-bit RAM on the motherboard, it lists for \$4895, making it the cheapest fully loaded system of the three reviewed. Standard, relatively inexpensive 100ns RAM chips help maintain the low price.

The Acer 1100's special interleaved memory addressing (a scheme roughly equivalent to half-a-wait-state RAM) makes the most of the medium-speed RAM chips, but the Acer 1100 still can't quite match the overall pace of the PC's Limited 386<sup>16</sup>. Note, however, the one glaring exception to this. Because the Acer 1100 accommodates Intel's 80387 math coprocessor, it beats its PC's Limited counterpart on the calculation-intensive *AutoCAD* test by a cool 26 seconds. Those who plan to use an 80386 computer as a CAD workstation, take note.

Another exceptional feature of the Acer 1100 is its medley of clock settings. In a special "smart" mode, the machine automatically switches from 16 MHz to 8 MHz for floppy access. You can also change speeds manually to 16, 12, 10, 8, 6, or 4.77 MHz by using keyboard commands. Though it seems a bit gimmicky, this range of speeds lets you downshift to oblige cranky old software and hardware while sacrificing as little performance as possible. And as NSTL's software

compatibility tests imply, the machine's garden-variety Award 386 BIOS (version 1.00) should be safe at many speeds.

The system unit measures 6½ by 21 by 16½ inches, several cubic inches larger than an IBM AT. You might have to buy a bigger desk for it, but a generous footprint has advantages. The machine's innards are spacious and tidy—no bunched-up cabling and plenty of room for additions. Outside, the box includes a keylock, a reset switch, and a light that glows green when the clock speed is set to either 16 MHz or smart mode. A likable 101-key keyboard and a 14-inch tilt-and-swivel EGA monitor (with three side-mounted controls, plus several fine-tuning controls hidden behind a back panel) complete the package.

The Acer 1100 offers the same mix of expansion slots as the PC's Limited 386<sup>16</sup>. Currently, there's no memory expansion board available for the single 32-bit slot, though Acer avers that it will be ready by the time you read this. With a 4MB daughterboard, Acer's 32-bit RAM board will hold 8MB, 2MB more than the PC's Limited entry. The price of memory expansion is \$995 for 2MB, \$1495 for 4MB, \$2095 for 6MB, and \$2595 for full-bore 8MB expansion.

As with the PC's Limited 386<sup>16</sup>, there's room for five half-height devices, although the controller and power supply can handle only four. However, the Acer 1100 excels by making three half-height bays externally accessible. That'll buy you room for a 5¼-inch floppy drive, an internal tape backup, and a 3½-inch disk drive for these tough, changing times.

## Executive Summary

### Acer 1100

80386-based computer

With four months of TRW service, a very low price, and a faster processing speed than the PS/2 Model 80, the Acer 1100 is an excellent deal. It also has one of the few motherboards to support the 80387 math coprocessor, a feature particularly attractive to CAD users. However, problems with the original video board, memory errors, and confusing setup inspire caution.

*Acer Technologies Corp.*  
401 Charcot Ave.  
San Jose, CA 95131  
408/922-0333

*List price: with 1MB RAM, 1.2MB floppy disk drive, 40ms 40MB hard disk drive, 101-key keyboard, one parallel and two serial ports, MS-DOS 3.21, GW BASIC 3.21, and four months on-site support (Model B4-1) \$3995; same with 28ms 40MB hard disk (Model B4-2) \$4295; same with 70MB hard disk (Model B7) \$4695; same with 120MB hard disk (Model B12) \$6595; 14-inch amber monitor with NSI Logic Smart EGA board \$375; 14-inch color monitor with NSI Logic Smart EGA board \$595; 14-inch EGA monitor with NSI Logic Smart EGA board \$825; expansion board with 2MB of 32-bit RAM \$995 (with 4MB \$1495, with 6MB \$2095, with 8MB \$2595); 80MB Miniscribe hard disk \$1495; 130MB Newbury Data hard disk \$3995*

## REVIEW: Systems

Included in one of the Acer 1100's 8-bit slots is an I/O board that sprouts one 25-pin parallel port and one 9-pin serial port. Handily enough, a second bracket contains another serial connector—this one with 25 pins for older (but still usable) peripherals. All told, with the controller taking up a 16-bit slot and the video board occupying the second 8-bit slot, the standard expansion boards leave a total of four 16-bit slots free.

It should be noted that in the first month or so of its product life, the Acer 1100 came bundled with an incompatible video board, ATI's EGA Wonder. Although an Acer representative says that fewer than 200 machines were shipped with the board, one of them ended up in *PC World's* review unit. Essentially, the video board would intermittently bury the screen under a thick layer of snow; resetting cleared it, but only momentarily. The board that replaced the EGA Wonder—NSI Logic's Smart EGA—appears to be a reliable performer. Acer will do a straight swap, no charge, with holders of the Wonder board.

The video problem was less onerous than one persistent and very disturbing glitch. When the DOS command CD (for Change Directory) was entered, the machine would occasionally hang. Because this problem seemed to disappear when the memory chips were reseated on the motherboard, a memory error appeared to be the only cause—although the machine consistently passed its RAM check.

The most expensive of the three systems reviewed, the Kaypro 386E can hold 10½MB of 32-bit RAM—more than either the PC's Limited 386E or the Acer 1100. The machine uses the Intel motherboard and an interleaved RAM addressing scheme.

Other imperfections were less offensive, such as the one long patch wire that snaked along the machine's motherboard. And, though a matter of taste, the reset button's location on the front panel makes it too easy to poke with the edge of a manual. To get pickier, the documentation doesn't reflect recent name changes: The glossy, four-color manual calls the machine "the Multitech 1100" throughout. More confusing is that installation and setup instructions are split between three separate (and sometimes contradictory) manuals.

The Acer 1100 warranty looks good on paper, but it too has a few wrinkles. Although any Acer-configured system is covered for one year, only the first four months' coverage is provided on site (by TRW). After that, you must send the machine to an au-

thorized Acer dealer for repair. Support personnel were knowledgeable and polite, but while some calls produced speedy fixes, others were put on hold indefinitely.

Unless you've just sprung full-grown from Jupiter's thigh, you've noticed the incredible proliferation of 80386 systems over the past few months. Most of these machines show signs of being put together in haste; with its memory problem, poorly tested video board, and missing memory expansion board, the Acer 1100 is no exception. However, not many 80386s have their own motherboard design or support the 80387; fewer still can match or exceed the Acer 1100's high marks on NSTL's test of raw processing power, the 1-2-3 benchmark. You can bet Multitech-cum-Acer—with its large resources and steadfast desire to succeed in the U.S. market—will iron out the 1100's kinks in a hurry. Nonetheless, it's a shame the company couldn't have done so before shipping time.

—Marlene Nesary



## Kaypro Model 386E

In the late seventies and early eighties, the Kaypro name stood for simple, rugged utility. The company sold hundreds of thousands of its inexpensive CP/M machines. Now, years later, these machines are still on the job, their proletarian sheet-metal cases quiet testament to Kaypro durability.

Those who bought the company's first MS-DOS machines have fewer memories to cherish. Early Kaypro PCs couldn't run a healthy selection of popular PC software. Worse still, the AT-compatible 286i was so bug-ridden that Kaypro yanked it off the shelves shortly after release to make major revisions.

This time around, the company has apparently learned its lessons. The Kaypro Model 386E is a solid, compatible, and largely unadventurous machine. Of course, gazing upon the behemoth 386E (which takes an AT-size box and adds a rakish row of chevron-shaped ventiports) might make you yearn for the trim elegance of a PS/2 machine.

Though far cheaper than its Compaq counterpart, the Kaypro 386E is still pricier than either the PC's Limited 386<sup>16</sup> or the Acer 1100. For \$5795, you get a switchable 8/16-MHz 80386 microprocessor, a 28ms 40MB Priam hard disk drive, a quiet 1.2MB floppy disk drive, 2.5MB of 32-bit RAM (512K on the motherboard), plus one built-in serial and one parallel port (but no video). Kaypro also throws in Quarterdeck's *Expanded Memory Manager 386*, as well as MS-DOS 3.21, GW BASIC 3.21, and *SpeedStor* (a hard

disk diagnostic utility). An EGA monitor and board add \$920 to the base price. Altogether, this package offers 1.5MB more 32-bit RAM and a dab more software than do the two other computers in this roundup, but at \$6715 you pay at least \$1600 more for the privilege.

While the price may not be alluring, a quick look inside the Model 386E is at least reassuring. The motherboard is made by Intel, and the keyboard connector is sheathed in metal, so plugging and unplugging the keyboard won't crack the motherboard over time. In combination with 512K of motherboard RAM, a 386E with a 2MB and an 8MB RAM board, respectively, in its 32-bit slots reaches its maximum of 10.5MB—2.5MB more than the Acer 1100. Sitting amidst the hubbub is a Phoenix BIOS ROM (version 3.06), making sure that *this* Kaypro is IBM compatible.

Look more closely though, and a different story unfolds. You'll find two 8-bit but only four 8/16-bit slots—one less 8/16-bit slot than the PC's Limited 386<sup>16</sup> or the Acer 1100. Jumpers, chips, capacitors, and other components are packed around the slots, so installing expansion boards requires a steady hand and a sharp eye. The motherboard is also laced with patch wires—a sign that not all the bugs have been fumigated. Worse, the machine reviewed was saddled with a pre-July Intel motherboard that doesn't support the 80387. That in itself would have been acceptable—after all, the fault is mostly Intel's—but Kaypro also failed to include a socket adapter for the 80287 (see the sidebar "CAD Users: Do Your Math Homework").

Kaypro claims that only the first 300 to 400 machines have been shipped with the old motherboard; all subsequent units have the new, working 80387 socket. If you're stuck with one of the old

## Executive Summary

### Kaypro 386E

80386-based computer

The Kaypro 386E reflects the company's utilitarian philosophy: The motherboard is an early Intel model, and the interleaved memory addressing scheme yields middle-of-the-road processing speeds for an 80386. Though much cheaper than the Compaq Deskpro 386, the 386E is approximately \$800 to \$1000 more expensive than the other two machines reviewed (when similarly configured).

*Kaypro Corp.*

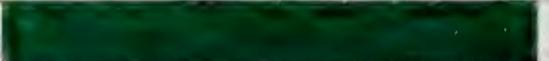
*533 Stevens Ave.*

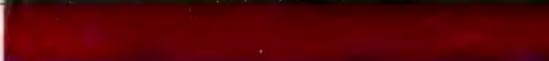
*Solana Beach, CA 92075*

*800/452-9776, 619/259-4441*

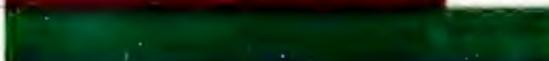
*List price: with 512K RAM, 1.2MB floppy disk drive, 101-key keyboard, disk controller, serial port, parallel port, SpeedStor, MS-DOS 3.21, GW BASIC 3.21, Expanded Memory Manager (Model A) \$4495; with 2.5MB RAM and 40MB hard disk drive (Model E-40) \$5795; with 2.5MB RAM and 130MB hard disk (Model E-130) \$8095; EGA monitor \$595; EGA board \$325; multimode adapter (monochrome, CGA, Hercules, and EGA emulation) \$295; color monitor \$455; monochrome monitor \$145*

## PC World Evaluation 386 Systems

	WordStar Professional	seconds
PC's Limited 386 <sup>16</sup>		69
Compaq Deskpro 386 Model 40		72
Acer 1100 Model 40		79
Kaypro Model 386E		92

	dBase III Plus	seconds
Compaq Deskpro 386 Model 40		54
PC's Limited 386 <sup>16</sup>		122
Acer 1100 Model 40		132
Kaypro Model 386E		138

	1-2-3	seconds
PC's Limited 386 <sup>16</sup>		20
Acer 1100 Model 40		21
Compaq Deskpro 386 Model 40		22
Kaypro Model 386E		25

	AutoCAD	seconds
Compaq Deskpro 386 Model 40		87
Acer 1100 Model 40		103
PC's Limited 386 <sup>16</sup>		129
Kaypro Model 386E		162

	Lattice C Compiler	seconds
Compaq Deskpro 386 Model 40		54
PC's Limited 386 <sup>16</sup>		65
Acer 1100 Model 40		73
Kaypro Model 386E		77

The PC's Limited 386<sup>16</sup> has a slight edge over the Acer 1100 in processing speed. Note that the Deskpro 386 tests were performed with the machine's bundled disk caching software—hence the faster times on disk-intensive operations.

**WordStar Professional** Although disk access plays a small part in the *WordStar* benchmark, processing and memory access speeds are the most significant factors.

The benchmark measures the time required to perform four operations on a 15,364-word document. All occurrences of the word *tomorrow* are replaced with *today*. A 13-line paragraph is copied from the beginning to the end of the document. The spelling checker is used to check the document for spelling errors (the file contains no errors, so the program does not stop for incorrect words). Finally, the first page of the document is printed.

**dBASE III Plus** Disk access speed is the most significant performance factor for the *dBASE III Plus* benchmark.

This benchmark measures the time required to produce a report based on a three-file join, select, and sort. The report includes calculated fields and subtotals. The benchmark uses a data base consisting of a customer file, an invoice file, and an item file. The customer file contains 500 customer records. The invoice file contains 1000 records, with one item record per invoice, or 1000 records in the item file.

The benchmark produces a report showing the companies delinquent in payment. For all invoices with merchandise shipped before a specified date and for which payment status is *N*, the company name, part number, quantity, price, and total cost (a calculated field that is the product of quantity times price) are printed. The report is sorted by state, with quantity and total cost subtotaled for each state and totaled for the entire report. All systems were tested with a math coprocessor installed.

**1-2-3** Because no disk access is required, the *1-2-3* benchmark de-

pend almost entirely on the processing and memory access speeds of the systems.

In this benchmark, a 1-2-3 macro executes a series of recalculations within a 50-by-50-cell matrix. The macro enters a number into the first cell of the matrix, enters into the adjacent cell a formula that performs a calculation using that number, and copies the formula to the rest of the matrix. The spreadsheet is recalculated three times, each time with a different number entered in the first cell of the matrix. This procedure is repeated using five different formulas; one each for addition, subtraction, multiplication, division, and exponentiation. After the mathematical operations are performed, the macro executes a block move and then erases the entire matrix.

**AutoCAD** Disk access, processing speed, and memory access all contribute to the performance of the AutoCAD benchmark. However, the speed and type of math coprocessor used by the system are the most important determining factors.

The benchmark uses the sample office drawing provided with the program and measures the time required to perform four functions: retrieving and displaying the sample drawing; zooming in on a small detail within the drawing; zooming out to reveal the entire drawing; and printing the entire drawing. The office drawing contains six two-dimensional and seven three-dimensional predefined views, all of which are displayed during the third step of the benchmark. All systems were tested with a math coprocessor installed.

**Lattice C Compiler** In the Lattice C Compiler test, the sequential disk access rate is the most important determining factor. Applications such as file managers commonly rely on this kind of disk access.

The benchmark measures the time required to compile and link two 1000-line programs. The test is performed automatically using a DOS batch file.

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

units and need a math coprocessor, have your dealer contact Kaypro. Nonetheless, as with the PC's Limited 386<sup>16</sup>, the motherboard must be removed before you can install the coprocessor.

Unfortunately, the state of the art in system configuration hasn't advanced much under Kaypro's aegis. To upgrade from a monochrome to a color monitor or to install more memory, ports, or a coprocessor, you must dig around on the motherboard, set the appropriate jumper (more than a dozen are spread all over the motherboard), run a supplied setup utility, and confirm the changes. Thankfully, acknowledging a new storage device is simpler—you merely change the parameters on the setup screen.

The 386E also gets mixed reviews on the input/output front. For starters, Kaypro takes a solid-feeling enhanced 101-key keyboard and exacerbates IBM's already muddled layout by stranding the backslash (\) key below the right <Shift> key and shrinking the <Ctrl> and <Alt> keys to make room for an unimplemented <Macro> key. The display is EGA bright and crisp, but images tend to warp at the edges; adjusting the horizontal and vertical size controls provides only minor relief. If you're feeling nostalgic, you can transform the monitor into an ersatz IBM Monochrome Display with the push of a button. Alas, Kaypro drops the pixel even here: The brightness control is curiously limited to settings ranging from dark to gloomy.

Kaypro's system and software manuals (all seven of them) are standard fare. The beginning user

guide, however, offers a solid introduction to personal computing basics, from using the keyboard to managing subdirectories. However, it devotes too much space to issues covered in the DOS manual, at the expense of such fundamentals as installing an expansion board. A comprehensive index would also be welcome.

More disturbing is the company's lackadaisical approach to compatibility with 80386-based software. When asked if the 386E had been tested with the OS/2 Developer's kit, *Windows 386*, or UNIX, one Kaypro engineer shrugged and said it wasn't necessary.

So let the buyer beware. The thought of breakneck computing for \$6000 may be alluring. But if an 80386-based machine can't step confidently into the OS/2 world, what you've bought is a very pricey AT. If speed is all you want, pick up a 12-MHz AT compatible with a 28ms 40MB hard disk from PC's Limited and save yourself \$3000. —Robert Luhn

#### ■ Sweet 16 MHz?

Choosing from among the PC's Limited 386<sup>16</sup>, the Acer 1100, and the Kaypro 386E begins with an easy call. Though it has a higher ceiling on 32-bit RAM, the Kaypro's price and speed simply can't match those of its rivals.

From here on things get trickier. With a socket for an 80387, support for 2MB more of 32-bit RAM, and a price about \$100 lower than that of the PC's Limited 386<sup>16</sup>, the Acer 1100 has a

REVIEW:  
Systems

Table 1: The PC's Limited 386<sup>16</sup> and the Acer 1100 give you roughly the same features for the same price. When all three machines are configured with the same amount of RAM, the Kaypro 386E costs approximately \$800 to \$1000 more.

	Acer 1100 Model 40	Kaypro 386E	PC's Limited 386 <sup>16</sup>
Price (with 40MB hard disk, EGA monitor and adapter)	\$4895	\$6715	\$4999
<b>System Unit</b>			
Clock speeds	16, 12, 10, 8, 6, 4.77 MHz	16, 8 MHz	16, 8, 4.77 MHz
Footprint	height: 6½" width: 21" depth: 17"	height: 6¾" width: 21¼" depth: 17"	height: 6½" width: 21" depth: 16½"
Expansion slots	two 8-bit, five 16-bit, one 32-bit	two 8-bit, four 8/16-bit, two 32-bit	two 8-bit, five 8/16-bit, one 32-bit
Ports	two serial, one parallel	one serial, one parallel	two serial, one parallel
Power supply wattage	196	217	200
Coprocessor socket	80387	80287	80287
Reset button	yes	no	no
BIOS	Award 386 BIOS version 1.0	Phoenix BIOS version 3.06	Dell Computer version 3.1
<b>Memory</b>			
32-bit RAM:			
amount shipped with basic unit	1MB	2.5MB	1MB
installable on motherboard	1MB	512K	no
system maximum	9MB	10.5MB	6MB
expansion board capacity	8MB	2MB	6MB
chip speed and type	100ns dynamic	120ns dynamic	70ns static
Total system memory capacity	16MB	16MB	16MB
<b>Storage</b>			
Floppy disk drive	1.2MB	1.2MB	1.2MB
Hard disk options	40MB, 80MB, 130MB	40MB, 130MB	40MB, 70MB, 150MB
Controller device support	two floppy, two hard drives	two floppy, two hard drives	two floppy, two hard drives
Maximum number of half-height devices	five	five	five
<b>Display</b>			
Monitor:			
tilt and swivel	yes	no	no
diagonal measurement	14"	13"	13"
EGA video board:			
modes supported	EGA, CGA, MDA	EGA, CGA, MDA, Hercules	EGA, CGA, MDA
<b>Bundled Software</b>			
	MS-DOS 3.21, GW BASIC 3.21	MS-DOS 3.21, GW BASIC 3.21, SpeedStor, Expanded Memory Manager 386	none

## CAD Users: Do Your Math Homework

Cutthroat competition among clone makers means that everyone's in a rush to get their machines out the door. Clearly, such haste can lead to unfortunate consequences. Nowhere is this more apparent than in the story of Intel's 80386 motherboard and its spotty support of math coprocessors.

Though Intel's first 80386 motherboard was pin-compatible with the 80387, Intel goofed; the board supported only the 16-bit 80287 math coprocessor, not the faster, 32-bit 80387. The company was in such a hurry, it started manufacturing the motherboard before the 80387 chip was complete. Intel corrected the problem in July of this year, so that all motherboards manufactured after July are 80387 compatible.

Meanwhile, thousands of the early motherboards have been shipped—to ALR, Kaypro, and dozens of other companies. Intel has left it up to vendors to tell customers that they aren't getting 80387 support. And be-

cause the motherboard was unsuccessfully designed to hold an 80387, an 80287 can't be accommodated without a special socket adapter. Intel has also made supplying the adapter the vendor's responsibility; if a vendor fails on this score, you get no coprocessor support at all.

People who use computer-aided design (CAD) software—which needs the computational power of a coprocessor to run at a reasonable rate—will be the most concerned about these matters. You can tell whether an Intel motherboard is 80387 compatible by checking a small white sticker along the left edge. Motherboards that *can't* use the 80387 coprocessor are labeled either PBA 149422-OXX or PBA 137406-OXX. Make sure these units at least have an 80287 adapter. —E. K.

marginally higher overall value. The PC's Limited machine, on the other hand, has a slight performance edge—one that multiplies as you add RAM. And if the review units are any indication, the Texas machine beats the one from Taiwan in the reliability department.

In short, due to its 80387 support, the Acer 1100 is the machine of choice for CAD applications—provided you're willing to trust your dealer's savvy once the four months of on-site TRW service runs out. For users with less specialized needs, the PC's Limited 386<sup>16</sup> holds the winning hand.

There are, of course, other options. New 386-based systems are coming to market every week; 386-equipped turbo boards can bring an AT into the big leagues too. If you're currently saddled with an XT, \$1495 buys a replacement motherboard from Hauptauge Computer Works, complete with 80386 microprocessor, 1MB of 32-bit RAM, and assured support for the 80387 and OS/2 (see "The Ultimate Turbo Board" in this issue's *Upgrade Path*). Patching up your old XT may not be as glamorous as buying a shiny new box, but you'll save a bundle and still get state-of-the-art performance. And that, after all, is what it's all about. ●

|| Eric Knorr and Robert Luhn are Senior Associate Editors and Marlene Nesary is an Assistant Editor for PC World.

# Media Movers



Andrew Shacht

An array of inexpensive cable and software packages makes moving files and programs from PC and AT to PS/2 feasible, if not fun.

Donald B. Trivette

||||| Anyone who plans to upgrade to a PS/2 faces a challenge akin to shoving a camel through the eye of a needle: moving programs and perhaps years of accumulated data stored on a machine with 5<sup>1</sup>/<sub>4</sub>-inch disk drives to a system using 3<sup>1</sup>/<sub>2</sub>-inch media. Fortunately, the problem has already been solved, thanks in large part to the popularity of laptop computers equipped with 3<sup>1</sup>/<sub>2</sub>-inch drives.

The solution is simple, direct, and affordable. Instead of fussing with modems or external disk drives, laptop users have simply patched their machines and PCs together with a serial cable and orchestrated data transfer with specially crafted communications programs. Now that the PS/2 has made the 3<sup>1</sup>/<sub>2</sub>-inch disk format official, a number of companies have taken this hybrid approach and refined it.

Of course, the data transfer programs reviewed here aren't the only way to move data across the PC-PS/2 chasm. You can attach an external 5<sup>1</sup>/<sub>4</sub>-inch drive to the PS/2 or a 3<sup>1</sup>/<sub>2</sub>-inch drive to the PC (convenient but expensive), shuttle the files between systems via external tape drives (slow), transfer files modem to modem (slower still), or use a commercial data-conver-

sion service (expensive but good for massive amounts of data). (For details, see the sidebar "Alternate Data Conversions.")

But if you don't plan on transferring gigabytes of data, and convenience and cost are paramount concerns, a number of software/cable combinations can do the trick. The setups examined here: *The Brooklyn Bridge*, *Data Migration Facility*, *Direc-Link 2.0*, *Duette 2.0*, *Fastwire II*, *File Shuttle 3.0*, *Lap-Link 2.05*, and *Paranet 1.3*.

#### ■ How They Work

Transferring data between two desktop machines is a lot like managing a remote telecommunications session: You must link the computers, load the same software at each end, and establish protocols so the machines can talk to each other. However, the medium of exchange isn't a phone line but a serial or parallel cable, and that means transmission rates can easily top 100,000 bps—ten times faster than modem-to-modem data transfers. Making the connection is also a lot easier than

## Alternate Data Conversions

There are a number of ways to convert data from 5<sup>1</sup>/<sub>4</sub>-inch to 3<sup>1</sup>/<sub>2</sub>-inch format. The method you pick depends on your wallet, schedule, and the kind and amount of data involved.

*Install an extra drive.* Although it's expensive, you can add an external 3<sup>1</sup>/<sub>2</sub>-inch drive to your PC or an external 5<sup>1</sup>/<sub>4</sub>-inch drive to the PS/2 (see this issue's *Hardware Shelf*). The suggested retail price for IBM's external 3<sup>1</sup>/<sub>2</sub>-inch disk drive is \$395; an external 5<sup>1</sup>/<sub>4</sub>-inch drive costs \$335 plus \$60 for a PS/2 adapter. If your company also uses a lot of laptop computers, this may be the simplest solution.

*Send from modem to modem.* If both computers have modems, establish a telecommunications link as if they were in separate cities and transfer the necessary files. It's a workable but slow solution unless you have a pair of high-speed modems with sophisticated error-correction software. (To save time and disk space, you can compress files with *Cubit* or any number of public-domain utilities.)

Text files can be transferred reliably even at

1200 bps, but if you have graphics files to move, don't reach out and phone the PS/2—graphics files can be immense and are easily corrupted.

*Use a null-modem cable.* When the computers are within 10 feet of each other, you can connect them directly with a null-modem cable. Theoretically, you can transfer data at 19,200 bps, but few communications programs (such as *Crosstalk XVI*) can run transfers beyond 9600 bps without generating errors.

*E-mail the files to yourself.* If you have just one modem, you could dial a bulletin board or an electronic mail service, send the file to your "mailbox," then connect the modem to the other computer, dial the service, and download the file. The E-mail approach can be incredibly tedious, but it works in a pinch.

*Use commercial media conversion.* Companies such as General Information Services of Philadelphia will transfer data from 5<sup>1</sup>/<sub>4</sub>-inch to 3<sup>1</sup>/<sub>2</sub>-inch media and vice versa for \$10 a disk. Even with quantity discounts, moving a few years' worth of correspondence is expensive. —D. B. T.

dialing a friend's PC, and all the programs install in a minute or two.

The eight programs reviewed here fall into two groups: *The Brooklyn Bridge* and *Paranet* are device drivers that rely on DOS functions, as does the *Data Migration Facility*. The other five are data transfer programs complete with menus, on-line help, sophisticated file handling functions, and even proprietary transfer schemes.

In transfer terminology, one computer is called the *master* (or local) computer, the other the *slave* (or remote) computer; the master is the one from whose keyboard you control a data transfer session. Typically, you select files stored on the master computer and send them to the slave, but the roles can be interchanged. With *Lap-Link* and a number of others, for example, you can run the transfer from either machine.

Except for IBM's *Data Migration Facility (DMF)*, the programs can send files in either direction and don't seem to care what kind of data is being moved: Binary, ASCII, graphics, and spreadsheet files all made the jump between PC and PS/2 at each program's highest-rated speed without error. Only *DMF* inexplicably failed to transmit certain files.

All the products can transfer data from any type of storage device on one machine to any type on the other computer. For example, transfers from a 360K disk on an XT to a 1.44MB high-capacity drive on a PS/2 Model 50 (or from a Bernoulli Box to a hard disk) are as easy as those from hard disk to hard disk.

## Any Port in a Storm

Which program you pick depends largely on the type of port your system has. All PS/2 models have built-in serial and parallel ports, but a PC, XT, or AT may have either, both, or none. As the performance results show, parallel-based data transfer programs are usually faster, but if master and slave are far apart, you may have to go serial; transmission errors crop up on parallel cables over 15 feet long.

Most data transfer packages come with both 5<sup>1</sup>/<sub>4</sub>-inch and 3<sup>1</sup>/<sub>2</sub>-inch program disks. Serial cables, when included, usually have two female D-shaped connectors at each end: a 9-pin that plugs into the serial port on an AT, and a 25-pin for a PC or PS/2. Use the cable that the transfer program vendor recommends. You can't always tell how a substitute cable is wired just by looking at it, and using the right one eliminates at least one source of potential problems.

Products that use the parallel port, such as *DMF* and *File Shuttle*, come with a Centronics-to-25-pin adapter that modifies a standard parallel printer cable.

## Setting Up a Transfer

Whatever approach you take—serial or parallel—physically connecting the two systems is probably a 15-second job. The data transfer programs are easily configured; normally you specify transmission speed, type of connection, and so on, from a menu. With the device drivers—*The Brooklyn Bridge*, *Paranet*, and *DMF*—choices are made from the command line. With all the programs, the maximum transfer

speed is the default setting, and there's little need to change it unless you are shuttling data over extremely long cables and are concerned about transmission errors.

Once the master and slave computers are properly connected and configured, a data transfer program usually will notify you of a successful linkup. If the connection is broken—say, if you accidentally trip over the cable—most of the programs display an error message, but don't expect them to pinpoint the specific cause. The device driver programs will merely note 'Device not ready...' when you attempt to send a file. The rest typically offer a list of possibilities: disconnected cables, mismatched speed settings, power loss, and so on.

With the lines of communication open, transferring files is done mostly in point-and-shoot fashion. The data transfer program lists the files; you highlight the ones to copy, press <Enter>, and they're off. With the device driver crowd, you run the show with the DOS COPY command and various wild cards, such as COPY \*.DOC.

If speed is your music, turn to the performance results supplied by the National Software Testing Laboratories (NSTL). These demonstrate without doubt which data transfer packages have the edge in speed. But remember, if you have to transfer data between systems repeatedly or off and on over a long period of time, a friendlier program may be a better buy.

## Executive Summary

### The Brooklyn Bridge

Data device driver

A device driver that is simple to install and use. But the program, which relies on DOS commands, is slow. Serial only; includes cable.

*White Crane Systems*  
6889 Peachtree Industrial  
Blvd. #151  
Norcross, GA 30092  
404/394-3119  
List price: \$129.95  
Not copy protected

### Direc-Link 2.0

Data transfer software

Displays directory trees and offers full file control. Runs quite fast in parallel mode, but serial transfers are the slowest in the group. Serial and parallel options; cable \$45.

*Micro-Z Co.*  
4 Santa Bella Rd.  
Rolling Hills, CA 90274  
213/377-1640  
List price: \$59.50  
Not copy protected

### Fastwire II

Data transfer software

A fast, easy-to-use serial program that offers simultaneous directories and scripts to automate transfers. Cable included.

*Rupp Brothers*  
P.O. Drawer J, Lenox Hill  
Station  
New York, NY 10021  
212/517-7775  
List price: \$129.95  
Not copy protected

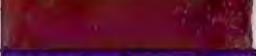
## PC World Evaluation

### File transfer programs

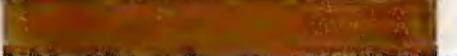
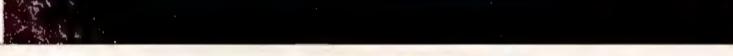
#### Serial transmission

	Text files	minutes:seconds
Fastwire II		0:51.69
Lap-Link		0:58.12
Brooklyn Bridge		0:58.33
File Shuttle		1:04.72
Duette		1:06.96
Direc-Link		1:14.42
Crosstalk XVI		6:25.00

#### Binary files

	Binary files	minutes:seconds
Fastwire II		0:34.58
Brooklyn Bridge		0:36.84
Duette		0:38.62
File Shuttle		0:47.79
Lap-Link		0:48.55
Direc-Link		0:54.45
Crosstalk XVI		1:56.00

#### Parallel transmissions

	Text files	minutes:seconds
File Shuttle		0:32.49
Paranet		0:48.34
IBM DMF		0:57.60
Direc-Link		1:21.08

#### Binary files

	Binary files	minutes:seconds
File Shuttle		0:20.76
Paranet		0:25.27
IBM DMF		0:37.05
Direc-Link		0:37.05

Of the eight products reviewed, two are parallel-based, four are serial-based, and two work either way. Their transfer speeds vary by a factor of nearly 5, but their ease of use and the type of ports available on your systems may be more important considerations.

This benchmark measures the speed at which these programs transfer files from a 360K 5¼-inch disk in an IBM PC AT Model 339 to a 720K 3½-inch disk in an IBM PS/2 Model 30. Tests were performed on two types of files, text and binary. The text files test consisted of transferring thirty 10,000-byte files; the binary files test measured the transfer of three 100,000-byte files. The times shown are averages of three iterations.

As a control, the tests were also conducted with *Crosstalk XVI* using the program's proprietary XMIT protocol in error-checking mode at 38,400 bps.

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

## ■ Brooklyn Bridge: DOS Driving

Like its namesake, *The Brooklyn Bridge* is solid and well built but not equipped to handle heavy traffic. It works via a serial connection, relies on DOS functions, and transfers files at a rate just below the average for the programs reviewed here.

Installing *The Brooklyn Bridge* is almost completely automatic, and the program's excellent documentation should reassure even the faint of heart. You slip a program disk into each computer and type INSTALL.BAT on the master. This automatically copies device drivers to the system and references them in the master CONFIG.SYS file. You then run the BRIDGE program on the slave and reboot the master.

At this point, the master can access the slave's drives, printer, and communications port as if they were its own. You can execute any DOS command to the slave except for DISKCOPY and FORMAT; with DOS 3.20 or a later version, you can use XCOPY to copy an entire drive's contents at once. And there is no need to set the speed; *The Brooklyn Bridge* defaults to 115,200 bps.

Since *The Brooklyn Bridge* acts as a DOS device driver, its operations are quite transparent. With an XT and a PS/2 linked by *The Brooklyn Bridge*, you could view the latter's hard disk directory just by typing DIR F: from the XT. To copy a group of files from the XT's hard disk to the PS/2's hard disk, issue the DOS COPY command with the usual drive specifiers and file extensions (e.g., COPY C:\*.DAT F:). To funnel data in the opposite direction, merely copy from drive F: to drive C:.

Note, too, that *The Brooklyn Bridge*, *Paranet*, and *DMF* all share one distinctive trait: When the programs are loaded, the slave is effectively frozen, waiting patiently to receive data. You can, however, still run applications on the master as long as it isn't in the process of transferring data.

## ■ Paranet: Slow Start, Fast Pace

Like *The Brooklyn Bridge*, *Paranet* is a device driver, but it has key differences. *Paranet* requires a parallel port, is relatively difficult to install, but moves files at a brisk pace, ranking second in transfer speed.

Getting *Paranet* up and running is an awkward, multiple-step procedure. The program first asks a series of somewhat confusing questions, such as 'Output drive for updated CONFIG.SYS?', then makes you run a separate utility program before it sends files to the slave computer for the first time. Once that's done, *Paranet* functions almost exactly like *The Brooklyn Bridge*, only faster.

## ■ Data Migration Facility: One-Way Trip

With IBM's *DMF* you get what you pay for. In this case, \$30 buys a parallel-based program that transfers files in only one direction (to the PS/2).

Although not a device driver like *The Brooklyn Bridge* or *Paranet*, *DMF* operates in much the same way. RECV35, a slave program that comes on the DOS 3.30 disk, is run on the PS/2; its counterpart, COPY35, is on the 5 1/4-

## Executive Summary

### Paranet 1.3

Data device driver

A device driver that manages transfers with DOS commands. Awkward installation but fast. Parallel only; includes cable.

*Adlersparre & Associates*  
4448 Houlahan Ct.  
Victoria, British Columbia  
V8N 6C6 Canada  
604/477-8708  
List price: \$94.95  
Not copy protected

### Data Migration Facility

Data transfer software

A limited parallel-based package that can transfer files only from PC to PS/2. Parallel adapter included.

IBM  
900 King St.  
Rye Brook, NY 10573  
914/934-4000  
List price: \$30  
Not copy protected

### File Shuttle 3.0

Data transfer software

The fastest performer in parallel mode, but quite slow in serial transfers. You can mark files globally by extension, date, and other means. Serial and parallel options; parallel adapter included. Full null-modem cable required for serial transfer.

*Getc Software*  
1269 Howe St.  
Vancouver, British Columbia  
V6Z 1R3 Canada  
604/687-3606  
List price: \$99.95  
Not copy protected

Data Transfer Programs Compared

	Brooklyn Bridge 1.30	Direc-Link 2.0	Duette 2.0	Fastwire 1.0	File Shuttle 3.0	IBM DMF 1.0	Lap-Link 2.05	Paranet 1.3
Port								
serial	◆	◆	◆	◆	◆		◆	
parallel		◆			◆	◆		◆
Cable included	◆	1	1	◆	2	2	◆	◆
File selection								
Tagged files		◆	◆	◆	◆		◆	
Wild card	◆	◆	◆	◆	◆	◆	◆	◆
Subdirectory	◆	◆	◆	◆	◆	◆	◆	◆
Point and shoot		◆	◆	◆	◆		◆	
Either machine can be master		◆		◆			◆	◆
Split screen		◆		◆	◆		◆	◆
Two-way transfers	◆	◆	◆	◆	◆		◆	◆
Temporary exit to run DOS commands	N/A	◆		◆	◆	N/A	◆	N/A
Macro/script facility		◆		◆	◆			
Price	\$129.95	\$59.50	\$49.95	\$129.95	\$95.95	\$30.00	\$129.95	\$94.95

<sup>1</sup> Cable extra

<sup>2</sup> Parallel adapter only

inch DMF distribution disk and works like the DOS COPY command. For example, to copy an entire subdirectory from an XT to a PS/2's hard disk, you type COPY35 C:\ABC\\*. \* F: at the DOS prompt. But COPY35 is a crippled version of COPY—unlike every other program reviewed, DMF doesn't let you rename files as part of the transfer.

As NSTL's benchmarks show, DMF runs with the middle of the pack. But that doesn't mean the program is consistent. DMF inexplicably fails to transfer files on

occasion, merely displaying the cryptic message 'File Receiving Error'. Even setting such quirkiness aside, the program's inability to send files in both directions makes it a questionable choice.

#### ◆ Direc-Link 2.0: Slow Showboat

Direc-Link is a versatile serial/parallel-based program with a wealth of features. It can transfer in either mode but performs better in parallel. Though seemingly a good buy at \$59.50, the package doesn't include a cable. Micro-Z offers a \$45 multiport cable that will make any serial or parallel connection.

Direc-Link is made by the same graphics-minded people who gave us Direc-Tree, and it shows. Once loaded, Direc-Link displays a tree diagram of each computer's file structures—a worthwhile feature for users who have trouble managing subdirectories. Direc-Link's vertical split screen shows you both sides of the transaction, so selecting and transferring files is a point-and-shoot operation.

Direc-Link is almost too rich in features; it sorts files eight differ-

ent ways. Press <F9> and you'll see every file on the master; press S and *Direc-Link* quickly sorts them by size. They can also be sorted by date, by file type, in ascending or descending order, and so on.

*Direc-Link* adds some nice touches to the usual point-and-shoot interface. Select the Archive option, for example, and the program puts a small triangular marker next to any file that has been written to since the last transfer; this makes it easy to find files that have been updated. The program also has a macro facility that lets you automate the process, but it lacks a learn mode; you must write scripts manually. Like most data transfer programs, *Direc-Link* lets you exit temporarily to run DOS commands.

With all its bells and whistles, *Direc-Link* can be confusing to use. Running the program requires an inordinate number of keystrokes. Its serial transfer speed is the slowest of the lot; the program performs acceptably in parallel mode.

### Lap-Link 2.05: Stately Elegance

*Lap-Link* is one of the most expensive products in the group and nearly the slowest, in spite of a proprietary data transmission mode that supposedly speeds file transfers. However, the \$129.95 does buy you a serial cable with 9- and 25-pin heads at each end. Another plus: The program is designed so logically, you needn't read the manual before transferring files.

As its name suggests, *Lap-Link* was developed originally to transfer data between laptop and desktop computers. The current

```

LAP-LINK (2.04) Copyright 1986, 87   Traveling Software Inc.           M123456
===== Local Drive (C:) 3831808 Free ===== Remote Drive (C:) 5322752 Free =====
. <DIR> 6-30-87 10:03a
.. <DIR> 6-30-87 10:03a
DLINK .COM 35942 6-22-87 9:38p
DUETTE .COM 64949 6-30-87 12:19p
FS .EXE 41356 7-01-87 12:00a
FSQ .EXE 41452 7-01-87 12:00a
FW2 .CMD 5374 6-19-87 9:57p
FW2 .DAT 62925 6-30-87 3:10p
FW2 .EXE 146897 6-28-87 12:35a
INSTALL .EXE 14208 5-30-87 1:11p
LL .EXE 60416 6-24-87 11:34p
SCREEN02.CAP 4256 6-30-87 12:35p
SCREEN03.CAP 4256 6-30-87 12:37p
SL .EXE 50443 6-28-87 12:46a

. <DIR> 6-30-87 10:09a
.. <DIR> 6-30-87 10:09a
FS .BAK 41356 7-01-87 12:00a
FS .EXE 41356 7-01-87 12:00a
FSQ .BAK 41452 7-01-87 12:00a
FSQ .EXE 41452 7-01-87 12:00a
LL .EXE 60416 6-30-87 5:51p
README .DOC 985 6-14-87 12:36p

= C:\LINK ----- C:\LINK -----
COM1: 115200
COMMANDS: Help Log Tree Copy Wildcopy Group Options View Erase Rename Dos Quit

```

To transfer a file with Lap-Link, highlight the file name on the originating computer, select Copy from the bar menu, and watch the file reappear on the destination computer's directory.

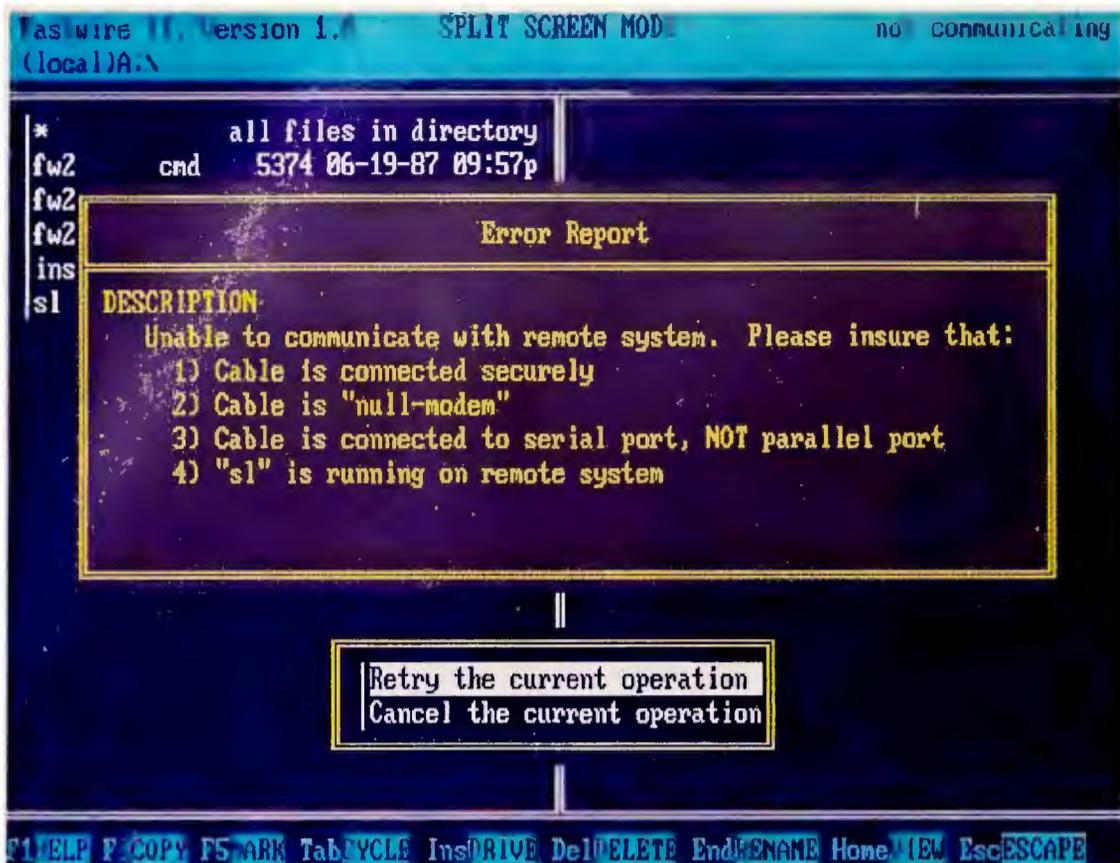
```

Fastwire II, Version 1.0      SPLIT SCREEN MODE      COM1:115200
(local)C:\FAMILY              (remote)C:\LINK
-----
* all files in directory
.. <DIR> move up directory
adconfig exe 33492 03-26-86 03:50p
allisonv 3861 09-27-86 01:33p
andyamos 2620 10-04-86 11:44a
ar bas 14635 04-26-87 12:37p
computer dat 1728 11-18-86 06:28p
config exe 19784 03-26-86 03:49p
convert exe 28694 05-30-86 07:55p
dickf 9009 02-27-87 11:52a
dickwill 3716 11-06-86 11:47a
fatdeed 2397 02-17-87 10:46a
foster dat 9216 01-01-88 12:04a
foster doc 2607 03-20-85 12:11a
fr exe 94182 10-24-86 10:51p
franklin 2397 02-17-87 10:46a
frchk exe 29424 03-26-86 03:51p
frr bas 18165 04-26-87 12:40p
frr exe 121238 04-26-87 12:43p
gedcom exe 78302 11-18-86 06:31p
forum fnt 9727 09-25-85 01:23a
frr exe 121238 04-26-87 12:43p
fw2 arc 203647 06-22-87 06:17p
fw2 cmd 5374 06-19-87 09:57p
fw2 dat 56292 06-30-87 03:13p
fw2 exe 139853 06-22-87 06:01p
install dvc 4470 09-25-85 01:23a
install exe 55152 09-25-85 01:23a
install lbr 266562 09-25-85 01:23a
install scr 43728 09-25-85 01:23a
iraapt wk1 3299 05-03-87 03:05p
italic1 fnt 8949 09-25-85 01:23a
italic2 fnt 11857 09-25-85 01:23a
jzzlotus xlt 11936 09-25-85 01:23a
kirk0 wk1 4584 03-08-86 02:14p
kirk2 wk1 7058 03-01-86 06:32p
kirk5 wk1 6856 03-06-86 02:13p
legacy wk1 2512 08-17-86 03:01p
lotus com 5817 09-25-85 01:23a
lotus fnt 8679 09-25-85 01:23a
-----
F1HELP F3COPY EnterSELECT F5MARK TabCYCLE InsDRIVE DelDELETE EscESCAPE

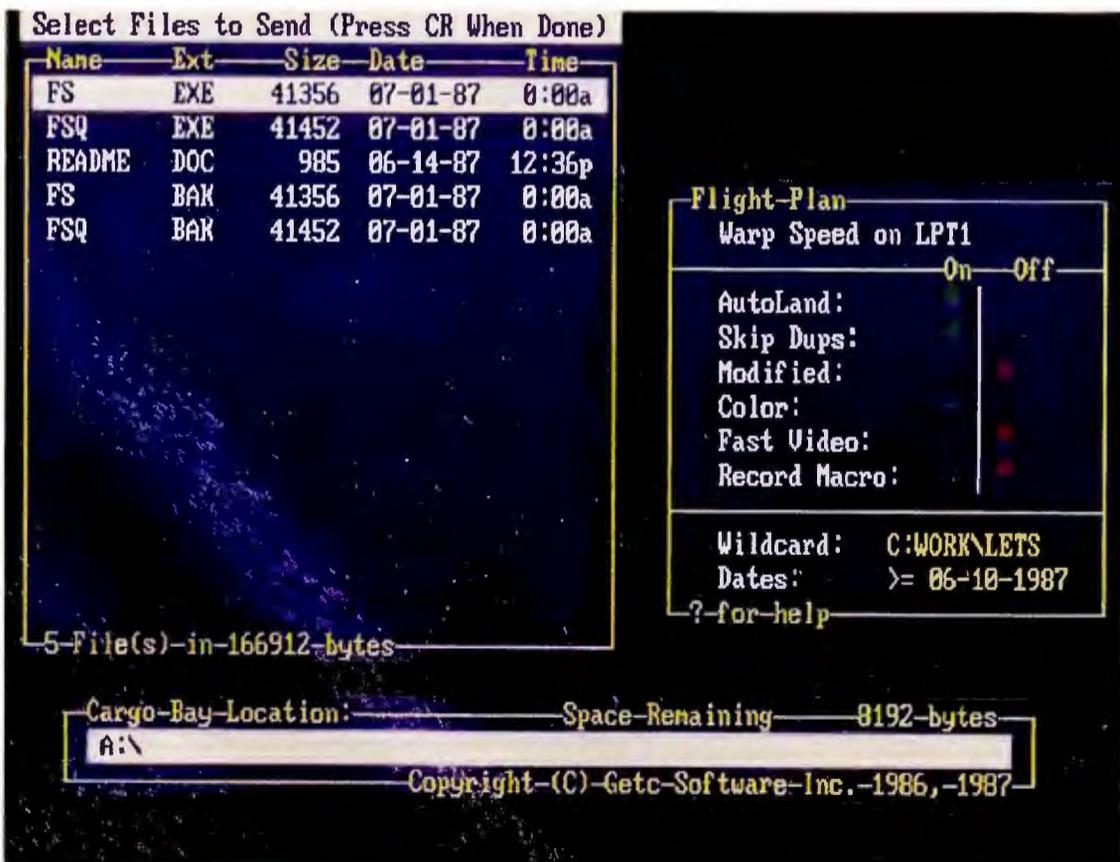
```

The Fastwire II file listing gives you a complete view of the files on the master and slave computers. Thanks to the split screen, transferring files is a point-and-shoot operation.

REVIEW:  
Communications



Fastwire II won't let you make many mistakes. If the connection between the two computers isn't correctly established, the program flashes a warning.



File Shuttle boasts excellent transfer speed, but it peppers a busy display with arcane aeronautical terminology. "Warp Speed Mach 115.2" corresponds to the more pedestrian 115,200 bps; the Cargo Bay is your file directory.

version can sort, display, and transfer files by name, extension, date, and size. *Lap-Link* also pioneered the split-screen technique used in *Direc-Link*, although here the screen is split vertically. You point and shoot to move files.

Unfortunately, file movement speed is the sticky issue with this otherwise elegant package. *Lap-Link* placed near the bottom in NSTL's time trials—and that may give you pause.

### Fastwire II: Solid Performer

*Fastwire II* is an easy-to-use, serial-based program that costs the same as *Lap-Link* yet transfers files about 30 percent faster. The program runs in three modes: command line, split-screen, and a macro mode called *forms*. The split-screen mode is particularly convenient. As with *Lap-Link* you can display master and slave directories simultaneously, making file management simple. The display is large and readable; you pick files by highlighting them. The on-line help and error messages are handy, as is a *WordStar*-like row of function key definitions across the bottom of the screen.

Forms mode lets you write and record scripts that shape your transfers for specific situations. You create a form by copying and adapting one of the three samples supplied and choosing drive names, file types, cutoff dates, and so forth. A *Fastwire* form called SALES, for example, would enable sales representatives to transfer files from their laptops and automatically update the home office network's files. *Fastwire* also

warns you when a disk on the slave is out of room. You can then remove the disk and select 'Retry the current operation', and *Fastwire* picks up where it left off.

### ■ **Duette 2.0: Transfers on the Cheap**

*Duette* is an elegant serial-based program and, at \$49.95, the biggest bargain in the group; an extra \$10 buys a cable identical to the one used by *Lap-Link*. Running next to last in a field of eight, however, won't endear the package to speed buffs.

As with most of the programs reviewed here, installation consists of little more than answering a few questions about monitor type, transmission rate, and so forth. What follows is similarly simple. *Duette's* opening screen looks a lot like a 1-2-3 worksheet, with a command line across the top and file names arrayed in the center. From here you can send or receive files, tag files globally, use wild cards, and change the communications configurations.

Where other programs make you exit temporarily to use DOS functions, *Duette* allows you to copy, type, delete, and rename files within the program. It can't sort files, however, which makes sifting through a large subdirectory a chore. (Platte River Associates says the next release will have a sort feature.) On the plus side, *Duette* is one of the few programs that warns you if you're about to overwrite a file on the slave machine.

■ **File Shuttle 3.0: Fast Flier**  
*File Shuttle* is by far the fastest package of the lot, a capable serial- or parallel-run program that unfortunately is riddled with cute aviation terminology. The Cargo Bay option selects the drive and directory, the Flight Plan is the setup menu, and you must remember to enable Auto Land if you want to transfer more than one file at a time.

Look beyond the jargon, though, and you find a solid program with some clever touches. Select Skip Dups on the slave computer's menu, for example, and the master won't send any file

already in the slave's directory. A few keystrokes let you tag files globally by extension, data, and so forth. And *File Shuttle* is the only program that tells how many files have been sent and how many remain to be transferred.

Although *File Shuttle* operates in either mode, parallel transfers are much faster. The package includes a Rocket Socket—a Centronics-to-25-pin male D-shaped adapter for a parallel printer cable. The maker suggests you buy a null-modem cable for a serial connection, but for \$129 the package should include one.

### ■ **Transfer, Please**

Though benchmarks aren't the only deciding factor in picking a program, NSTL's tests make the choice easier. If you have a serial port and many files to transfer, *Fastwire II* will do the job most efficiently, since it joins speediness with an easy-to-use point-and-shoot file selection. Though no speed demon, *Duette's* \$59.95 price tag makes it the top choice for thrifty occasional users. If money is no object, *File Shuttle* in parallel mode is the obvious choice. ●

#### *Executive Summary*

### **Duette 2.0**

Data transfer software

An inexpensive but very slow menu-driven package. Serial only; cable \$10.

*Platte River Associates*  
2000 W. 120th St. #10  
Denver, CO 80234  
303/469-7765  
List price: \$49.95  
Not copy protected

### **Lap-Link 2.05**

Data transfer software

A convenient serial-based package, but among the slower products tested. Simultaneous directory displays. Cable included.

*Traveling Software*  
19310 North Creek Pkwy.  
Bothell, WA 98011  
800/343-8080  
List price: \$129.95  
Not copy protected

*Donald B. Trivette is the author of A Quick and Easy Guide to Dow Jones News/Retrieval, published by Compute Books (Greensboro, North Carolina, 1987).*

# Dac-Easy: Still Small-Time Accounting

Rewritten in C and now easier to install, Dac-Easy 2.00 improves on its predecessor's data entry and reporting. Nonetheless, this popular accounting program for small businesses still has some pretty big holes.

*Ralph Soucie*

||||| When you launch a software product at one-tenth the price of its closest competitors, you have to persuade people you're selling a tool, not a toy. *Dac-Easy Accounting 1.00*—an almost all-in-one accounting package introduced in 1985 by Dac Software—didn't convince everybody that it was a serious tool for computerized accounting. But at only \$69.95, it made asking the question affordable.

Despite primitive reporting and audit features, *Dac-Easy* found an immediate home in the small business market. Now, two years and 250,000 sales later, Dac Software has released version 2.00 of *Dac-Easy Accounting*, bumping the price a mere \$30 to \$99.95. Like the original (see "Penny-Wise Accounting," *PCW*, April 1986,

for a full review of version 1.00), version 2.00 includes a general ledger, accounts receivable and payable modules, and basic inventory and purchase-order capabilities. *Dac-Easy 2.00* also retains its forerunner's simple time, billing, budgeting, forecasting, and reporting functions (payroll comes as a separate module for \$69.95). Although *Dac-Easy* now faces competition from other accounting packages in the under-\$100 range, it remains the most popular in its class.

Rewritten in C (up from BASIC), *Dac-Easy 2.00* runs considerably faster. New error-handling and reporting features answer some of version 1.00 users' persistent complaints. And version 2.00's help screens, usable documentation, tutorials, and menu-driven installation routine—all glaringly absent from version 1.00—indicate that *Dac-Easy* knows what it requires to live up to its name.



Despite this revamp, *Dac-Easy* still falls short of full functionality. For most people, *Dac-Easy 2.00*'s simplistic and rather badly organized financial statements will be the biggest drawback. A major stumbling block for larger businesses is that the program can't perform the consolidations true departmental accounting requires—even though its PR materials suggest it can. Moreover, an inadequate audit system is made worse by a general ledger that can't give you more than a month's transaction history at a glance.

Finally, the "window" feature (purported to provide access to DOS functions from within *Dac-Easy*) doesn't work at all—a failing that Dac is attempting to correct.

Thus, large businesses and those with complex reporting needs probably won't find *Dac-*

*Easy* worthwhile. But mom-and-pop businesses—ever the mainstay of Dac's customer base—are likely to be pleased by the improvements and tolerant of the quirks.

#### ■ New Look, New Bugs

Version 2.00 has two program disks—rather than 1.00's one—and as before, there's no copy protection scheme to hassle with. Though colorful and well paced, *Dac-Easy*'s new menu-driven installation program isn't as straightforward as it seems. The first snare is minor: What the manual calls the Install disk is actually labeled Disk No. 1; use it accordingly and you'll be all right.

*Dac-Easy 2.00*'s new built-in chart of accounts presents a more subtle dilemma. *Dac-Easy* lists 255 accounts and subaccounts—perhaps 200 more than most small businesses need. The Rents and Leases account, for instance, includes 6 subaccounts—for furniture, trucks, offices, and so on. You can delete these extra ac-

counts so they don't clutter up your system, but only one at a time through a cumbersome editing routine.

If you elect to develop your own chart of accounts, you'll have to wrestle with what Dac calls the "brains" of the system: the General Ledger Interface Table. Here you establish the links between modules and set up the detail and totaling accounts. Until you get the sequence and hierarchy of these account relationships exactly right, *Dac-Easy* may lock you out of modules other than the general ledger.

Whether you opt for a canned or a customized chart of accounts, you can't finish installation without allocating file space for your

REVIEW:  
Accounting

Like the rest of *Dac-Easy 2.00's* financial statements, the income statement shows the hierarchy (levels) of detail and summary accounts generating the figures. But notice the unorthodox placement of totals.

Date: 07/30/87  
Time: 01:29 AM

Page no. 3

INCOME STATEMENT

Acct #	Account Name	Level 5	Level 4	Level 3	Level 2	Level 1
4	SALES					144296.20
41	SALES				144296.20	
4101	BEVERAGES			64340.20		
4102	POTATO CHIPS			38698.00		
4103	CANDY BARS			41258.00		
7	OTHER INCOME/EXPENSE					173.00
71	FINANCE CHARGES				173.00	
	TOTAL REVENUE					144469.20
5	COST OF GOODS SOLD					83027.53
501	BEVERAGES				37829.53	
502	POTATO CHIPS				20702.00	
503	CANDY BARS				24496.00	
6	OPERATING EXPENSES					46356.00
61	RENT				16980.00	
63	WAGES AND SALARIES				25967.00	
65	TAXES				2837.00	
651	PAYROLL TAXES			2623.00		
652	PROPERTY TAXES			214.00		
66	DEPRECIATION				572.00	
8	TAXES ON INCOME					2543.00
	NET INCOME					12542.67

system. *Dac-Easy's* disk file management process requires you to estimate how many vendor and customer accounts you'll need space for and the maximum number of invoices you'll process per day. This installation routine is made worse by jumbled question-and-answer boxes on screen. When you've exceeded the space set aside for files, you must perform a file rehash on your system—reallocating space for your expanded files through a separate, time-consuming routine.

### Standard Operating Procedures

Old *Dac-Easy* hands will notice that getting around the program feels much faster and smoother with the C rewrite; attractive and easy-to-follow new screen designs add to the streamlined feel of 2.00. For example, *Dac* designers have clarified and expanded the use of function keys with 2.00, adding a status line at the bottom of the screen that shows which function keys are active at any given point.

*Dac-Easy's* new context-sensitive help system is a mixed bag. Some aspects are marvelous: When you're processing a shipment in the accounts receivable module, for instance, a box pops

up with handy information such as the original credit limit and year-to-date sales for that account. However, scrolling through help screens can be treacherous: <End>, <Home>, <Cursor-Up>, and <CursorDown> work as you might expect, but <PgUp> and <PgDn> pop you back into the program with nary a blink.

After spending long hours at the keyboard entering and correcting data, *Dac-Easy* veterans should be ecstatic to hear that correcting data as you enter it is much easier than with 1.00. Now you can enter data for a whole

screen, check it over for errors, back up through fields as necessary, and make corrections by overtyping.

### ■ Updates and Audits

Dac designers switched a few updating functions from batch to real-time processing with 2.00, producing a sensible balance. Transactions made within any given module instantly update that module. But when you want to update the general ledger, you shift into the more protective batch processing mode.

With most accounting systems, you're forced to print a list of transactions before they're posted to the general ledger; that printout keeps your audit trail intact. *Dac-Easy* doesn't use this tactic. In fact, it does not provide a menu option to print a batch of transactions before posting. Moreover, the manual provides only limited guidance in this area. There's no entry for audit reports in the documentation's index or table of contents.

Of all the modules, only the general ledger lacks a clean way to produce listings of transactions for audit purposes. The general ledger's Account Activity Detail report comes closest, but it mixes both posted and unposted transactions—not the clearest audit system. To make matters worse, *Dac-Easy* doesn't store any account activity (just totals) for months whose books have been closed. Whether your business is large or small, the lack of a well-organized audit trail can create problems with the IRS.

### ■ General Ledger

The structure of *Dac-Easy*'s general ledger remains essentially the same in the new version. You can opt for a 13-month year and keep two months open at once. But once you've closed the period, all transaction history is collapsed into the summary accounts. *Dac-Easy* has retained the user-defined two-character journal code that version 1.00 uses to describe miscellaneous general journal entries (DE for depreciation, SA for sale of fixed assets, AP for accounts payable, and so on). However, you can now sort the general journal listing by these codes and produce handy management reports.

#### *Executive Summary*

## Dac-Easy Accounting

Accounting software

Version 2.00 of *Dac-Easy Accounting* is easier to install and quicker to respond than 1.00, and it sports vital new error-correction and reporting features. However, a few bugs remain, and the program's primitive audit trails and financial statements may trouble your CPA.

*Dac-Easy Accounting*,  
version 2.00  
Dac Software  
4801 Spring Valley Rd., Bldg.  
110B  
Dallas, TX 75244  
214/458-0038  
List price: \$99.95; upgrade  
from version 1.00 \$35  
Requirements: 256K, two  
disk drives (hard disk rec-  
ommended), DOS 2.00 or  
later version  
Not copy protected

*Dac-Easy* has exchanged the ungainly YYMMDD date entry format of version 1.00 for the more conventional MM/DD/YY. Even better, version 2.00's General Journal screen now displays running totals of debits and credits, a feature missing from version 1.00. This serves as a constant reminder of a transaction's status and helps to keep you from posting erroneous data.

Dac Software now says *Dac-Easy Accounting* offers multicompany and departmental accounting, but this claim is misleading. By *multicompany*, Dac means the ability to conveniently access accounting data for different entities on separate hard disk directories. The program is not able, however, to combine or consolidate the data for these entities. *Dac-Easy*'s new departmental capabilities are also half-baked; you can departmentalize only by product or customer, not by location.

### ■ Second-Rate Reporting

*Dac-Easy 2.00* has remedied some but not all of 1.00's reporting problems. Notably, the program can now produce statements with multiple columns to reflect the hierarchy of detail and summary accounts. The format, though, is idiosyncratic, with totals placed above rather than below the relevant detail. While you might find this format of some value for internal purposes, it would not be acceptable for submission to outside parties—like your banker.

Other persistent quirks include the nonsuppressible date, time,

and page number at the top of reports and inadequate underlining. However, version 2.00 has enhanced its old single-column format with single and double underlining.

Available through the File Creation and Maintenance menu, *Dac-Easy 2.00's* report editor allows you a bit more flexibility when creating financial statements than did 1.00's. It's more straightforward than the report editors of most higher-priced accounting systems, but less powerful too. You can't, for instance, move the totals columns or add descriptions of more than 20 characters.

*Dac-Easy* has added some new reports—most notably a Statement of Changes in Financial Condition—that require no design effort on the part of the user. However, the statement of changes' primitive design limits its usefulness. Again, this is not a financial statement you would want to distribute to outsiders.

#### ■ Billing and Accounts Receivable

Version 1.00's billing module was designed exclusively for purveyors of goods. Although version 2.00 offers added features for service firms, the module still can't assign work codes or employee numbers to bills or produce reports based on such breakdowns. Essentially, this function is little more than a blank forms editor where you type in a custom invoice and multiply units (not hours) by cost to produce totals.

As with version 1.00, the new *Dac-Easy* accounts receivable module allows you to select an open-item or balance-forward method for each customer. The

system keeps three years' worth of information on each customer account (totals, not individual transactions). Especially useful for billing and receivables activity, version 2.00 includes a nifty new message-generating capability, which you can use throughout the system. It allows you to create memos and reminders and specify where and when they should pop up on screen. For example, entering a specific customer code could trigger the message 'Check whether last invoice paid' for a slow-paying customer.

#### ■ Inventory, Purchase Order, and Accounts Payable

Although inventory is likely the least-used *Dac-Easy* module because it lacks the most common costing methods (LIFO and FIFO), *Dac* Software designers have made several small enhancements. For instance, you can now enter purchase discounts in absolute dollars (version 1.00 allowed only percentages), and the product code has been expanded to 13 digits—large enough to handle American and European universal product codes. In addition, the message file can flash alerts like 'Ask for special pricing' when specified vendors appear on the purchase-order entry screen.

*Dac-Easy* offers an easy-to-use, full-featured accounts payable module. Able to import invoice information from the purchase-order module or process it directly, the accounts payable module automatically calculates due dates, alerts you to available discounts, and provides a sensible list of pay-

ables reports—including vendor directories and mailing labels.

Version 2.00 also allows you to display unpaid invoices, helping you to select the ones you wish to pay. A new report, Checks to Print Journal, allows you to review payment information for accuracy before printing checks.

#### ■ Forecasting

The most pretentious part of this \$100 accounting package has to be its forecasting and budgeting features. Drawing data from the accounts receivable, accounts payable, general ledger, and inventory modules, version 1.00 allowed you to apply percentage increases (or decreases) and generate projections for current-year accounts. However, you couldn't carry over forecasts into the general ledger or vary the percentage for different accounts. The projections had to be global—10 percent across the board, for example—yielding simplistic results.

*Dac-Easy 2.00's* forecasting module is still far from a fully developed business modeling system, but it has moved up a notch. You can now apply different percentage increments to individual account balances—adding 10 percent to sales, for instance, and 8 percent to costs. Still, the average spreadsheet user will likely prefer a worksheet and a few simple formulas to *Dac-Easy's* forecasting toy.

#### ■ Almost a Free Ride

Both the manual and the support program for *Dac-Easy* have been completely revised—and generally for the better. The manual now begins with a well-done primer on accounting basics, as

STATEMENT OF CHANGES IN FINANCIAL CONDITION

Acct #	Account Name	Last Yr.--Yr. Bef. Last		This Yr.-- Last Yr.		Current Period	
		Sources	Uses	Sources	Uses	Sources	Uses
1	ASSETS		0.00		64189.85		0.00
11	CURRENT ASSETS		0.00		53444.85		0.00
111	CASH		0.00	29441.53			0.00
1111	CASH-CHECKING		0.00	29441.53			0.00
113	ACCOUNTS RECEIVABLE		0.00		24840.45		0.00
114	INVENTORY		0.00		58045.93		0.00
13	FIXED ASSETS		0.00		10745.00		0.00
132	EQUIPMENT		0.00		10745.00		0.00
2	LIABILITIES		0.00	31647.18			0.00
22	ACCOUNTS PAYABLE		0.00	3115.77			0.00
23	SALES TAX PAYABLE		0.00	531.77			0.00
3	STOCKHOLDERS' EQUITY		0.00	200000.00			0.00
31	COMMON STOCK		0.00	200000.00			0.00
4	SALES		0.00	144296.20			0.00
41	SALES		0.00	144296.20			0.00
4101	BEVERAGES		0.00	64340.20			0.00
4102	POTATO CHIPS		0.00	38698.00			0.00
4103	CANDY BARS		0.00	41258.00			0.00
7	OTHER INCOME/EXPENSE		0.00	173.00			0.00
71	FINANCE CHARGES		0.00	173.00			0.00
5	COST OF GOODS SOLD		0.00		83027.53		0.00
501	BEVERAGES		0.00		37829.53		0.00
502	POTATO CHIPS		0.00		20702.00		0.00
503	CANDY BARS		0.00		24496.00		0.00
6	OPERATING EXPENSES		0.00		46356.00		0.00
61	RENT		0.00		16980.00		0.00
63	WAGES AND SALARIES		0.00		25967.00		0.00
65	TAXES		0.00		2837.00		0.00
651	PAYROLL TAXES		0.00		2623.00		0.00
652	PROPERTY TAXES		0.00		214.00		0.00
66	DEPRECIATION		0.00		572.00		0.00
8	TAXES ON INCOME		0.00		2543.00		0.00
		=====	=====	=====	=====	=====	=====
Totals		0.00	0.00	196116.38	196116.38	0.00	0.00

This report should allow you to see at a glance your changes over a given period. But because of Dac-Easy's illogical groupings, the changes in your working capital get buried in the jumble.

well as an overview of the *Dac-Easy* system, before it settles into (usually reliable) descriptions of installation procedures and day-to-day routines. The printing, diagrams, and screen shots are more readable in this manual, though some of the printouts are still on the fuzzy side.

Dac now includes 10 minutes of free phone support with *Dac-Easy Accounting*—not much, but still 10 minutes more than you got with version 1.00. You can (and should)

subscribe to Dac's fee-based phone support; for \$60 you receive a toll-free number and 60 minutes of consultation.

Overall, version 2.00 is snappier, more professional, and—most important—easier to use than version 1.00. A few caveats aside, *Dac-Easy Accounting* provides excellent value for many small businesses.

Ah, but those caveats. Version 2.00 still does not deliver the financial reporting flexibility of higher-end packages, and its annoying bugs, incomplete audit trail, and primitive file rehash

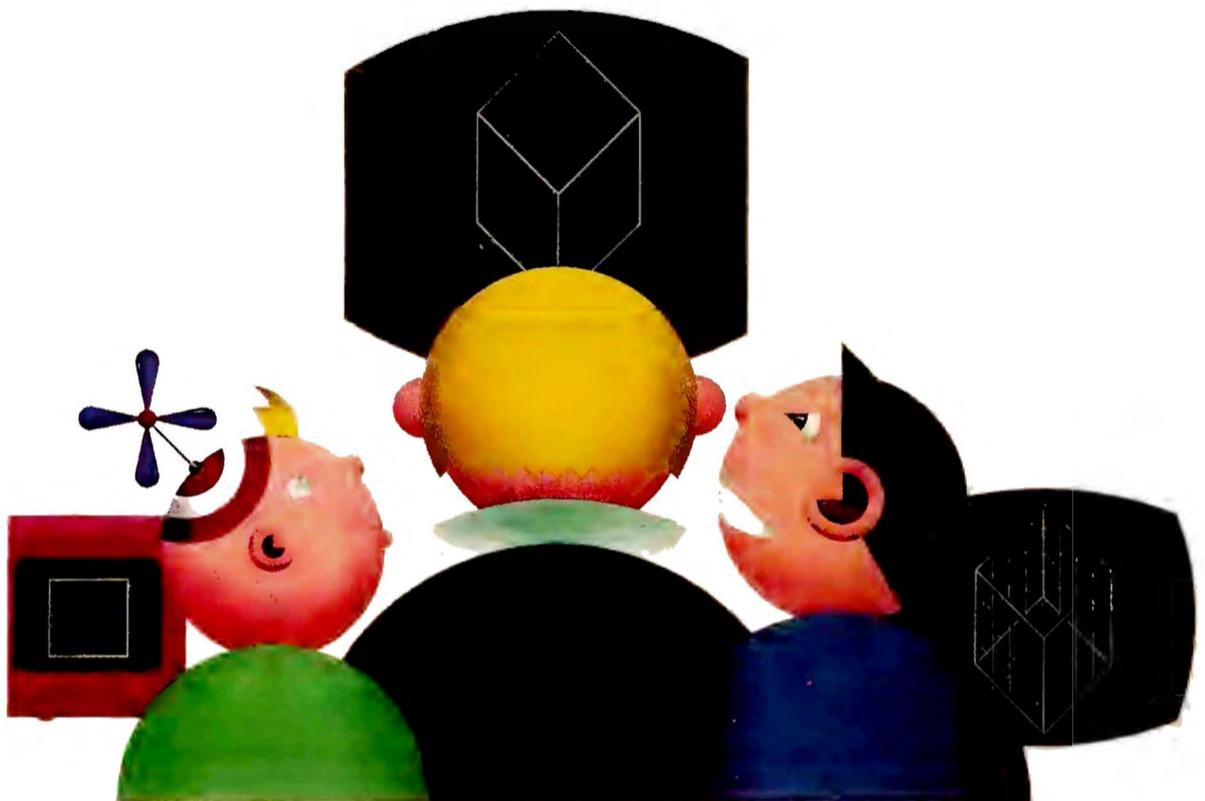
method suggest a product that isn't quite mature. Before committing yourself to a *Dac-Easy* conversion, study the program's financial statements in detail to be sure you—and your banker, auditor, or CPA—can live with their limits. ☹

*Ralph Soucie is a CPA with McAllister & Co., P.C., in Portland, Oregon.*

# Light-Duty Drafting

A slick user interface, a \$295 price, and enough functionality for most light-duty drafting make *Drafix 1 Plus* one of the most effective low-end CAD programs around.

*Steven Lord*



||||| The key question to ask when considering a low-end CAD program is, will it really be more useful than a good drafting board? While the industry has yet to produce a cheap CAD package for full-time designers and draftspeople, technicians or analysts who do occasional drawing or layout should find Foresight Resources' *Drafix 1 Plus* an improvement over laying lead.

The main selling point of *Drafix 1 Plus*—aside from its low price—is its intuitive user interface.

Instead of relying on the columnar menu arrangement favored by stalwarts like *AutoCAD* and *VersaCAD*, the program combines 1-2-3-like menu bars with pull-down menus—two of the most effective interface types. Other highlights include a wide selection of dimensioning formats and a robust symbols library.

*Drafix 1 Plus* improves on its previous version, *Drafix 1*, with a

pair of major new features: function key macros and a handy pop-up text editor. Foresight has also added a freehand sketch mode, curve fitting, and the ability to save default settings for such attributes as background color and grid style. Were it not for a mediocre redraw speed and poor support for high-resolution displays (not to mention some buggy zooming and editing commands), *Drafix 1 Plus* could be in the big leagues.

### ■ First Steps

The documentation for *Drafix 1 Plus* includes a brief, sensible manual devoted to setup, so even a raw beginner can breeze through configuration. The minimum hardware requirements are 512K of RAM and one floppy drive, plus a mouse and a CGA-compatible display. Unless you want to sit through endless screen redraws, however, you should have a hard disk, a math coprocessor, and one of the few high-resolution color displays that the program supports.

*Drafix 1 Plus*'s main function menu is three lines deep, a distinct improvement over *1-2-3*'s two-line

arrangement, especially when you're at the bottom of a complex menu tree. The main menu stays fixed as the first line of the screen. Selecting an item from the first or second line summons a corresponding line of subcommands, but even when you're knee-deep in command levels, you can jump back to the main menu and make a selection. In addition, four fixed menus stacked in a column along the left side of the screen activate pulldown menus for global options such as colors, line styles, and layers. The biggest drawback to this otherwise effective interface is that you can't customize menus.

One unique aspect of *Drafix 1 Plus*'s screen layout is a representation of a three-button mouse in the lower left corner of the screen. As you choose different menu items, the labels change to reflect the functions you can execute with each button. This design exploits the mouse to maximum advantage (with a two-button mouse, pressing both buttons serves as the third key).

Unlike many CAD packages, *Drafix 1 Plus* lets you set text, background, and menu bar colors to your preference, greatly enhancing the appearance of color screens. It's also easy to save these default settings, along with parameters for symbol libraries, grid specs, and drawing sheet size. For users who need to do very large layouts, however, the sheet size limitation of roughly 225 by 150 units may be a problem.

The conventional way to increase the usefulness of low-end CAD programs is to soup them up with macros, chaining commands to work around cumbersome aspects of operation. Although *Drafix 1 Plus* lets you program only ten function keys, the command strings you set up are nested; that is, you can use these macros while executing other commands. For example, you can't pick *Drafix 1 Plus*'s zoom or pan commands from the menu and use them in conjunction with other commands—a common failing. But if you've set up the macros for zooming and panning sequences, you can press a function key in the middle of a tricky editing or dimensioning process to get a closer look.

### Drawing Basics

*Drafix 1 Plus* has all the basic construction elements, including points, single and double lines, arcs, circles, rectangles, polygons, ellipses, and paths (sequences of lines). As with most CAD programs, drawing elements can be assigned any color and placed on any of the package's 255 drawing layers. In addition, you can change paths or polygons to smooth curves, and fill closed shapes with solid colors.

You might not use it that often, but *Drafix 1 Plus*'s most unusual drawing feature is a freehand sketch mode reminiscent of business graphics packages like *Freelance Plus*. When you draw a line freehand, the program assigns points along the way, producing a polyline that can be manipulated like any other drawing entity. The combination of this feature and more traditional CAD drawing functions makes up a complete set of drawing capabilities.

For pinpoint placement of drawing elements on the screen, *Drafix 1 Plus* provides a set of adjustable grids and cursor snaps as well as absolute, relative, and polar coordinates. With the snaps you can jump between gridpoints, or jump to endpoints, midpoints, intersections, or arc centers. You can also snap according to user-defined increments or to the closest point on a line or arc. Special modifiers enable you to construct tangents, parallels, and perpendiculars to existing entities.

Although *Drafix 1 Plus* offers a full complement of zooms and

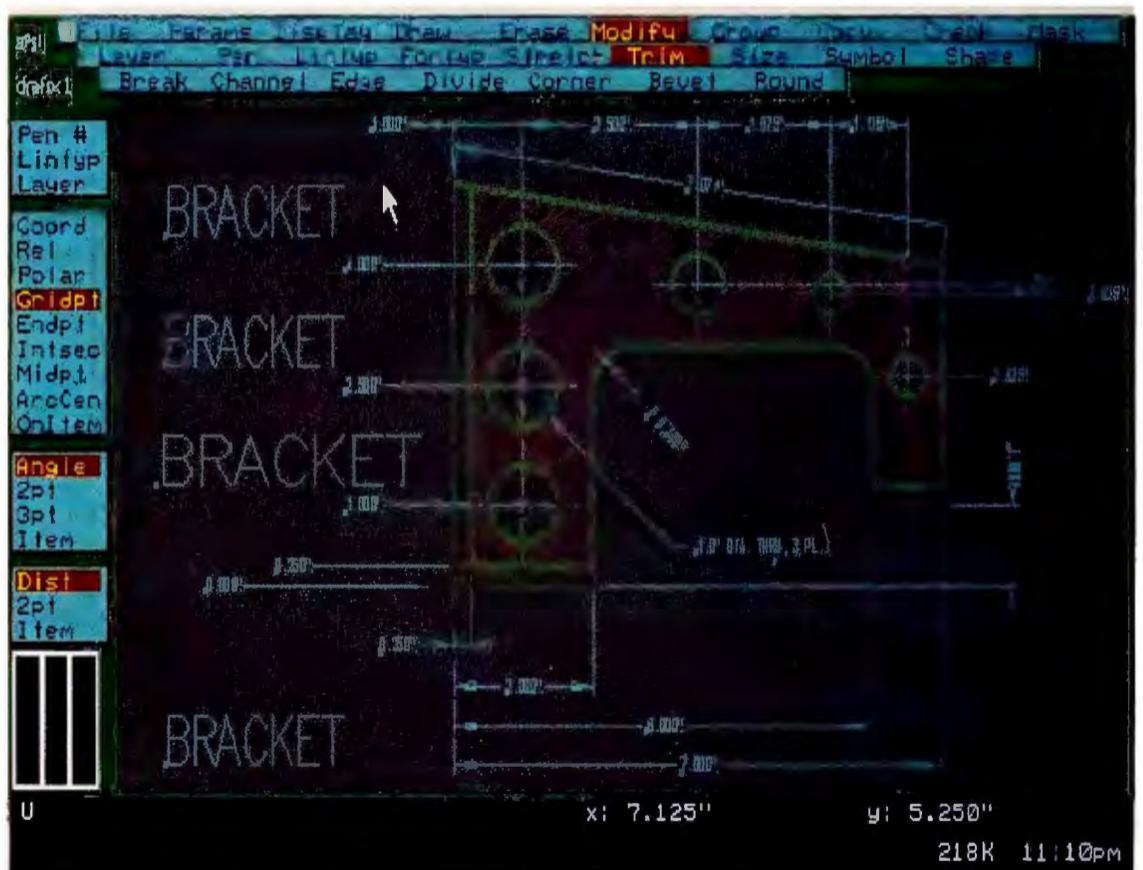
pans, plus the ability to save and recall up to eight specific views of a drawing, zooming in on maximum magnification sometimes causes entities to disappear mysteriously. The entities will reappear when you zoom back out, but you may be frustrated when you need to examine extremely small details. Moreover, if you're positioning the endpoint of a new line, the usual rubber-band line that guides you may fail to show after a nested macro zoom.

The program supplies a set of approximately 450 predrawn architectural, electrical, and mechanical symbols. You can also create, name, save, and recall an unlimited number of your own symbols. Symbols are treated as grouped entities and must be ex-

ploded with the undo command for symbols before they can be edited. You can also nest symbols within other symbols, in which case the undo command explodes only one level at a time.

### Editing Entities

*Drafix 1 Plus*'s array of editing commands covers most of the bases, but not all of them. For starters, you can erase, scale, rotate, stretch, copy, move, trim, break, divide, and mirror-copy any entity. Additional commands add filleting between lines or between arcs and change an entity's color, layer, or line style. You can also bevel corners, replace one



This drawing of a bracket shows ordinate, baseline, chained, and parallel dimensions as produced semiautomatically by *Drafix 1 Plus*. Also shown are radial dimensions, centerlines, and callouts.

symbol with another, and convert paths or polygons to smooth curves.

Notably absent are a general-purpose undo command and commands to create rectangular or circular arrays (that is, entities that replicate themselves around the perimeter of a geometric shape, as with teeth on a gear). The lack of an undo command is the most annoying omission, because the program compensates by requiring an extra button click to confirm each edit.

You can select entities by choosing individual items, by defining a rectangular region with the cursor, by picking the current work group, or by specifying all entities in the drawing. When you select a region, you can designate secondary elements by layer, color, line style, or type of entity, speeding categorical selection considerably.

For simultaneous editing, sets of entities can be assembled into a temporary group, which you can dissolve when you're through. When you define a group, *Drafix 1 Plus* thickens the lines that make up the elements, so you always know exactly what entities the work group contains.

The geometry editor suffers from a few bugs. For example, certain sequences can cause filleted corners to invert, and sometimes filleting between lines or arcs leaves gaps or trailing edges behind. Moreover, some operations leave underlying duplicate copies of objects, which remain invisible until you try to edit the objects. These problems are gener-

ally not too difficult to work around, and Foresight is actively pursuing fixes.

*Drafix 1 Plus* boasts an effective automatic cross-hatching command. To hatch an area, you incorporate its boundaries into a group, select 1 of 15 standard hatch patterns, set the hatch line angle and spacing, and watch the hatch function speedily do the rest. Only one drawback mars this otherwise delightful arrangement: If you need to modify the area boundaries, the program provides

no easy way to erase the hatch pattern without also erasing the boundaries. One way to sidestep this problem is to save an unhatched version of any drawing, just in case.

## ■ Dimensioning Text

The semiautomatic dimensioning facility offered by *Drafix 1 Plus* is more flexible and complete than most. It includes baseline, chain, centerline, and ordinate dimensions as well as the more typical horizontal, vertical, parallel, radial, and angular dimensions. Call-out arrows (misnamed leaders by the documentation) are also provided. Because the dimensions are not associative (that is, when you scale an entity, the measurements don't change accordingly), you have to erase and reenter measurements whenever you change a finished detail drawing.

*Drafix 1 Plus* offers more precise control over the format of its dimensions than most competing programs. You can independently set the arrow type and size; the length of the gap in the leader; and the text height, angle, location, and precision level. In addition, the program lets you adjust the size of the terminator and set minimum "leader" length.

The package also shines in its ability to handle text. It not only offers a choice of 16 standard fonts but supplies left, right, and center justification as well as the ability to align text parallel to any reference line. Another top-notch feature is a simple built-in text editor (with word wrap) that resides in a

### *Executive Summary*

## **Drafix 1 Plus**

Computer-aided design

A \$295 CAD package with an ingratiating user interface, *Drafix 1 Plus* adds macros, freehand drawing, and a pop-up text editor to the original *Drafix 1* package. The selection of dimensioning text formats is superior, but generally the drawing and editing functions are merely adequate. Lack of associative dimensioning, no menu customization, and meager support for high-resolution displays are the program's biggest failings.

*Drafix 1 Plus*  
Foresight Resources Corp.  
932 Massachusetts Ave.  
Lawrence, KS 66044  
913/841-1121

List price: \$295, D- and  
E-size plotter drivers \$150,  
.DXF file translator for im-  
porting and exporting Au-  
toCAD files \$95

Requirements: 512K, one  
disk drive, pointing device,  
graphics adapter and  
monitor

## REVIEW:

### Computer-Aided Design

pop-up window. When you've finished polishing the text, you just pick a point, press the left button on the pointing device, and the program pastes the text into the drawing.

#### Final Drawing

Foresight supplies drivers for just about any plotter. If you want to use a D- or E-size plotter, however, the drives will cost you an additional \$150—another indication that the program is not intended for professional drawings. For rough previews, a complete set of dot matrix printer drivers comes with the basic package.

Several factors combine to make support for additional displays with resolutions of 1024 by 1024 or better a must for *Drafix 1*'s next release. If redraws are slow, sheet size is limited, the zoom command is buggy, and the display isn't sharp enough to reveal fine detail, you may as well forget using the program to create large, intricate drawings.

Despite its flaws, *Drafix 1 Plus* is one of the most powerful programs in its class; Evolution Computing's *EasyCAD* stands as one of the few programs to offer similar price/performance (see "Easing Into CAD," *PCW*, December 1986). *EasyCAD* has the advantage of true associative dimension-

ing, easily customized menus, support for very high-resolution graphics, and a lower price; but *Drafix 1 Plus*'s superior wealth of dimensioning formats, nested function key commands, and flexible text editing makes a choice between the two programs a tough call.

Like many vendors of low-end CAD products, Foresight is learning from the competition, incorporating as many me-too features as possible to compete with higher-end programs. *Drafix 1 Plus* does a better job than most packages at capitalizing on the industry's advances, and it clearly outstrips such rudimentary packages as *AutoSketch* and *Generic CADD*. What the program needs most is refinement, with special emphasis on eliminating bugs, adding associative dimensioning, implementing a general-purpose undo command, and speeding up the redraw. Until then, *Drafix 1 Plus* should be far more popular with 1-2-3 users who do occasional drawing than with professional draftspersons. ●

Steven Lord is a mechanical engineer and freelance writer living in Tewksbury, Massachusetts.



A typical *Drafix 1 Plus* screen showing a sample drawing of a robotic gripper. The three vertical stripes in the lower left corner represent the three mouse buttons, each labeled to show the current effect if clicked.

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*Rusel DeMaria, PC Week ”*

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# The agony of delete.

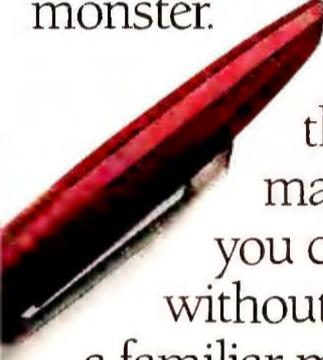
## HO FILES

- ~~1. Alfa Repairs~~
- ~~2. Alfa Repairs, II~~
3. Alfa Repairs, son of!
- ~~4. ANR 2045~~
5. ANR 2046
- Resume P. 4 → 6. BTP 6060
7. Bus. Klenel.
- ~~8. Critical file~~
- stet → ~~9. CDE 6011~~
10. CDE 6012
11. Donations → delete PTL Club!
- ~~12. Do not destroy~~
13. DR1 300 KNT
- ~~14. Int/Rec.~~ → save "Flight Simulator"
- '86 Football Pool - DJ owes \$40 → 15. FBPL 86
16. FDT 9011
- 11 Foreign affairs → delete Helga + Pia
- Projected '88 Taxes → 18. Future shock
- ~~19. Hart Campaign~~
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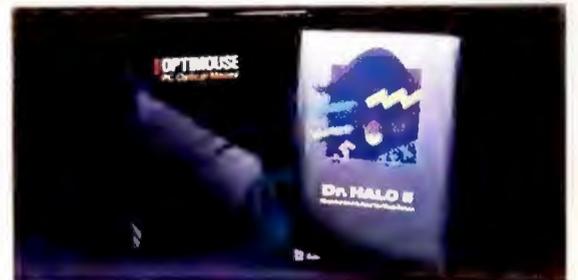
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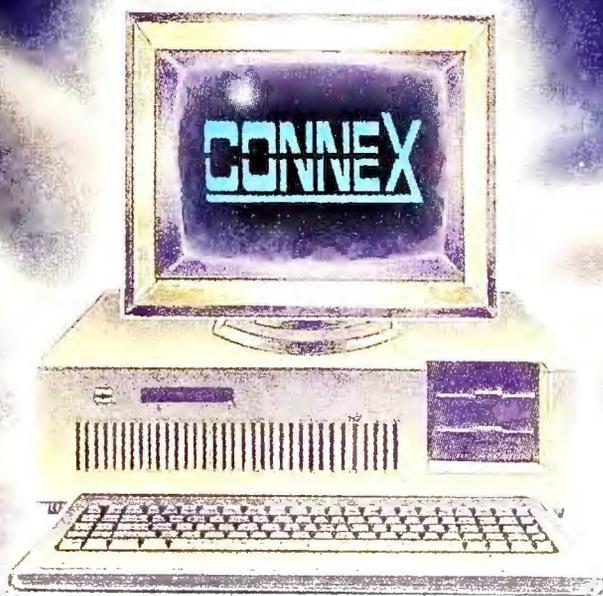


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System Requirements: Lotus Metro runs on IBM® PC/XT™, AT® Portable PC®, COMPAQ PORTABLE®, COMPAQ PLUS®, COMPAQ DESKPRO®. Two 5.25" double sided disk drives (hard disk recommended for optimal performance). Minimum of 80K required for RAM-resident kernel of Metro. Metro is unprotected and can be removed from memory. Lotus Metro runs with a wide variety of software programs, including 1-2-3, Symphony, Symphony Spelling Checker, Symphony Text Outliner, Lotus Report Writer™ and Signal®. When you purchase Lotus Metro directly from Lotus, take your first 30 days to try it. If after 30 days, Lotus Metro does not perform as described and you've purchased it directly from Lotus, we'll gladly give you a full refund.

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Circle 147 on reader service card

# THE HARDWARE SHELF

*Edited by Michael Goodwin*

## *This Month*

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## American Micro Technology AMT-286 Turbo *AT-compatible computer*

*Pros: Fast processing speed, low price*

*Cons: Mushy keyboard, hard disk errors*

*American Micro Technology  
14751-B Franklin Ave.  
Tustin, CA 92680  
714/731-6800*

*List price: with 640K RAM and  
1.2MB floppy disk drive \$1100,  
Hercules-compatible graphics  
adapter \$75, 20MB Seagate hard  
disk \$300, 40MB Priam hard  
disk \$700, amber monitor \$90*

American Micro Technology has never been guilty of hiding its IBM work-alike capability under a bushel. In fact, until Big Blue's lawyers got on its case, it used to start its model numbers with *AT*, and its advertisements featured a kid made up like Charlie Chaplin. One painful out-of-court settlement later, AMT's model numbers read *AMT*, and the kid in the ads now wears a painted-on moustache and a barrel.

The AMT-286 Turbo still looks like an *AT*, works like an *AT*, and



The AMT-286 Turbo looks like an AT and works like an AT, but it's faster and cheaper than the real thing.

sprawls over roughly the same amount of desk space—but with a clock speed of 12 MHz and a base price of \$1100, it's faster and much cheaper than the real thing. Like IBM's original, AMT's copy provides six 8/16-bit slots and two 8-bit ones. A 200-watt power supply provides the juice to make it hum, and the basic system includes a 1.2MB floppy drive, 640K of motherboard RAM (expandable to 1MB), a math coprocessor socket, and the ubiquitous battery-powered clock/calendar. Add a \$300 Seagate hard disk, a \$90 amber monitor, and a \$75 Hercules-compatible video board, and you're up and running for less than \$1600. Now *that's* a deal.

AMT's manuals are emblazoned with enough red, white, and blue to give Ollie North goose bumps. Nonetheless, the electronics inside the 286 Turbo hail from the Far East, birthplace of most economy clones (the company's name might more accurately be AAT, for American Assembly Technology). In *PC World's* review unit, the display adapter (with a parallel printer port) took up an 8-bit slot, while the combination floppy/hard disk controller occupied another.

A nonglare, tilt-and-swivel amber monitor provides pin-sharp, Hercules-compatible text and graphics that are a pleasure to look at. In addition, the machine's metal cabinet gives the AMT-286 a reassuring weight. Unfortunately, the IBM feel ends at the keyboard, which shares the mushy

response of its clone peers.

AMT includes a software utility to switch the machine's 80286 processor speed between 6 MHz and 12 MHz. In the latter mode, it performs faster than IBM's PS/2 Model 50. And the AMT-286's Phoenix BIOS earns high marks in the compatibility department.

But speed means nothing without reliability, and that's where the AMT-286 falls short. Just as the six-week evaluation period was ending, the machine's hard disk began to burp, causing DOS to report occasional 'Sector not found' errors. An AMT representative admitted that some of the

# COMPUTER FAX PROCESSOR

Buy a FaxPro-20 unit,  
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FaxPro-20, a stand-alone facsimile communication controller, can be used with a PC or a general purpose computer to turn a normal G2/3 facsimile into a Laser-printer-like output as well as a scanner-like input device for image processing and desktop publishing system. Communication with remote facsimile machines is, of course, a standard function on FaxPro-20.

The Facsimile transmission industry is one of the most flourishing fields in Telcommunication. The main reason is, in our busy world, we need a much faster and more efficient approach to send/receive our numerous texts and graphs. Hence, fax machines were developed to meet these needs. And now, a new fax processor - FaxPro-20 was designed to offer a total and satisfactory solution currently unavailable from traditional fax machines.

FaxPro-20 improves the productivity of conventional fax machines. It can be linked with PC to share its powerful utilities; only few expensive fax machines can do this. With this feature, users can edit/compose any document with any existing package, such as Wordstar, Lotus 1-2-3 or Ventura, and then directly send it from FaxPro-20 at high speed upto 9600 bps. The received texts/graphs can be printed out through dot-matrix printers or fax machines - the resolution of the printout is close to that of a Laser printer.

FaxPro-20 provides more appealing features than basic functions such as auto-dialing, multi-addressing sending, schedule sending, etc. Powered by 68000 microprocessor with built-in 512K memory, FaxPro-20 significantly improves transmission performance compared to conventional fax machines. The received messages can be saved on storage disks without any deterioration for future use. Moreover, FaxPro-20 provides the menu-driven screen and 24-hour operation even when PC is off. It automatically turns on PC when buffer is full. FaxPro-20

also allows cocurrent workings: users can edit with PC while FaxPro-20 is sending or receiving texts/graphs in the background mode.

FaxPro-20 will surely make increased add-on business profits due to its unique capabilities. FaxPro-20 also offers an opportunity to turn PC's into an image processing and desktop publishing system with an attractive price. For FaxPro-20 distributors, the manufacturer of FaxPro-20-LITE-ON INC. - part of The LITON Group (200 million dollars), with strong R & D capability and good service can be relied upon as a long-term business partner.

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## Product Specifications

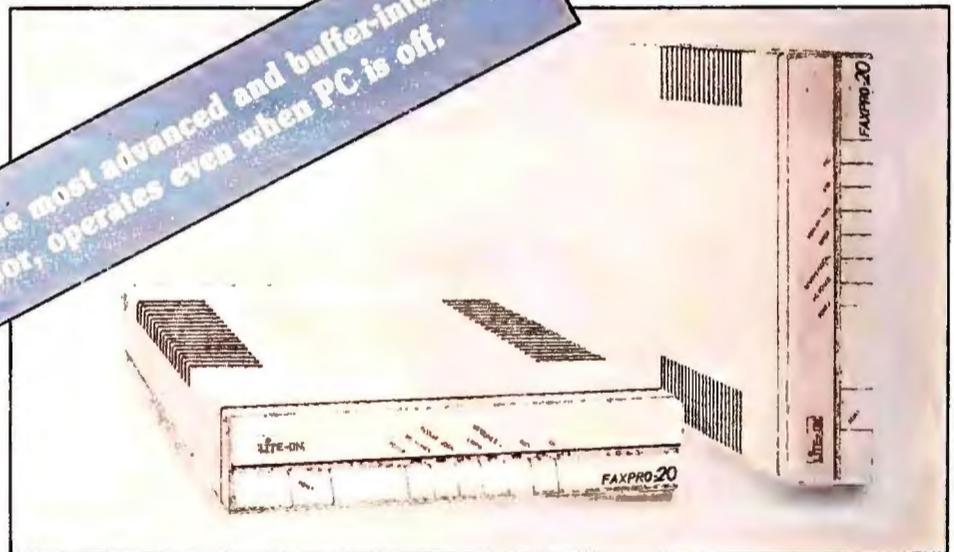
### Product Specifications

FaxPro-20 is a control box that allows PC to communicate with Group II/III facsimile machines or PC's over a telephone line. It implements the following features:

- \* Communicate with any CCITT Group II/III facsimile machines.
- \* 9600 bps with automatic fall back to 7200/4800/2400 bps.

- \* Automatic or manual send/receive operations.
- \* Complete user-friendly menu-driven/help screen software.
- \* 24-hour operation even when PC is turned off.
- \* Automatically turns on PC when sending/receiving FAX messages.
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# LITE-ON

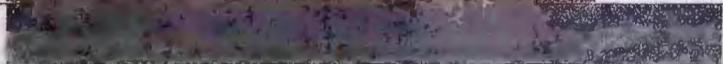
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\* Wordstar is a registered trademark of Micropro Inc.  
\* Lotus is a registered trademark of Lotus Development Corp.  
\* Ventura is a registered trademark of Xerox

# PC World Evaluation

## AMT-286

	WordStar Professional	seconds
AMT-286		109
IBM PS/2 Model 50		125
IBM PC AT (8 MHz)		150

	dBase III Plus	seconds
IBM PS/2 Model 50		84
AMT-286		175
IBM PC AT (8 MHz)		205

	1-2-3	seconds
AMT-286		34
IBM PS/2 Model 50		41
IBM PC AT (8 MHz)		51

	AutoCAD	seconds
IBM PS/2 Model 50		171
AMT-286 <sup>1</sup>		247
IBM PC AT (8 MHz)		251

The AMT-286 beats the AT across the board, and aces the Model 50 at *WordStar* and *1-2-3*.

**WordStar Professional** Although disk access plays a small part in the *WordStar* benchmark, processing and memory access speeds are the most significant factors. This benchmark measures the time required to perform four operations (replacing, copying, spell-checking, and printing) on a 15,364-word document.

**dBASE III Plus** Disk access speed is the most significant performance factor for the *dBASE III Plus* benchmark. This benchmark measures the time required to produce a report based on a three-file join, select, and sort.

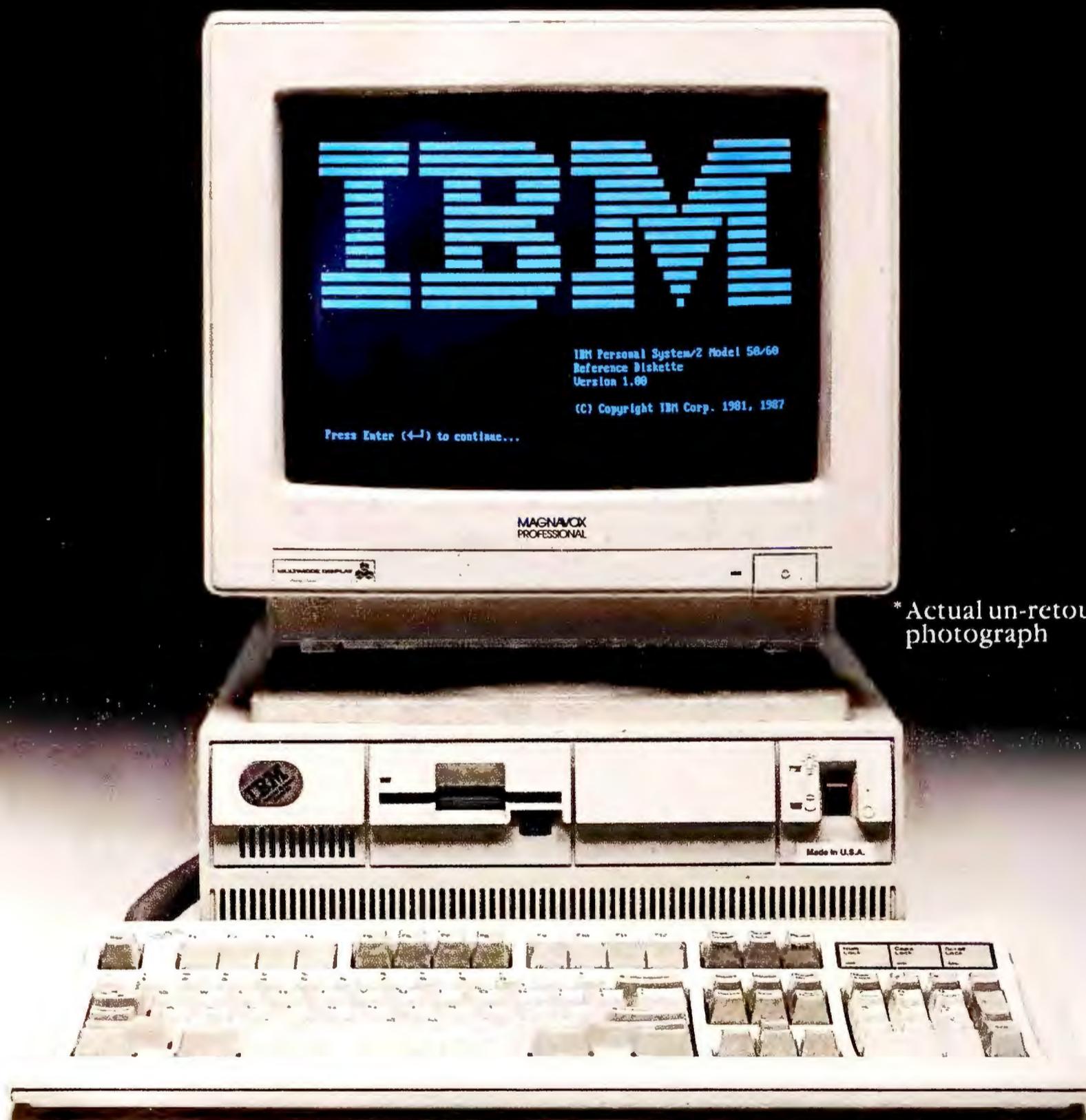
**1-2-3** Because no disk access is required, the *1-2-3* benchmark depends almost entirely on the processing and memory access speeds of the systems. In this benchmark, a *1-2-3* macro executes a series of recalculations within a 50-by-50-cell matrix.

**AutoCAD** Disk access, processing speed, and memory access all contribute to the performance of the *AutoCAD* benchmark. However, the speed and type of math coprocessor used by the system are the most important determining factors. This benchmark uses the sample office drawing provided with *AutoCAD* and measures the time required to retrieve and display the sample drawing; zoom in on a small detail within the drawing; zoom out to reveal the entire drawing; and print the entire drawing.

<sup>1</sup>This benchmark was performed at the 8-MHz clock speed with the IBM EGA card installed. The EGA did not function when the clock speed was switched to high.

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

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## MAGNAVOX

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Multimode Display suggested retail \$899.

Circle 111 on reader service card

firm's Seagate drives were acting "a little flaky of late," but offered assurance that the drives' one-year warranties were being honored. All other components are guaranteed for 90 days.

Although AMT changed its advertisements in the face of Big Blue's legal unpleasanties, it does not seem to have changed its act. Close examination of the AMT-286's reference manual reveals that many drawings and text passages have been lifted directly from IBM's *Guide to Operations* for the AT. Some drawings even show ATs, clearly identified with a front panel IBM logo. Curiouser and curiouser, when you run the AMT diagnostic disk (which sports a prominent AMT logo), you are greeted with a sign-on message reading: 'IBM Personal Computer Advanced Diagnostics, version X.XX. Copyright IBM Corp. 1981, 1982, 1983, 1984.' Now that's compatibility.

(When *PC World* called AMT to verify these facts, president Perry Lamba stated that the reference manual had been written by an outside contractor and was being withdrawn due to its unauthorized use of IBM text and drawings. He also declared that the copyrighted IBM diagnostic disk was for "internal use only," was not normally provided to end users, and had been sent to *PC World* to help verify full IBM compatibility.)

Nonetheless, this intriguing discovery, combined with the hard disk's temperamental behavior, inspired an intense episode of creeping clone paranoia—the unease you feel when you're using a cut-

rate clone and you start wondering how long your guarantee will be worth the paper it's printed on.

There's no reason to think that AMT won't honor its warranty on this fast, compatible, and inexpensive machine. But buying a no-name clone is always a gamble. Smart gamblers may opt for AMT's optional one-year warranty, available for 5 percent of the purchase price. It may not increase your chances of getting a reliable computer, but as long as AMT remains in business, it will at least buy you better odds at the gaming table. —Jim Heid

## ComputerLand BC 286

*AT-compatible computer*

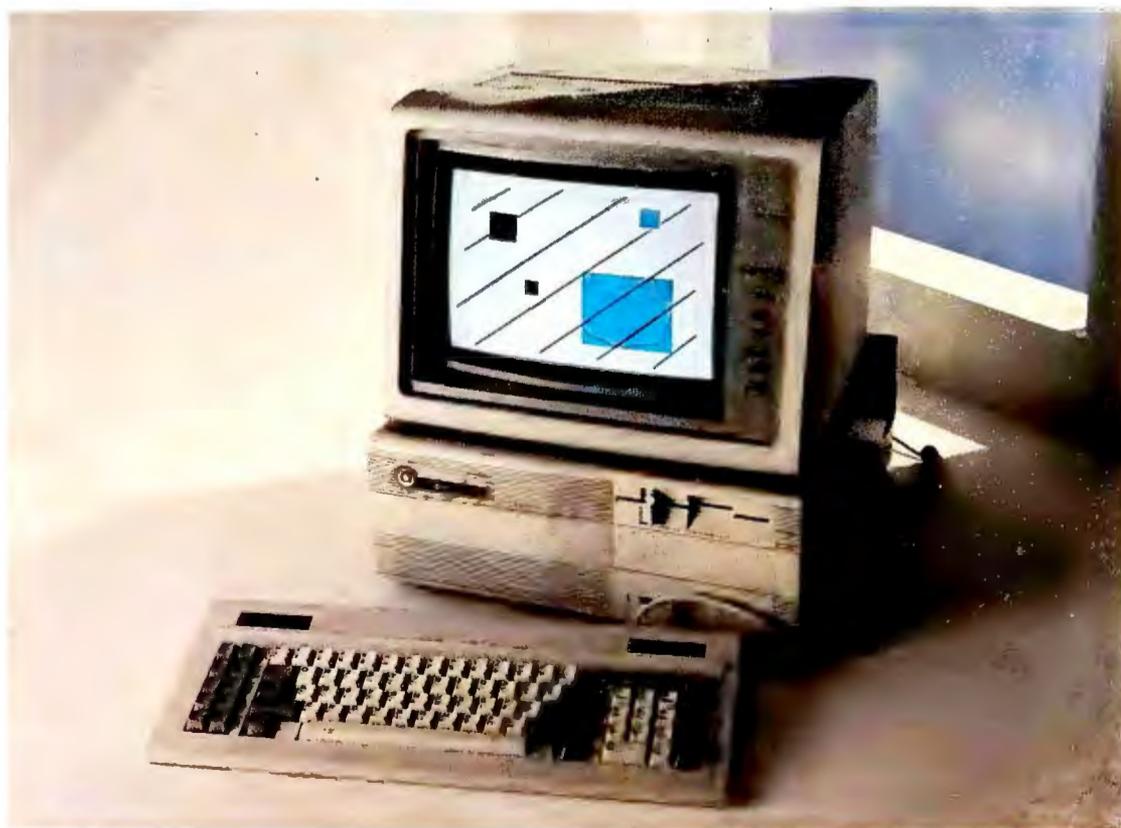
*Pros: Small footprint, ComputerLand name and support*

*Cons: Medium-speed processor, few available slots, keyboard glitches*

ComputerLand Corp.  
30985 Santana St.  
Hayward, CA 94544  
415/487-5000

*List price: with 512K RAM, 65MB hard disk, Adaptec half-board controller (required for 65MB drive), separate hard/floppy controller, 360K floppy drive, CGA or Hercules graphics adapter, keyboard, one parallel and two serial ports, MS-DOS 3.10, and GW BASIC \$3495; Sysdyne Monochrome Display (green or amber) \$199; Sysdyne EGA monitor \$799; EGA/CGA/Hercules board with 256K \$399*

One year ago, when ComputerLand joined the PC-cloning crowd, it settled on a "salad-bar"



John Greenleaf

ComputerLand's midspeed AT compatible is short on slots but long on mass storage—and a bit pricey. But given the firm's flexible profit margins, you can probably cut a deal. DOS 3.10 comes free.

PS/2  
Compatible



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Technical Information: 1-305-623-9262

**Micro Interfaces, Corp.** 16359 NW 57th Avenue, Miami, Florida 33014. Telex # 5106004680 MICRO INTER CO.

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Circle 100 on reader service card

approach. After reviewing 30 machines, it picked a Far Eastern manufacturer's box consisting mostly of metal shell, power supply, cabling, speaker, slots, and drive bays. Customers were encouraged to choose the drives, monitor, video board, and CPU options they wanted, and C-Land's dealers would pile them on the plate.

While ComputerLand hadn't exactly misread the public's pulse, it did neglect to foresee that modularity would be so quickly—and cheaply—available elsewhere. In any case, the \$2895 price tag for an AT compatible with no hard disk was too steep to lure many customers away from cheaper clones.

ComputerLand still carries the salad-bar clone, but the company has responded to its cool market reception by providing the BC 286, a prix fixe, sit-down-dinner version of its 286-based predecessor. This time ComputerLand made virtually all the decisions, leaving the customer with only one: to buy or not to buy.

Manufactured in Korea, ComputerLand's 6-MHz/8-MHz, one-wait-state system comes with 512K of RAM (expandable to 2MB on the board), a CGA/Heracles-compatible video board, a 360K floppy drive, and a 65MB (28 millisecond) voice-coil actuator hard drive. The machine includes an 80287 coprocessor socket and a handy reset switch (though its backside placement is decidedly unhandy), plus two extra back-panel punch-outs. *PC World's* test machine also included an EGA board and a Sysdyne EGA monitor.

### SuperCache in the Speed Zone

- PC with SuperCache-286
- 8-MHz IBM AT
- 8088 PC

Find all prime numbers less than 1000 in interpreted BASIC



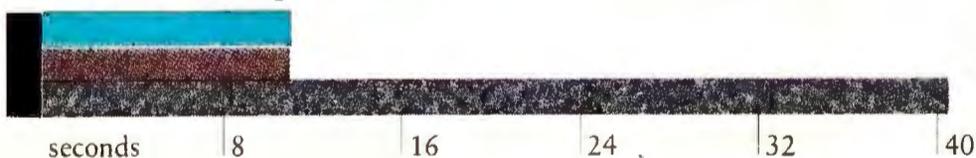
Find all prime numbers less than 10,000 in compiled BASIC



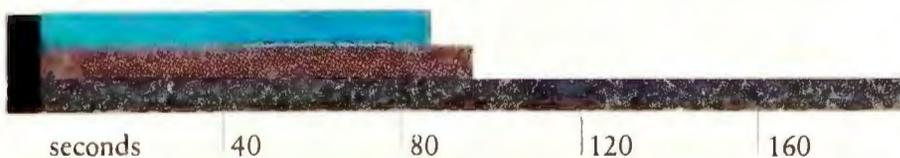
Reformat a 150K WordStar document



Run GLOBE in compiled BASIC



Run GLOBE in interpreted BASIC



SuperCache-286 whips the PC, wins some and loses some against the AT.

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\* Using the suite of 48 comprehensive benchmarks published in Data Based Advisor, March 1987.

\*\* Multi-User FoxBASE+ 2.00 for MS-DOS costs \$595. Multi-User XENIX version available at \$795.

Fox Software  
27493 Holiday Lane, Perrysburg, Ohio 43551  
(419) 874-0162 Telex: 6503040827 FOX  
FAX: 4198748678

Circle 68 on reader service card

The BC 286 comes bundled with MS-DOS 3.10 and GW BASIC, a one-year warranty, and acceptable documentation (though the manual's minute type size will discourage regular consultation). A service contract, available for

disk controller—the Adaptec half-board—is required, taking up one more slot. Add a graphics board, and you're down to three open slots before you know it.

Though the undersized BC 286 beats IBM in the footprint depart-

with abundant mass storage in a compact case, delivers more bang for the buck than its high-priced modular precursors—although its merely moderate performance is not exactly competitive at \$3495. (Here again, though, ComputerLand's flexible profit margins may help you cut a better deal.)

For those who find the backing of the biggest national PC retailer comforting, the BC 286 could be a decent value. However, those not requiring corporate consolation will find that a flood of lower-cost no-name machines offer superior 10-, 12-, and even 14-MHz power. —Art Wilcox

*ComputerLand's BC 286 is a prix fixe, sit-down-dinner version of its salad-bar predecessor.*

\$250 per unit per year, guarantees that a ComputerLand technician will see your ailing machine within 5 hours of a phone call.

The machine sports a slatted, beveled front casing with hard disk and CPU-speed indicator lights, plus the usual keyboard lock. Its slim steel frame holds three 8-bit and five 8/16-bit slots, a 155-watt power unit, and four half-height drive bays. Its passive backplane design forgoes a motherboard; instead, slots on the bottom of the case hold add-on boards with RAM, ROM, BIOS chips, and so on. This setup uses three slots to do the work of a single motherboard: Slot one holds the 80286 chipset and a battery-backed clock/calendar; slot two contains a board with a parallel port, two serial ports, and up to 2MB of RAM; slot three hosts a combination floppy/hard disk controller.

Unfortunately, the standard floppy/hard disk controller that comes with the machine doesn't support the 65MB MicroScience hard disk. Hence, if you want the 65MB drive, an additional hard

ment, it fails to outrun it in the speed zone. At 8 MHz, ComputerLand's machine runs just about neck and neck with IBM's 8-MHz unit. For loading persnickety applications, the BC 286 can be toggled down to a stately 6 MHz using a DOS routine or a special keyboard sequence.

The machine's EGA monitor, manufactured in Taiwan for Sysdyne (ComputerLand's private label), is exemplary. Responsive brightness and contrast controls are placed up front for easy access; a button lets you switch quickly between the monitor's EGA and pseudo-monochrome (amber or green) modes. At \$799, it's a bit pricey—but ComputerLand gives its dealers flexible margins to play with, so you may be able to get it for less. The AT-style keyboard's clacky, responsive feel was a pleasure until a dislocated <Space> bar and a sticky <CapsLock> key raised the question of whether "clacky" might soon become "tacky." (An earlier review machine suffered more serious problems, including two failed floppy disks and a flaky hard drive.)

This specially configured edition of the ComputerLand clone,

## IBM 3.5-Inch External Diskette Drive

*External 3 1/2-inch disk drive*

*Pros: Enables PCs with 5 1/4-inch drives to read and write 3 1/2-inch disks; installs easily; increases speed and storage capacity*

*Cons: Works with only some compatibles*

IBM

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Boca Raton, FL 33432

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Illinois

List price: \$395

Requirements: DOS 3.20 or later version, disk controller with external drive connector

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Circle 123 on reader service card

The software you've been waiting for finally arrives. Eagerly, you open the box. Oh no! The program is on 3½-inch disks, but your AT has 5¼-inch drives.

By including 3½-inch disk drives as standard equipment on its PS/2 line of computers, IBM has not only made the rigid little disks legitimate, it has made them inevitable. It has also made owners of older PCs increasingly nervous.

Fortunately, IBM has taken pity on those of us who haven't yet gotten around to trading in our trusty old PCs, XTs, or ATs. Big Blue now makes a \$395 external 3½-inch drive that connects to older IBMs and compatibles: the Model 1 for 8088 machines (PCs and XTs) and the Model 2 for the 80286 AT. The drive measures just 2 inches wide, 4½ inches high, and 6 inches deep, and to conserve space it is designed to stand vertically. If desk space permits, the unit can be laid flat for a more traditional look.

Installation is simple and clean. You remove the PC's cover and plug a Y-cable into the power plug at the rear of the A: drive. This cable branches; one lead goes to the power supply and the other goes to the rear of the computer, where a female plug is mounted on the outside of the case. The drive itself attaches to the disk adapter connector on the rear panel and to the female power plug, via a 3-foot power-and-data Y-cable. (Beware: Many IBM compatibles lack an external-drive connector; the drive cannot be used with these machines.)

The computer must run DOS 3.20 or a later version to use the new drive, and you'll need to



John Greenleigh

Avoid technological obsolescence with IBM's external 3½-inch drive. The add-on can be connected to older PCs, ATs, and clones for full floppy compatibility.

place a line in the CONFIG.SYS file describing the 3½-inch device. You'll also need to copy the standard device driver (DRIVER.SYS), provided with DOS 3.20, to your start-up disk. Once installed, the external drive is automatically assigned the next available drive letter. For example, if you install the unit on a PC with two floppy drives, it will be identified as drive C:; if it's installed on an XT with two floppies and a hard drive, it'll be drive D:. A 15-page manual explains both hardware and software installation in detail.

A fringe benefit is that 3½-inch drives are slightly faster than their 5¼-inch cousins. Copying a 134K file from a hard disk to 5¼-inch media takes 16 seconds; the same file copies to 3½-inch media in only 13 seconds—about 19 percent faster. The real advantages to the smaller drives are increased

storage capacity, the additional protection the rigid case gives your data, and of course, the ability to read data to and from 3½-inch disks (including the ones in your laptop). Not to mention the satisfaction of knowing you're immune to technological obsolescence—at least this week. —Donald B. Trivette

## PC Type Right

### Hardware spelling checker

**Pros:** Always on line, uses no RAM, fast access to large vocabulary, easy to use

**Cons:** Does not suggest alternative spellings for misspelled words, sometimes beeps correct words

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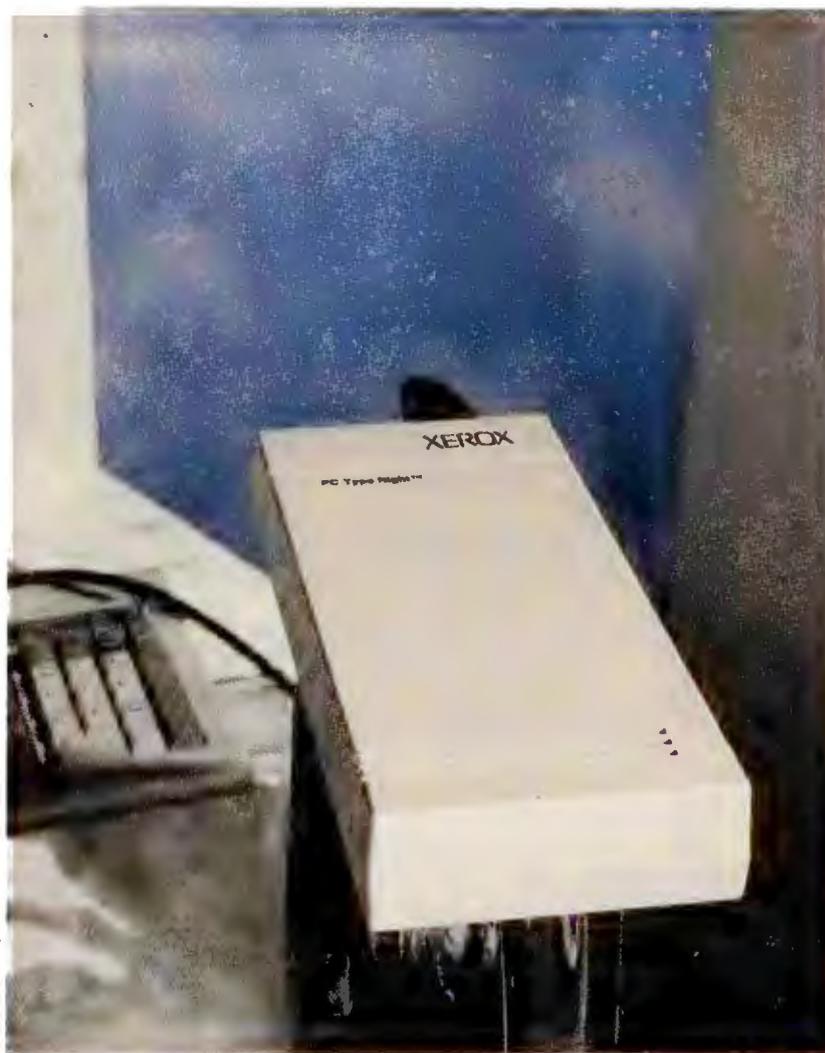
List price: \$169.95

Like a nasty schoolteacher shaking her finger at you and going "Tsk! Tsk!" every time you make a mistake, an on-line spelling checker can be downright obnoxious. On the other hand, it's supposed to hassle you if you mess up, which is why even the best spelling checker in the world is bound to be a lot less fun than, say, watching *Indiana Jones and the Temple of Dume*.

At first glance, PC Type Right seems to be a perfect (that is, perfectly horrible) example of the genre—except it's hardware, not software. A box that fits between the keyboard and the computer, it emits a beep every time you misspell a word—just about as amusing as an alarm that rings whenever the dishes are dirty.

The \$169.95 price tag seems high; you can buy similar software programs for half as much—you can even get a typewriter that beeps at errors for the same price. Still, initial impressions can be misleading; though PC Type Right could offer more capability than it does, it is still far handier than it seems at first glance.

Basically, the unit is its own computer, based on an Intel 8031 microprocessor. It includes a built-in 100,000-word dictionary held in 128K of ROM, plus a 1200-word personal dictionary stored in battery-backed RAM to which you can add words easily and quickly. (When the box beeps at a word you want to add to the dictionary, just hit <Alt>-



John Greenleigh

Xerox's PC Type Right spelling checker hassles you if you mess up. On the other hand, that's what you're paying for.

<GrayPlus>.) Unlike memory-resident software, it does not take up RAM or cause compatibility problems; should the default hot keys interfere with your programs, you can switch command-key designations easily. You may even become a more careful typist, if only to avoid the abominable beep.

Installation is a painless, 30-second procedure. The keyboard plugs into the Type Right unit, which in turn connects to the keyboard port on your PC. The oblong white box can then be placed anywhere within earshot and cable length.

Although PC Type Right is sold by Xerox, the software and word list come from Microlytics, manufacturer of *Word Finder*. According to Microlytics, however, Type Right's dictionary differs from the one in *Word Finder* because it's geared to office applications. The dictionary includes business-speak

like *leveraged*, *payback*, and *overachieve*, and proper names like Goldberg, Garcia, Johnston, Merrill, and Lynch. The alarm sounds if a proper name is typed without a capital letter.

While conventional full-file spelling checkers do a fine job of correcting letters, reports, and so on after they're written, on-line spelling checkers are particularly valuable for writing in a hurry or for composing E-mail text on line, when you may have to pay by the minute for making and correcting errors. You can even set the device to recognize your password and beep if you mistype it, thereby eliminating a bevy of incorrect sign-on messages. Furthermore,



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by placing often-used commands in the personal dictionary, you can cut down on input errors in all of your programs.

*Turbo Lightning* is probably the premier on-line software spelling checker, and comparing it with PC Type Right is illuminating. *Lightning* does everything that Type Right does, and it even includes a thesaurus. *Lightning* can be set to check every word on screen at one time, as well as checking word by word as you type.

It allows you to turn off the beep if it's driving you crazy. Most important, when *Lightning* detects a mistake it automatically suggests alternative spellings. The only advantage Type Right has over *Turbo Lightning* is that it does not use up valuable RAM or interfere with other programs.

What's more, Type Right contains a few bugs. Every once in a while the silly thing beeps at words you know are correct. This often occurs when you've tried several spellings in quick succes-

**PC Type Right beeps every time you misspell a word—about as amusing as an alarm that rings whenever the dishes are dirty.**

sion, but sometimes there's no reason at all. Type Right also randomly beeps at cursor moves.

Still, until a multigigabyte CD-ROM-based dictionary/thesaurus becomes available at an affordable price, we may be stuck with PC Type Right—even if its only audience seems to be people whose RAM is on terminal overflow.

—Charles Bermant

## SuperCache-286

### 80286-based accelerator board

**Pros:** Fast, reliable 12-MHz CPU; large cache-memory; high-speed 7.2-MHz system clock accelerates motherboard I/O

**Cons:** Incompatible with some hardware and software; does not support the NEC V20 processor

MicroWay  
P.O. Box 79  
Kingston, MA 02364  
617/746-7341

List price: 12-MHz SuperCache-286 \$599, 9-MHz FastCache-286 (without motherboard clock chip replacement) \$399, 87/88 Turbo (motherboard clock chip replacement) \$149, 80287 math coprocessor chip \$450

The most straightforward way to "turbo" a poky PC is to supplement the slow 8088 processor with a faster 80286. Getting your old system to keep up with the new processor is another story.

A turbo board with more kick than most, MicroWay's SuperCache-286 takes a three-pronged approach to souping up your system. It uses an 80286 that zips along at 12 MHz, it employs a generous amount of cache memory to speed up data I/O, and—

unique among accelerator boards—it replaces the standard 4.77-MHz motherboard clock chip with an on-board 7.2-MHz crystal.

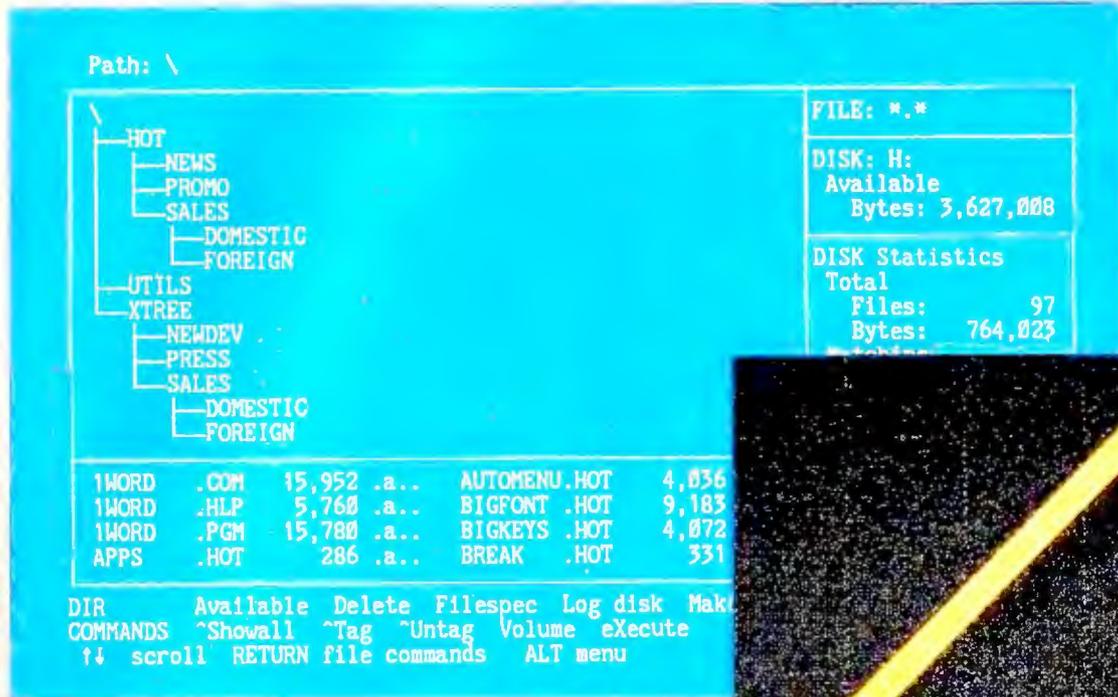
To speed up data I/O, most turbo boards use cache memory, which stores frequently needed data in a special block of high-speed RAM. (SuperCache uses 70-nanosecond static RAM chips running with zero wait states; data transfers between the cache and the 80286 are six times faster than "normal" data transfers between the turbo board and the motherboard.) When the CPU needs data, it looks in the cache first. Only when it fails to find it there does it look to disk or slower system memory. MicroWay's SuperCache-286 provides 32K of cache memory—four times as much as competing turbos—enhancing the likelihood of finding data in the cache.

In addition, replacing the motherboard clock speeds up I/O memory operations. This allows operations like screen write and keyboard input (which are beyond the control of the 80286 processor) to proceed at up to 150 percent of their normal speed.

It must be noted that not all PCs are happy about having some speed demon mess around with their motherboard clock.

Some RAM chips and hardware peripherals cannot operate properly with a 7.2-MHz clock. The Seagate 20MB hard disk on PC World's test computer, for instance, suddenly developed an army of lost clusters and even erased file names from the directory. It was possible to partially recover the files using CHKDSK, but this is hardly a desirable way

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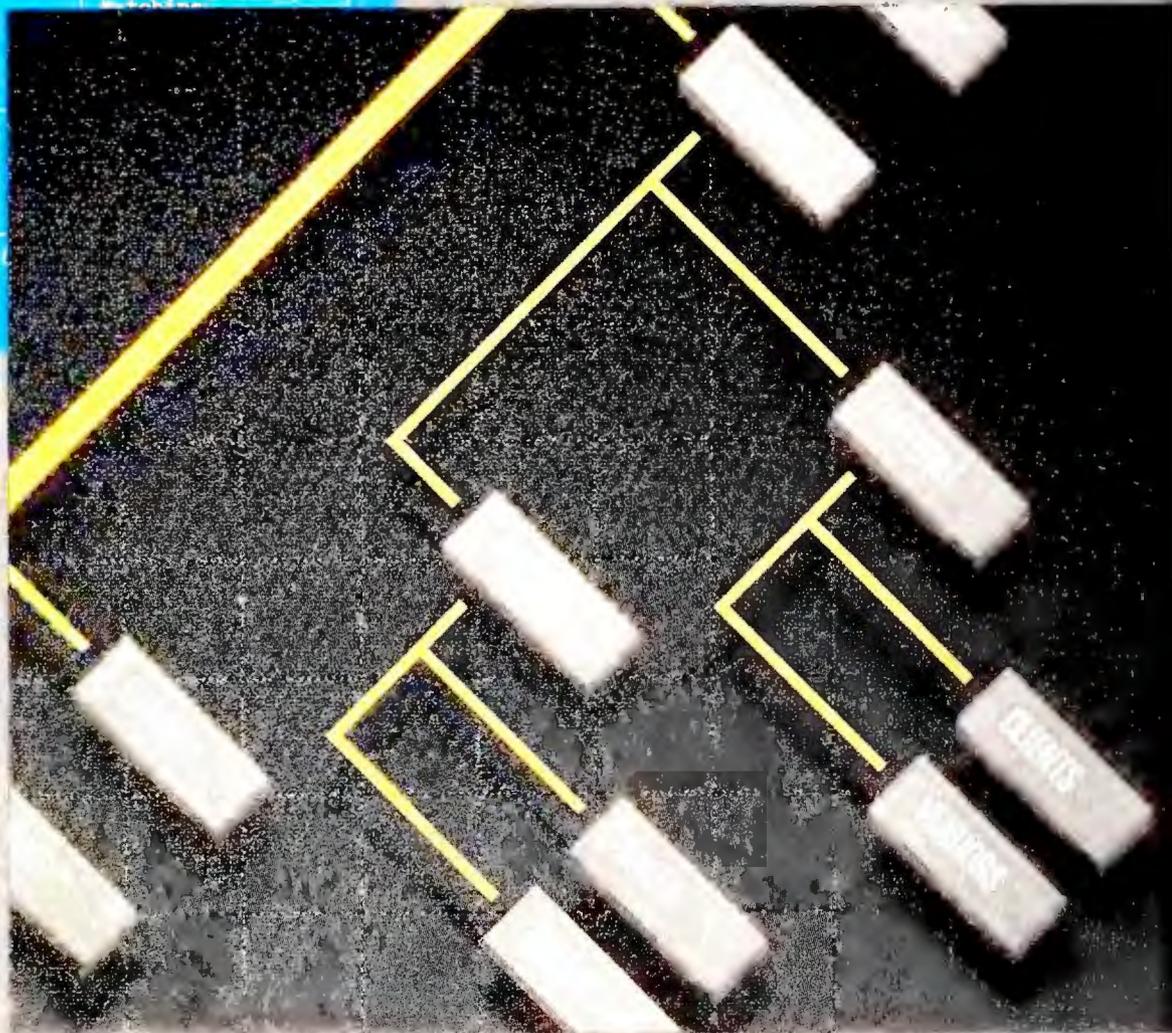
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to do business. MicroWay suggests you experiment with the motherboard clock speed by trying different crystals (two are included) until the system performs properly. Doing a full backup before opening the SuperCache box would be even smarter.

While the documentation is clear and to the point, installing the SuperCache-286 was trickier than anticipated. You have to remove two chips—the 8088 CPU and the clock crystal—from the motherboard and seat the 8088 on the SuperCache board. Then you attach connector cables to the now-empty sockets. Short cables force you to place the turbo board in the expansion slot closest to the 8088 socket; if your only open slot is at the other end of the cabinet, you may find yourself playing musical boards. Removing delicate chips from the motherboard in a space just large enough for one hand is no fun either. Worse yet, when I replaced the cover and fired up the machine, nothing happened.

Fortunately, a call to MicroWay's technical hot line revealed the culprit: The NEC V20 chip that I had substituted for the original 8088 CPU will not work with the SuperCache-286. After several minutes of searching through long-forgotten boxes, I located the battered 8088 and the system came up just fine.

Once the computer was operational, programs raced at a gratifying velocity. A closer examination of software performance, however, revealed some interesting facts. While no programs crashed because of the pro-

cessor's accelerated speed, the cache memory caused at least two applications to run amok. *Copy II PC*, for instance, went bananas, rejecting perfectly good disk sectors. With the cache memory turned off, it ran just fine. It's not clear whether *Copy II PC* would have similar problems with any cache memory. One suspects it would. (Fortunately, the cache

*While no programs crashed, the cache memory caused at least two applications to run amok. Copy II PC, for instance, went bananas.*

can be turned off easily, either by using a switch located on the mounting bracket of the turbo board or via SuperCache software.)

Speed problems occurred with spreadsheet applications as well. These programs need random access to blocks of data in system memory. Because SuperCache insists on searching the cache first, some spreadsheets actually run slower with cache memory than without it.

Several copy-protected programs balked under the timing pressures of the 7.2-MHz motherboard clock. More annoying, *FORMAT* refused to run at all, and *DISKCOPY* returned alarming numbers of errors. A second external switch allows you to throttle down the motherboard clock to the standard 4.77 MHz, but flipping the switch during operation causes the system to crash. (Alternatively, software can reset the motherboard clock to 4.77 MHz with no system crash.)

While some problems exist with the SuperCache-286, most

of them (aside from the glitches stemming from its unique clock chip speedup technique) are common to every turbo board in existence. Trade-offs between dependability and performance are everyday realities of real-life engineering. So if you are willing to accept some shortcomings in exchange for speed and power, the SuperCache-286 is a fast, reliable

alternative to staring at the PC while you wait for it to do something. For those who find clock-speed crashes unacceptable, MicroWay's 9-MHz FastCache (with no clock speedup and a painless price of \$399) may make more sense. —TJ Byers

*Jim Heid is a freelance writer and the author of several computer books, including Power Windows, forthcoming from Microsoft Press. Art Wilcox is a Contributing Editor for PC World. Donald B. Trivette is a freelance writer in Wrightsville Beach, North Carolina. Charles Bermant is a San Francisco-based freelance writer. TJ Byers is a freelance writer and the author of Inside the IBM PC AT (McGraw-Hill, New York, 1986). ●*

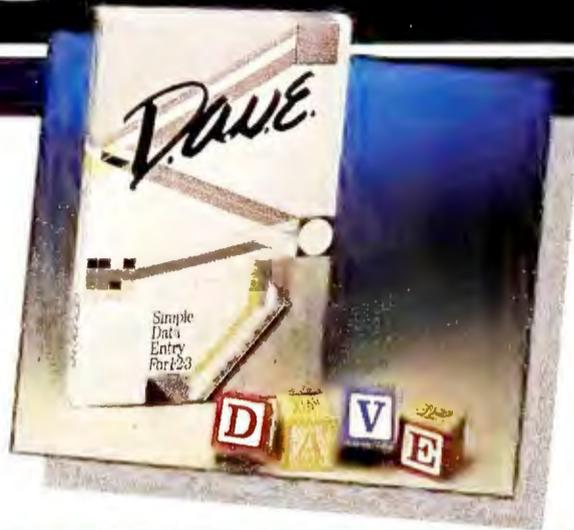
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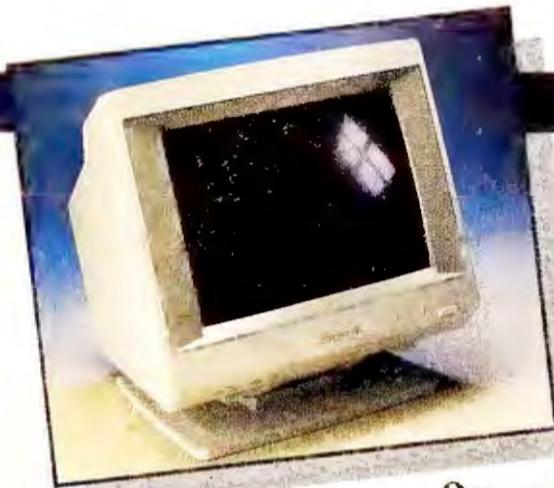


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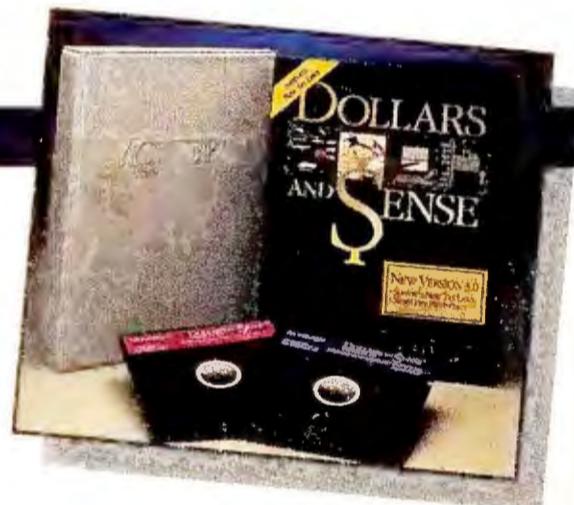


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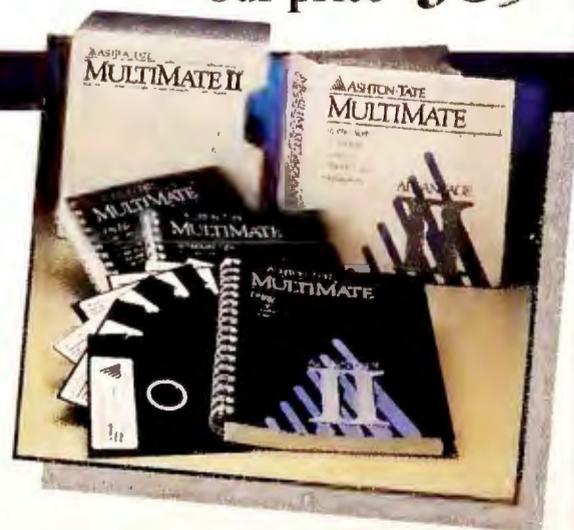
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# THE SOFTWARE SHELF

Edited by William Rodarmor

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Paul Mensei

at a private grammar school (it was the first software they tried on their new PC clone), they managed to produce form letters linked to a data base on their first day.

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- SeeMORE 1.0 . . . . . 49.

### Quarterdeck ... NCP

- DESQView 2.0 (operating environment) . . . . . 79.
- Expanded Memory Manager 4.0 . . . . . 39.

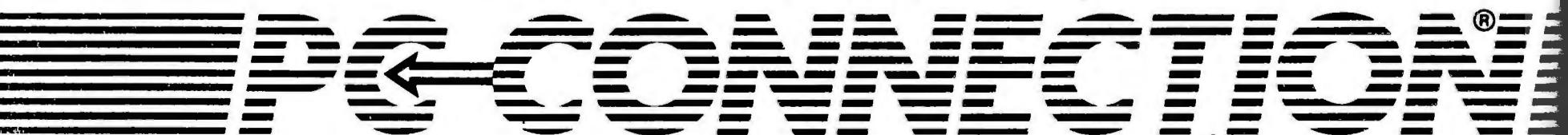
### Simon & Schuster ... NCP

- Typing Tutor IV . . . . . 33.
- Webster's New World Writer 1.04 . . . . . 59.

### Softlogic Solutions ... NCP

- Software Carousel 2.0 (everything resident) 35.
- Disk Optimizer 2.01 . . . . . 35.

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<b>Software Publishing ... NCP</b>	
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PFS:Professional Write 1.03 .....	119.
PFS:Professional File 1.01 .....	149.
Harvard Total Project Manager 2.0. ....	379.
<b>Springboard ... NCP</b>	
Newsroom•Pro .....	45.
<b>Symantec ... NCP</b>	
Q & A 2.0 (database, word processor) ...	209.
Q & A Write 1.0. ....	119.
<b>Traveling Software ... NCP</b>	
LAP-LINK 2.0 (5 1/4" to 3 1/2" and back) ...	79.
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True BASIC 2.0 .....	59.
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Grand Siam Bridge (CP) .....	45.
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Sargon III (Chess program) .....	15.
<b>Infocom ... NCP</b>	
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22.  
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22.  
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49.  
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25.  
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33.  
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33.  
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27.  
**Sphere, Inc. ... NCP**  
Orbiter (Shuttle simulation, requires CGA) ..

27.  
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33.  
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69.

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59.  
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8.

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18.

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25.  
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17.

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17.  
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21.

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32.

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69.  
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Multisync Plus . . . . .	949.
GB- (supports 640 x 480 resolution) . . . . .	279.
<b>NSILogic ... 3 years</b>	
Smart EGA Plus . . . . .	299.
<b>Okiata ... 1 year</b>	
Laseline 6 . . . . .	call
Advanced Personality Module . . . . .	159.
<b>Orcid Technologies ... 2 years</b>	
TinyTurbo 286 . . . . .	379.
PC Turbo 286e w/1 Meg (10 MHz) . . . . .	729.
Jet '86 (includes cable kit) . . . . .	869.
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T1000 Laptop Computer . . . . .	call
T3100/20 Laptop (w/20 Meg Hard Drive) . . . . .	call
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Maxell (10 disks per box) . . . . .	59.

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Grolier's OnLine Encyclopedia . . . . .	32.
<b>PC Connection</b>	
Computer Toolkit . . . . .	22.
Smartmodem-to-AT cable (9 feet) . . . . .	19.
15-foot Parallel Printer cable . . . . .	19.

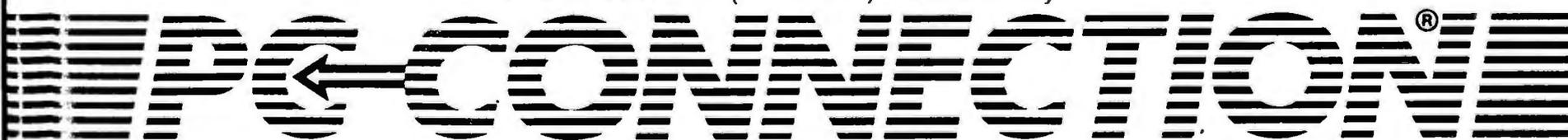
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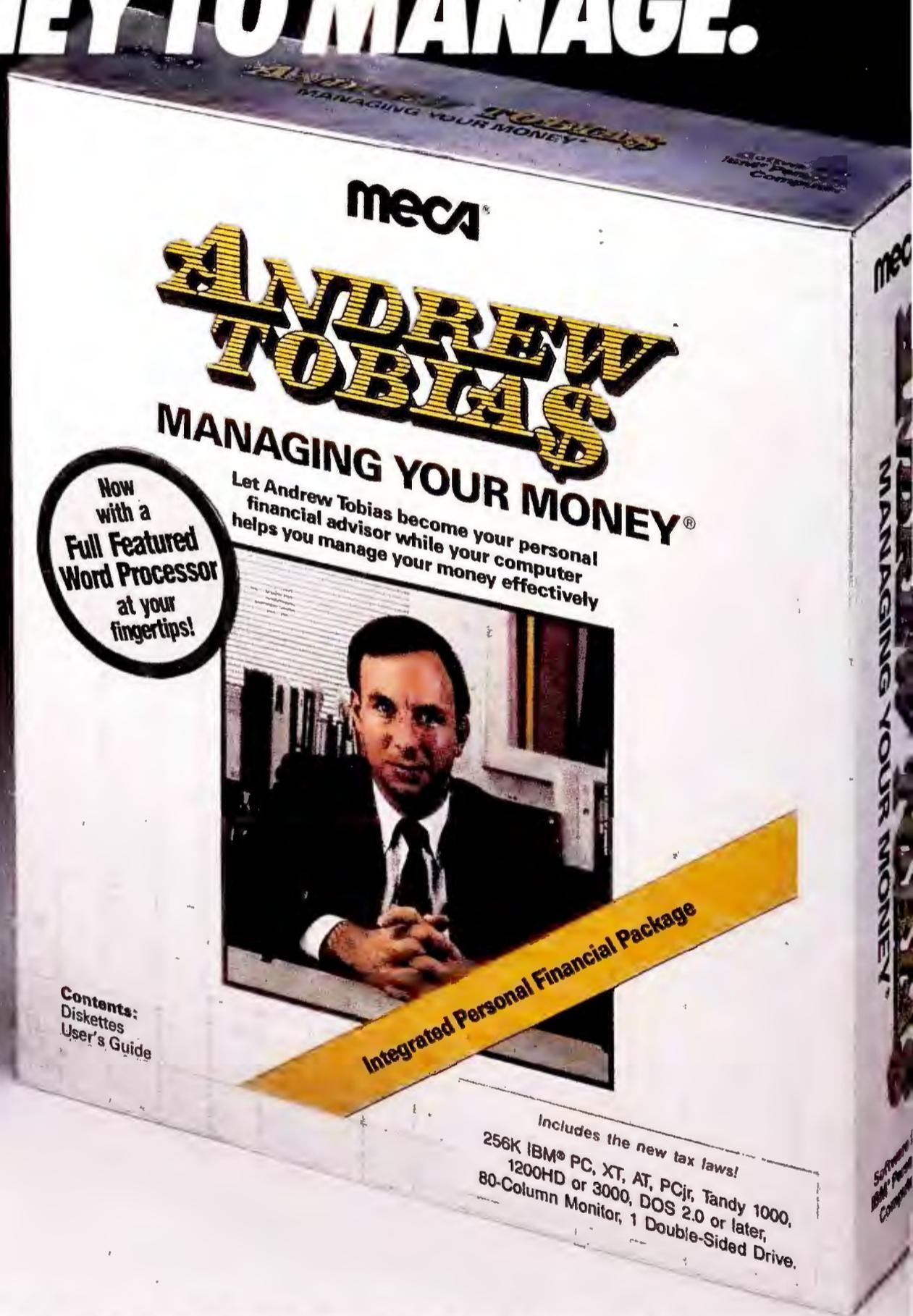


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# PC World Evaluation

## Ability Plus

### Graphics

	Send chart to screen	seconds
Ability Plus		9.8
Ability 1.0		19.9

### Data base management

	Find last record	seconds
Ability Plus		12.0
Ability 1.0		15.5

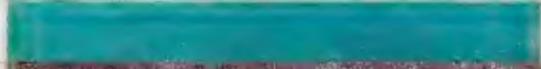
### Wild-card search

	Wild-card search	seconds
Ability Plus		20.0
Ability 1.0		26.7

### Word processing

	Reformat document	seconds
Ability 1.0		23.9
Ability Plus		29.2

### Maximum print speed

	Maximum print speed	seconds
Ability Plus		36.1
Ability 1.0		53.5

### Global search and replace

	Global search and replace	seconds
Ability Plus		63.1
Ability 1.0		131.2

Faster and more compact, Ability Plus dances circles around the original Ability 1.0.

Each of this integrated package's modules—word processor, data base manager, spreadsheet, graphics, and communications—were tested on an IBM PC XT with 640K of memory and a 10MB hard disk drive.

The word processor tests used an 8-page (480-line) test file consisting of groups of 4 characters with each group separated by a space (aaaa bbbb cccc). A carriage return and a blank line followed every 9 lines of text. The file was formatted at 60 characters per line. For the reformat test, margins were cut to 50 characters. The print-speed test shows the speed at which a document could be printed by an infinitely fast printer. Search and replace performance was measured by replacing all instances (238) of aaaa with AAAA.

Data base management tests were performed on a file of 1000 records. The first test timed finding the last record using the index. The second test timed locating a record using a subset of one field's characters plus a wild-card character.

Spreadsheet tests were performed on a 50-by-50 matrix. All cells were given a starting value of 0 and formatted to display right-justified, fixed numerics with two decimal places. Column width was set globally to 5. For each test, all cells except A1 contained similar formulas. For example, for the multiplication test, B1 contained the formula  $A1 * 1.01$ , C1 contained  $B1 * 1.01$ , and so on. Cell A1 was given an initial value of 1 for all tests except exponentiation, where it was given a 2. The tests were performed using each program's natural recalculation mode, and again using row recalculation mode. The fastest time, regardless of mode, is shown here.

The graphics test measured how fast the programs display a pie chart, with text, on an Amdek Color II screen.

The communications test measured the speed at which the programs transmit a 10,000-character file at 1200 bps with and without protocol.

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

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PVGA 1

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Circle 131 on reader service card

# PC World Evaluation

(continued)

## Communications

Transmit file without protocol seconds

Ability Plus	81.7
Ability 1.0	93.4

Transmit file with protocol seconds

Ability Plus	96.6
Ability 1.0	99.2

## Spreadsheet

Multiplication seconds

Ability Plus	11.1
Ability 1.0	11.1

Addition seconds

Ability Plus	15.4
Ability 1.0	15.9

Exponentiation seconds

Ability Plus	30.5
Ability 1.0	43.1

Division seconds

Ability 1.0	16.0
Ability Plus	18.4

*Plus*, a fast, tightly integrated package that costs less than half as much as its major competitors.

*Ability Plus* combines a solid word processor and data base, an outstanding spreadsheet, fair business graphics, and an easy-to-use communications package, all organized around an application manager called the Library Screen. You can import a mailing list from *dBASE III*, convert it to worksheet format, merge it with a mailing list imported from *1-2-3*, and export the merged list back to either application. Thrown in—but not well integrated—is a slide-show utility called *Presentation*.

All applications in *Ability Plus* are entirely menu-driven, and you transfer data between them all in the same way: Press <F7> to shade the data, pick it up with <F5>, and put it down wherever you want with <F6>. The mechanism even extends to transfers into and out of *Ability Plus*: You can pick up a text file from the Library Screen and put it down in *WordStar*, *DisplayWrite*, or a number of other formats. It's like having a fast built-in text conversion program.

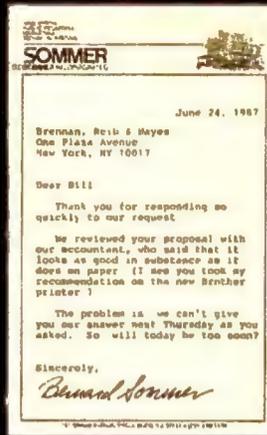
Migent took user complaints to heart, and the word processing and data base modules now rank at the top of the "most improved" category. The word processor is faster (its global search and replace function is twice as fast), it can finally double- and triple-space text, and it's gained a 150,000-word spelling checker. In the data base, you can now use relational and logical operators

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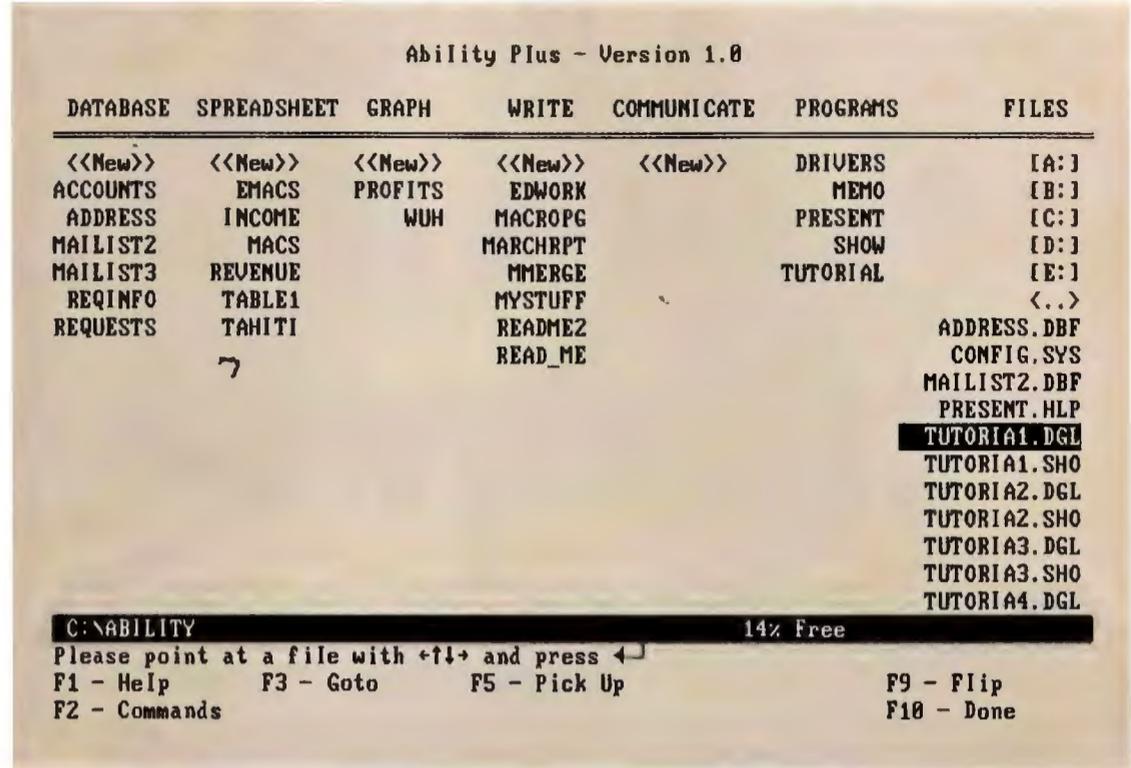


brother

such as angle brackets to speed searches, and you can easily create two-way links between files (or parts of files) in one module and those in any other. For example, typing an inventory part number in the word processor could automatically produce its price and availability from the data base. Migent has also expanded *Ability*'s spreadsheet to 702 columns by 9999 rows. And you can now use side-by-side windows to compare versions of a file or to move data between them.

Transmitting text-plus-graphics files is yawningly familiar to Macintosh users, but *Ability* was one of the first programs to make it practical for the PC. *Ability Plus*'s Communicate module lets users transmit files in batches. It emulates DEC, VT 100, and VT 52 terminals, supports XMODEM and a proprietary protocol, and is somewhat faster than the original.

After this litany of praise, a few negative points must be raised. With all its new features, *Ability Plus* now takes up five disks, so unless you have a hard disk you'll do lots of disk swapping for functions like file import/export. The Graph facility produces pie, bar, and line charts and a few new types (such as four-quadrant scaled plotting), but the results aren't impressive and can be viewed only from inside the *Ability Plus* spreadsheet. Though the Presentation module lets users take and edit snapshots of screen images, it isn't likely to keep the makers of *Freelance Plus* awake at night. Still, you can always export *Ability Plus* worksheets into 1-2-3 release 1A format and enhance



The Library Screen in *Ability Plus* is the equivalent of a desktop in icon-based systems. Routine file housekeeping and file format translation are accomplished by picking up files and putting them down in different places on the screen.

them with *PC Paintbrush* or a similar program.

While it isn't perfect, at \$259 *Ability Plus* is one of the true bargains in software, ranking with *SideKick* and *The Norton Utilities*. In a world dominated by a handful of stand-alone programs, the developers of *Ability Plus* are offering a fair selection of talents in a single package. —Charles Seiter

## Relay Silver

*Telecommunications program*

**Pros:** Powerful script language; excellent documentation

**Cons:** Clumsy editor with poorly designed command-key layout

Version 1.0

VM Personal Computing

41 Kenosia Ave.

Danbury, CT 06810

203/798-3800

List price: \$150

Requirements: 192K, two disk drives, DOS 2.00 or later version, Hayes-compatible modem  
 Not copy protected

If you can dial a phone, you can use *Relay Silver*, a first-class telecommunications program from VM Personal Computing that excels at making on-line connections. Though it suffers from an awkwardly designed script editor, *Relay Silver* is far more flexible than *Smartcom* and falls midway between *Crosstalk XVI* and *Mk.4* in scripting capability. It will appeal to anyone from MIS managers trying to standardize communications links to first-time E-mail users. People who spend a lot of

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Circle 16 on reader service card

# PC World Evaluation

## Relay Silver

### No protocol

	seconds
Crosstalk XVI 3.61	24.9
Relay Silver 1.0	38.4
Microsoft Access 1.01	72.3

### Protocol

#### Proprietary

	seconds
Relay Silver 1.0	10.1
Crosstalk XVI 3.61	17.2
Microsoft Access 1.01	n/a

#### XMODEM

	seconds
Crosstalk XVI 3.61	13.6
Relay Silver 1.0	16.4
Microsoft Access 1.01	81.5

#### Kermit

	seconds
Relay Silver 1.0	18.2
Crosstalk XVI 3.61	18.9
Microsoft Access 1.01	n/a

### Protocol/delay

#### Proprietary

	seconds
Relay Silver 1.0	13.5
Crosstalk XVI 3.61	59.0
Microsoft Access 1.01	n/a

#### XMODEM

	seconds
Crosstalk XVI 3.61	90.1
Relay Silver 1.0	93.7
Microsoft Access 1.01	159.8

#### Kermit

	seconds
Relay Silver 1.0	108.6
Crosstalk XVI 3.61	141.0
Microsoft Access 1.01	n/a

Thanks to Relay Silver's transmission efficiency, the program can keep connect time short enough to spare both your budget and your patience.

The tests were designed to simulate the typical conditions and environments in which a communications program would be used. Each program transmitted a file at 9600 bps with and without protocol and with various combinations of protocol, error checking, and line delay.

Communications normally takes place without protocol when using an on-line data base service such as CompuServe or The Source or uploading and downloading data from an IBM mainframe. Protocol should be used in situations where data integrity is important. (Both systems must use the same protocol.)

In the tests using protocol, each program was run with its proprietary protocol (if it had one) as well as Checksum XMODEM and Kermit protocols. Proprietary protocols vary from program to program but generally offer a high level of performance. Checksum XMODEM and Kermit are not universal standards, but most communications programs support them.

To gauge a program's ability to handle transmission errors under realistic conditions, some tests introduced two types of errors into the transmitted data. A *burst error* changes a bit in a character, causing the wrong character to be received. A *drop-out error* refers to a lost character; it is sent but not received. Typically, as transmission speeds increase, so does the frequency of errors. The errors were introduced in the same sequence and quantity for each program: one drop-out error and one burst error every 1500 characters, on average.

Line delays were also introduced in some tests. A common example is the delay experienced when a long distance phone call is conducted over a satellite link; each party, thinking the other has paused, constantly interrupts the other. For these tests, characters were delayed approximately .5 second between computers.

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

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## PC World Evaluation

(continued)

### Protocol/error

	Proprietary	seconds
Relay Silver 1.0		44.6
Crosstalk XVI 3.61		57.7
Microsoft Access 1.01		n/a

### XMODEM

		seconds
Relay Silver 1.0		189.9
Microsoft Access 1.01		232.3
Crosstalk XVI 3.61		Didn't work

### Kermit

		seconds
Relay Silver 1.0		Didn't work
Crosstalk XVI 3.61		Didn't work
Microsoft Access 1.01		n/a

### Protocol/delay/error

	Proprietary	seconds
Relay Silver 1.0		62.7
Crosstalk XVI 3.61		120.5
Microsoft Access 1.01		n/a

### XMODEM

		seconds
Microsoft Access 1.01		286.0
Relay Silver 1.0		251.3
Crosstalk XVI 3.61		Didn't work

### Kermit

		seconds
Relay Silver 1.0		138.7
Crosstalk XVI 3.61		Didn't work
Microsoft Access 1.01		n/a

time on line can even run the program in the background.

*Relay Silver* is derived from VM's original *Relay*, which allowed PCs to communicate with mainframes and act like 3270 terminals. It's a little brother to *Relay Gold*, a program that works with *Relay* in a VM/TSO mainframe operating environment.

In addition to a powerful script language, *Relay Silver* includes a learn mode that automatically records log-on sequences for reuse, and VT 100, VT 52, TTY, and Telex emulation. *Relay Silver* can easily manage 1200- to 9600-bps communications and supports Checksum XMODEM, CRC XMODEM, Kermit, and ASCII transfer protocols. It also has a very fast proprietary protocol that mediates between two machines running *Relay Silver*.

*Relay* is easy to install; the program prompts for modem type, default transmission rate, and the communications port your modem is connected to. Operations center on two main menus. From the Off-line menu, you use the function keys to access basic program commands, call another computer or on-line service, set communications parameters, enter phone numbers, or print files. From the On-line menu, you can send and receive files, change your parameters on the fly, exit to run a program, toggle the printer on and off, start and stop file transfers or script execution, hang up, or edit a file after you receive it.

Like *PC-Talk III*, *Relay Silver* offers a dialing directory that lists

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Robotic Hands Page 3

### Recent Robotic Hand Research

Presently, there are two disparate approaches to gripper construction, with correspondingly different design goals. The two types are industrial hands and omni-hands. Industrial hands are fairly simple, uni-function, one or two DOF grippers which are currently being used for such jobs as welding and assembly-type functions. Omni-hands are complex, multiple DOF hands.

Anthropomorphic hands are supplemented by sophisticated hardware and feedback control and offer many advantages; a large range of motion and the ability to pick up objects and manipulate delicate parts without causing damage to them. Maintaining a stable grasp, high costs, and complexity of control relegate this hand to the status of a research tool for the present. The complexity of the additional degrees of freedom inherent in the Omni-hand is illustrated in Figure 1.

Figure 1: Angle Definitions of Hand Geometry

Until concurrent work in decision-making, task strategy, and vision systems is developed, the potential of this hand cannot be realized. The decreasing cost of producing a functional hand with more than one degree of freedom is speeding acceptance by industry as illustrated in the following graph.

INSTALLED ROBOTIC HANDS (Degrees of Freedom)

The cost figures are based on a three fingered hand, each finger supporting three DOFs. Lower acquisition costs will allow an increase in the number of degrees of freedom employed in industrial hands. Placing the control for the hand on the arm so as to reduce the weight on the hand itself also lowers cost. The hand-object system was modelled as a rigid body system, in which a heuristic for a stable grasp is a grasp that, when altered by an external force, seeks to produce a motion or force to return the system to stability.

January Scientific Conference

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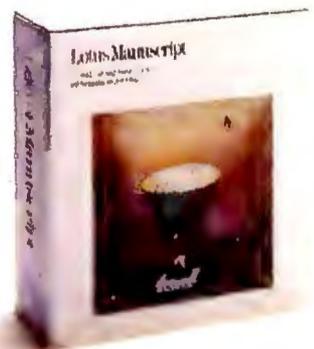
to word processing, graphical elements have been treated like afterthoughts, relegated to "exhibit on next page" or "cut and paste" status.

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## Lotus Manuscript™

names, transmission rates, emulation modes, and various other parameters, along with the comments you add. The designers have wisely installed 25 popular on-line services such as MCI Mail and CompuServe. Once you've entered a service's local access number, you highlight the name and press <Enter> to set *Relay Silver*'s gears in motion. To add a new service, just copy the information from an existing listing and edit the settings.

Better still, whenever you load *Relay Silver*, it checks the modem's switch settings, beeps if they're wrong, and displays a schematic of the incorrectly positioned switches on screen. This excellent feature will save many PC users time and frustration.

Once properly configured, *Relay Silver* gets you on line with a minimum of fuss and, if you like, records the commands and password needed to forge a link. Other niceties: When you're on line, you can change horses in mid-stream and reset parameters. If you lose track of what has gone where, two keystrokes display a handy status screen that notes what files have been sent or received, their size, the time spent on line, and whether the program encountered any errors in sending or receiving the files.

If capturing a session for playback isn't enough, *Relay Silver* offers a sophisticated script language with an English-like command set that supports IF... THEN...ELSE logic, system and memory variables, nesting, and error trapping. Although *Relay Silver* scripts can't match the pow-

```

RELAY Silver      (c) Copyright 1985,86 VM Personal Computing      Hayes Modem
WARNING: Your Smartmodem (on COM1) may not be properly configured for RELAY.
For a Hayes 1200 external modem turn the modem off and set switches 1 and 6
in the UP position. Press ENTER (↵) when ready.

  1   2   3   4   5   6   7   8   9  10
  ---
  UP  UP  DN  UP  DN  UP  UP  DN  UP  DN

The switches are located behind the front plastic panel. To remove it,
insert a small screwdriver behind the side tab and pry out slightly. Gently
pull the front panel toward you. Change switches with a pen or small tool.

For a Hayes 1200B internal modem the switches should be set as follows:

                1   2   3   4   5   6
                ---
3 switch model  UP  DN  UP
6 switch model  DN  UP  DN  UP  UP  UP

                Press F10 for HELP
RELAY Silver 1.0      06/28/87 18:39:52      Line 01 Column 01

```

If your modem's switches aren't set correctly, *Relay Silver* can identify the problem and suggest a solution. Here, switches 1 and 6 are highlighted as incorrectly set on a Hayes Smartmodem 1200. Following on-screen instructions, you can quickly solve the problem by removing the front of the modem and resetting the two switches.

er (or the Byzantine syntax) of those generated with *Crosstalk Mk.4*, they're plenty capable. For example, you could easily set up a script that directed *Relay Silver* to call all your company's PCs, collect the day's accounting figures, then upload the files to a mainframe. Because scripts can present menus, gather input, wait for results, react to error situations, and so on, they can even be used to create an unattended electronic bulletin board.

Unfortunately, *Relay Silver*'s built-in script editor isn't quite up to snuff. It provides such features as block copying, line centering, and cursor control, but its command structure is wildly inconsistent. (<Ctrl>-B moves the cursor

to the end of a line, for example, while <Alt>-<F5> saves and continues.) Those who plan to write a bundle of *Relay Silver* scripts should use a word processor that generates ASCII files.

If *Relay Silver*'s excellent manual and disk tutorial don't answer all your questions, you can leave queries on VM's *Relay Silver* bulletin board or download "zap files"—patches that resolve various compatibility problems.

—Ken Smith

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— PC Magazine

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Circle 228 on reader service card

## Cubit

### File compression program

**Pros:** Can squeeze 1-2-3 worksheet files by 70 percent; includes run-time decompression utility

**Cons:** Slow; should not be used on WordStar 4.0 files

Version 2.0

SoftLogic Solutions

530 Chestnut St.

Manchester, NH 03101

800/272-9900

List price: \$49.95

Requirements: 128K, one disk drive, DOS 2.00 or later version  
Not copy protected

There are two basic ways to cut telecommunications costs: Speed up the transmission or shrink the amount of data being sent. By using *Cubit 2.0* from SoftLogic Solutions, you can compress data to half its normal size for a fraction of the cost of a 9600-bps modem. The program is also useful if your hard disk overfloweth or you need to archive data.

An enhancement of the initial 1986 release, version 2.0 reduces worksheet files more efficiently. An equally notable improvement: When you transmit a file, you can now include a special UNCUBIT utility that allows recipients who don't have a copy of the main program to decompress the file. *Cubit's* documentation, however, is somewhat arcane.

Naturally, *Cubit's* efficiency depends on the file type and on how much unused space is in a file. In tests run on an IBM XT with DOS 3.10, *Cubit* shrank 1-2-3 worksheets by 70 percent; with ASCII text, by 54 percent; with binary (program) files, 47 percent; and with graphics, by 26 percent.

*Cubit* relies on four compression techniques to cram the most data into the smallest space:

*Dictionary compression* replaces commonly used words with 1 or 2 bytes of encoded data.

*Data* and *the*, for example, would each be reduced to a single byte.

*String compression* is a trick *Cubit* resorts to when it can't find a word in its dictionary. It enters the word in a *string list*, which is stored as part of the compressed file, and makes a corresponding 2-byte substitution in the text.

*Digraph compression* exploits the fact that many English words share pairs of letters, such as *ed* and *ly*. These too can be encoded and replaced by a single byte.

Once the entire file has been processed, the string list itself is com-

pressed 30 percent by the digraph routines.

to work, displaying a block on screen for every 100 5-byte "words" that have been squeezed. You can also compress files in batches from the DOS prompt if you supply file names, wild cards, and the necessary switches.

While most people use *Cubit* manually, you can automate compression and decompression by adding a 5K memory-resident program named CUBITR and referencing it in the system's AUTO-EXEC.BAT file. When an application tries to read or write to a compressed file, CUBITR automatically jumps in to decompress it first. When the application finishes, CUBITR saves the file in compressed form. While convenient, this can slow file handling considerably.

**Cubit 2.0 from SoftLogic Solutions compresses data to half its normal size for a fraction of the cost of a 9600-bps modem.**

pressed 30 percent by the digraph routines.

*Run-length compression* condenses repeated characters; a string of 80 blanks, for example, is compressed into just 3 bytes.

*Cubit* compresses not only individual files but groups of files or entire subdirectories. It's so easy to run, you'll rarely need the manual or help screen. Type CUBIT at the DOS prompt, and the program requests a file name and an optional name for the compressed version. It then goes immediately

You can switch CUBITR on and off, and it's a good thing, too. If you leave CUBITR active while using the DOS COPY command, each copied file will be run through the decompress/compress cycle twice, because of the way DOS opens and closes files.

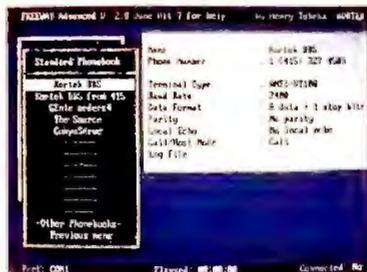
Normally, *Cubit* automatically analyzes each file and decides how best to compress it. Since *WordStar* files aren't standard ASCII, SoftLogic provides a manual switch that calls on special routines to compact the file while maintaining *WordStar's* formatting. A word to the wise: The

## Main Menu and Autopilot



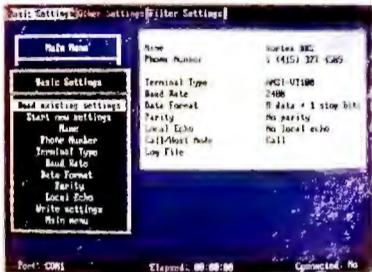
Freeway's pop-up menus and windows make communications fast. With the "autopilot" you can automate any communications sequence, without programming scripts, simply by going through the sequence once.

## Phonebooks



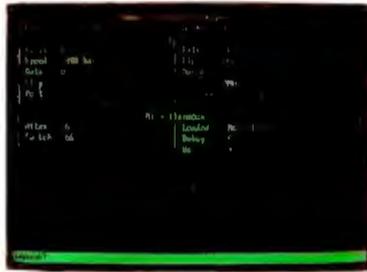
Freeway stores the numbers and settings for up to 108 systems. You simply pick the number you want and hit Enter; Freeway dials.

## Settings



The parameters you need are gathered in simple menus. You simply zip through with arrows and Enter and save settings in the Phonebooks.

## Crosstalk® Emulation



Command line interface screen for users accustomed to Crosstalk®. Freeway Advanced's script language is an extension of the command language used by Crosstalk®.

Take Freeway's simple menus, clear displays, and broad range of features. The result is powerful but straight forward communication.

# ~~FREWAY~~ → *is the best communication software.*

### Freeway versus Other Communications Software

	On-Line Help For Every Command	One-liner EASY Setup	Phonebooks/Automatic Dialing	Login Learning (Autopilot)	On-Line Page Editor	Password Protection	Script Language	Crosstalk Emulation	LIST PRICE
FREWAY	YES	YES	YES	YES	YES	YES	NO	NO	\$ 59.95
FREWAY Advanced	YES	YES	YES	YES	YES	YES	YES	YES	\$139.00
Xtalk XVI	NO	NO	NO	NO	NO	NO	NO	YES	WELL... \$195.00
Xtalk Mk.4	YES	NO	NO	YES	YES	YES	YES	YES	WELL... \$159.00
SmartcomII	NO	NO	YES	LIMITED	LIMITED	NO	NO	NO	\$149.00
MS Access	NO	NO	NO	LIMITED	LIMITED	YES	YES	YES	\$245.00

**FREWAY**  
**\$59.95**

**FREWAY** → **Advanced**  
**\$139.00**

### Technical Specifications:

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switch works well with earlier releases of *WordStar* but can corrupt *WordStar 4.0* files. SoftLogic claims an upcoming version will correct the bug.

Because *Cubit's* degree of file compression varies so widely, its appeal to users will, too. 1-2-3 users will love it, but *WordStar* types should wait until SoftLogic squeezes out another release.

—Donald B. Trivette

## Keywords Advanced

*Programmable macro processor*

**Pros:** Macros can be triggered by screen context; powerful programming language

**Cons:** Information scattered across three volumes

Version 1.0

Alpha Software Corp.

30 B St.

Burlington, MA 01803

800/451-1018, 617/229-2924

List price: \$299

Requirements: 128K, one disk drive, DOS 2.00 or later version

Not copy protected

In its simplest incarnation, *Keywords Advanced* is a RAM-resident macro generator much like *ProKey*, *SmartKey*, and *SuperKey*. It generates macro-run menus, help screens, and DOS shells just as well as its talented kid brother, *Keywords 3.0* (see "A Key to Powerful Macros," *PCW*, July 1987).

What sets *Keywords Advanced* apart is the *Keywords Programming Language (KPL)*—a souped-up macro language that lets you automatically generate macro code that can read the screen, branch, and create data entry forms. If you're frustrated with

```

A:LTSTEST.KW      P01 L03 C01 Insert Align
-----R
({!TEST}<Test if Lotus is READY>
(Case)
(Scrn){1,76,5}{=="READY"
(Do){@GO_ON}{Jump}
(Case)
(Bell)
(Cancel)
(:GO_ON)

({C+IF1}<){!TEST}@SUM({Pause},{Pause}){Enter}

```

Thanks to *Keywords Advanced's* ability to act on information it reads from the screen, you can create a 1-2-3 macro that executes only if the program is in READY mode. If it isn't, the macro rings the computer's bell.

limited DOS extensions like *EBL* and you spend much of your time designing turnkey systems (and you'd rather not learn a full-blown programming language), *KPL* could be the answer. *KPL* includes flow of control statements such as *DO...WHILE*, *DO...UNTIL*, and *CASE*, and accommodates logical operators, labels, comments, string and integer variables, and even arrays. *Keywords Advanced* has a single-step debug mode and lets you test macros as you create them.

The program requires at least 100K of RAM. You can set aside a macro buffer holding the equivalent of 9500 keystrokes, but the limitation seems artificial since you can load and unload macro

files at will and even store long macros directly on disk. If your system has expanded memory, *Keywords Advanced* will store its macro buffer there, which cuts the program's memory needs to 60K. Moreover, if it's the last program loaded, you can flush it out of memory and reclaim some work space. Installation is simple, but to change a single setting later, you have to plod through the entire process again. You can avoid this hassle by editing the program's configuration file with the built-in editor.

One of *Keywords Advanced's* most impressive skills is its ability to scan the screen for specific strings and execute a macro in response. This allows you, for example, to write a macro that runs only when 1-2-3 is in READY mode.

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The possibilities are endless. One company that sends Telexes via *EasyLink* developed a *Keywords Advanced* macro that searches the screen for the word *acceptance*. When it appears, *Keywords Advanced* reads the identification number that follows and

scribing the new features in *Keywords 3.0*, and a third document outlining the features of *Keywords Advanced*. For \$299, I expect at least an integrated manual. But this is a minor complaint about an otherwise impressive product. —John Walkenbach

that lets you pigeonhole your friends and ring them up without touching your telephone.

The phone company's yellow pages let your fingers do the walking; *LBB*'s two auto-dialers give them a rest. Paired with a Hayes-compatible modem, its Directory auto-dialer calls any telephone number you've entered in the *LBB* directory; the Screen auto-dialer pops up over the current application and can dial any number off the screen.

The *LBB* Directory stores up to 400 listings, which you can sort by category and then print. The data entry screen is well designed and holds first and last name, telephone number, address, and up to three 26-character lines of notes. Finally, you can typecast your acquaintances by relegating them to one of up to 30 predefined index listings such as *advertiser*. When you print the directory, you can create a personalized "yellow pages" using the index listings as subject headings.

To pop the auto-dialers into action, you press a redefinable two-key combination. The Directory auto-dialer initially displays the names of the 30 people assigned to the most frequently called category. If a name is not among the chosen few, you can find it by specifying another index category, by scrolling through the entire list, or by entering the first letter or two of the last name. To make a call, enter the two-digit number assigned to the name. If you need help, *LBB* can display a list of area codes, in numerical order or alphabetically by area served.

You can print the Directory in full-page alphabetical form or, using compressed print, in a pock-

**K**eywords Advanced is a souped-up macro language that lets you automatically generate macro code that can read the screen, branch, and create data entry forms.

stores the number in the firm's Telex log file.

Creating sophisticated macros like that is quite simple. *Keywords Advanced* prompts you at each step of the process and even writes most of the macro code. The program's screen literacy is also the source of its talent for creating custom context-sensitive help menus. The trick is to link pop-up text window macros or macro menus to specific words that your application generates on screen.

Programmers will find *Keywords Advanced* appealing because it lets them access macros directly and control macro playback with programs written in BASIC, Pascal, C, and other high-level languages. Alpha Software offers a run-time version for developers who wish to distribute macro systems without requiring that the user own a full copy of the program.

Nobody should plan to master *Keywords Advanced* in a single evening: It's a complex and powerful product. It comes with the *Keywords 2.0* manual, a book de-

## The Little Black Book

*Personal phone directory and auto-dialer*

*Pros: Names easily found; slick pop-up auto-dialer*

*Cons: 400-name limit; limited printer support*

Release 2.0

Cygnnet Technology  
48431 Milmont Dr.  
Fremont, CA 94538  
415/683-2339

List price: \$89.95

Requirements: 60K, one disk drive, DOS 2.00 or later version  
Not copy protected

Dick Cavett once joked that the world is divided into two kinds of people: those who divide the world into two kinds of people, and the rest. If you're one of the dividers, *The Little Black Book (LBB)* will appeal to you. It's a RAM-resident phone directory



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et-size format designed to fit in a cover supplied with the program.

Before you sink \$90 into *LBB*, consider potential compatibility problems. The screen dialer won't work with programs such as *Microsoft Word* in graphics mode, for example. The manufacturer doesn't guarantee that *LBB* will coexist with other memory-resident programs, although it worked peaceably with such RAM thugs as *SideKick* and *Ready*.

*LBB* is one of a small herd of programs designed to eliminate phone books and save your fingers. *NamePro* from Computer Management and *My.Phonebook* from Nine.ninetyfive both print out address books, and General Information's *HotLine* can store and dial thousands of numbers. But *LBB* is compact and its screen auto-dialer invaluable. You can even get around the program's biggest drawback—its 400-name limit—by calling up names and numbers stored in a word processing file and using the screen dialer to call out. —Jordan Breslow

## Tas-Plus

*Data manager*

**Pros:** *Clever data base structure; powerful programming language*

**Cons:** *You must create and write programs to accomplish simple tasks; poor documentation*

Version 2.07

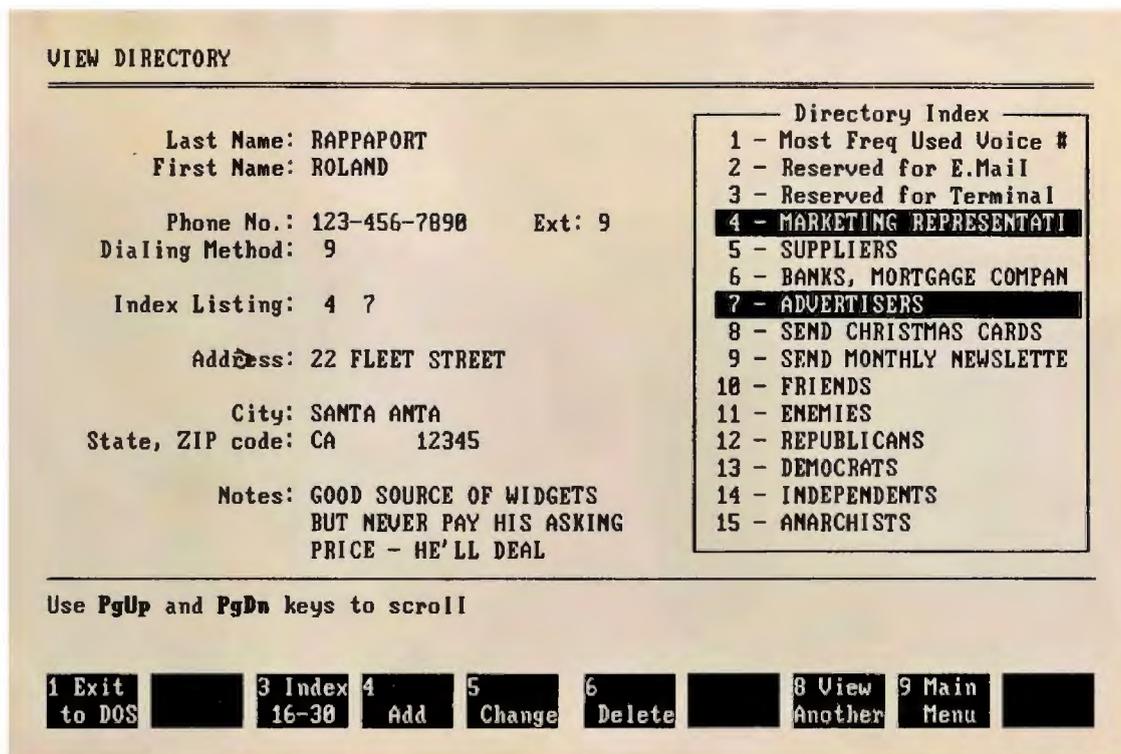
Business Tools, Inc.

1125 12th Ave. NW #B2

Issaquah, WA 98027

206/392-9781

List price: \$69; developer's version \$199; multiuser version \$299



The Little Black Book lets you enter phone numbers and addresses and provides fields for grouping callers by category or writing notes to yourself.

*Requirements: 384K (512K recommended), one disk drive, DOS 2.00 or later version (hard disk recommended)*

*Not copy protected*

To crack today's saturated market for data managers, a program has to do it all. It must be simple enough to use for a tickler file yet capable enough to track 500 employees. Of course, it should include a data entry screen generator, a report generator, a built-in programming language and editor, and even a compiler. Oh yes—it should also cost a few hundred dollars less than *dBASE*.

At first blush, *Tas-Plus* meets all these requirements and then some. But features alone do not a data manager make, even if they include a powerful programming

language and a unique approach to structuring data. *Tas-Plus* is so confusing and poorly implemented that even a professional programmer will find it hard to master.

*Tas-Plus*'s installation program makes it easy to customize function keys, screen colors, and cursor size. Working from the program's main menu, you create and maintain data base files, interactively paint data input screens, and generate simple reports. Unfortunately, to do almost anything else—even delete a file—you have to write a program first.

Lord knows, the power is there. *Tas-Plus*'s programming language includes 86 commands with over 200 options. FOR...NEXT...ELSE and WHILE constructs are available, and structured loops can be nested up to 10 levels deep. But a language is only as powerful—and

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useful—as its editor. Though *Tas-Plus*'s editor has pulldown menus that guide you through the syntax structure, common functions for moving, copying, or deleting blocks of code aren't available. And although the editor prompts

you for the next command to enter in a program, there is no on-line help.

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One of *Tas-Plus*'s assets is its use of a data dictionary for storing file structure and field information.

One of *Tas-Plus*'s assets is its use of a data dictionary for storing file structure and field information, a technique borrowed from the mini and mainframe environments. The dictionary file holds essential information about every defined field. This enables you to modify a file's structure without having to change existing programs or massage the actual data.

You can either define a data base file from the main menu or go directly to the screen painter and define each new field as you paint the screen. As with screen generators included with traditional compilers, once you save the formatted screen, *Tas-Plus* quickly generates the relevant code. You can then edit the code, relate fields from one file to another, or add context-sensitive help routines. Simple reports are designed in a similar fashion. You choose fields to be included in the report, define conditions to be met (such as total fields), and a program representing the formatted report is generated and com-

And although the editor prompts

types: alphanumeric, numeric, time, and two date formats. You can also define characteristics such as length of field, link fields to associated data files, and specify that a field is to be indexed.

*Tas-Plus* can open 16 data files at once and 65,000 records in any one file. You can define as many fields for each file as memory allows and identify up to 16 different fields as keys for indexing. Each field can be 255 characters long, with a limit of 10,254 characters per record, and a program can swell to 64K in size. (Business Tools also sells a developer's version of *Tas-Plus* that allows up to 17 million records per file and 32 indexes per record.) In addition, *Tas-Plus* saves disk space by storing date and numeric data in the binary coded decimal (BCD) format.

Unfortunately, *Tas-Plus* is handicapped by internal quirkiness. It lacks a hierarchy of operations in arithmetic calculations and restricts numeric fields to an even number of decimal places. Worse, data fields that may store negative numbers must be defined with an odd number length. Thus, a field defined with a length of 9 can hold -100, while a field length of 10 cannot.

Any data base package with few utilities that requires programming for anything but the most rudimentary procedures must have comprehensive, easy-to-follow documentation. Here again *Tas-Plus* falls short. It explains programming commands poorly, lacks on-line help, and fails to give examples of source code.

At press time, Business Tools was planning to release *Tas-Plus* version 3.0, which is supposed to have new documentation and a new file structure. It's probably just as well, because with all of its oddities, version 2.07 isn't likely to put *dBASE* out of business.

—Hal Chapel

*Charles Seiter is a Northern California writer and consultant on scientific programming and computer languages. Ken Smith is a technical support supervisor for a large software company in San Rafael, California. Donald B. Trivette is the author of A Quick and Easy Guide to Dow Jones News/Retrieval (Compute Books, Greensboro, NC, 1987). John Walkenbach is a manager of consumer research at a major savings and loan association in Southern California. Jordan Breslow is an attorney in Walnut Creek, California, who specializes in computer law. Hal Chapel is with Pacific Business Solutions in San Francisco, a consulting firm that studies data base management systems. He is a co-author of Revelation Revealed (Paradigm, San Francisco, 1986). ●*

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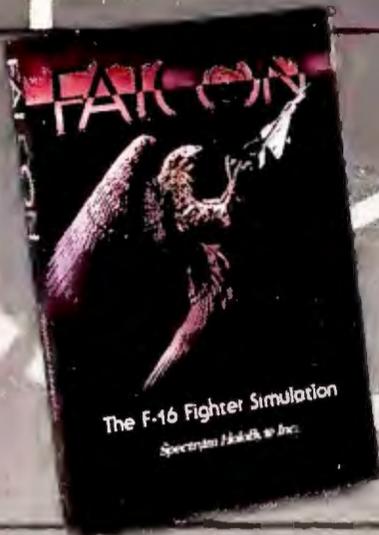
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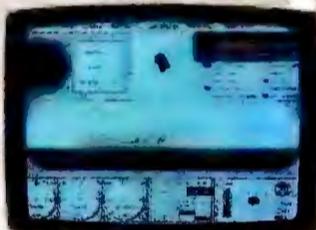
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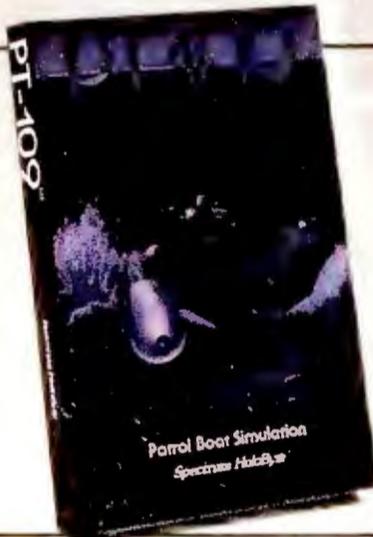
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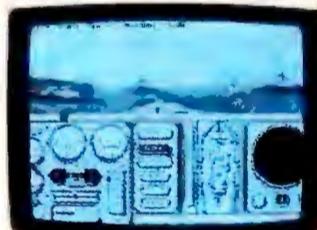
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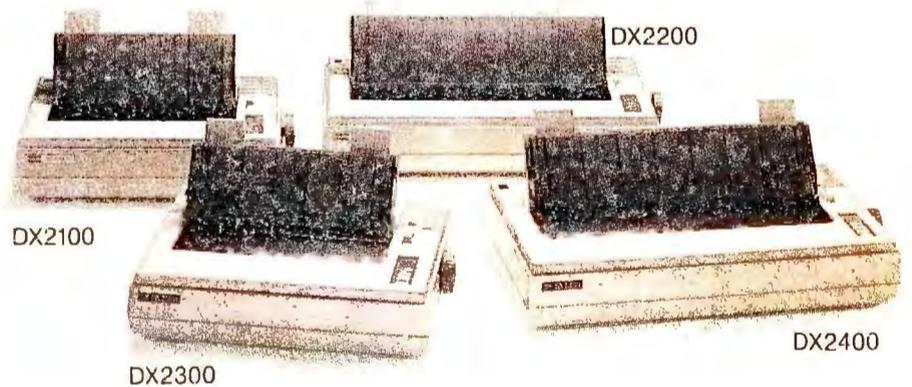
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# A Model for Mail Order

Cofounders Patricia Gallup and David Hall have seen some pleasant returns from PC Connection's emphasis on customer service.



Behind-the-scenes services boost PC Connection to a leading role in mail-order sales.

*Becky Batcha*

When the subject turns to mail-order houses, horror stories spill out from CompuServe's IBM hardware special-interest group. But surfacing from the torrent of complaints about premature and unauthorized credit card charges, lengthy waits for merchandise, and hefty shipping costs are some words of praise for Peter Haas.

"I guess that leaves Peter Haas as the only honest firm in the business," one correspondent writes. "I would have preferred to buy from Peter," agrees another. "Who is Peter Haas?" a newcomer asks. "Peter runs PC Connection. His prices are not always the lowest, but he tells you honestly whether stuff is in stock and when you might expect it."

Although his on-line friends might be surprised to hear it, Haas doesn't actually run PC Connection, a thriving mail-order operation in Marlow, New Hampshire. He serves strictly as director of customer affairs. But it says much about PC Connection's approach that its customer service manager looks like the chief executive.

PC Connection is an anomaly in the cut-rate mail-order world, where customers usually surrender good service for low prices. "We've always wanted to give

more support than people can even believe," declares cofounder and chief executive officer David Hall.

At one extreme, the company currently is constructing a million-dollar, broadcast-quality facility that will produce free videotaped instructions on such tricky procedures as installing hard disk drives. On a much smaller scale, the firm boxes up shipments with an expensive low-static brand of Styrofoam, so that when customers open a package, the Styrofoam doesn't cling to their hands.

But PC Connection's reputation rests on more traditional customer service. Technicians working the toll-free support line are told to help customers in any way possible—even if it means walking a caller step by step through a lengthy installation. A 120-day warranty backs every item sold, and PC Connection typically delivers goods within two days after a customer calls in an order. To avoid confusion, the firm charges a flat \$2 shipping charge for most orders.

"You are looking at a straight-up operation, and in this world there aren't many of them," comments Barbara Lee Chertok, who writes a consumer column in the Boston Computer Society's *PC Report* newsletter. Chertok collects and reports grievances about mail-order houses, but she's never

received a letter condemning PC Connection: "All I have is racks of testimonials."

The strongest complaint customers level against the firm concerns its long-standing policy of refusing American Express payments. Hall has spurned American Express because its service charges cut too deeply into his slim profit margins, but he's seeking a way to bring it into the fold. "To be more competitive," he explains, "you have to offer more services."

### Special Services

Almost every facet of PC Connection's operations is designed to satisfy buyers. Behind the scenes, customer affairs director Haas taps into CompuServe to monitor conversations about computer sales, and he closely follows calls that come into the technical-support line. If enough customers call for help installing a board or a software package, PC Connection writes custom documentation for it and shrink-wraps it along with the product.

Each day, distribution manager Don Kincaid drafts short tutorials that teach workers about the items they are packing, and tapes them on a table near the warehouse entrance. If employees

know something about what they are packing, Kincaid reasons, they are less likely to ship the wrong item. PC Connection sells about 2000 separate items, and Kincaid and his staff claim better than 99 percent accuracy in shipment.

PC Connection's Mac Connection subsidiary recently switched couriers from UPS to Airborne so that it can offer next-day delivery

otic resources such as directories of PCjr parts suppliers (to direct the many inquiries from owners of that orphaned machine).

By company decree, PC Connection's sales representatives are well educated and well spoken. Everyone hired to handle the phones must hold a bachelor's degree, or an associate's degree in computer science or business.

*If enough customers call for help installing a board or a software package, PC Connection writes custom documentation for it and shrink-wraps it along with the product.*

nationwide for orders placed as late as 8 p.m. Eastern time. If all goes well, the parent company will do the same.

The firm rewrote the order-processing software that runs on its IBM System/38 minicomputer so that it charges buyers' credit cards only when the order has been filled. The software is also designed to make the quantity-on-hand entry for each inventory item blink on and off when stock runs low.

PC compatibles sit next to the telephone-sales terminals, and sales representatives are encouraged to bone up on the software that they're selling. More traditional customer-support aids are also at hand. Hanging on the walls of representative Kevin Damon's tidy cubicle, for example, are a UPS delivery zone map, area-code/time-zone maps, and es-

Although telephone-sales slots at a mail-order company in the remote reaches of New Hampshire might seem an unlikely spot to find a group of well-trained men and women, PC Connection has little trouble recruiting qualified prospects, according to cofounder and president Patricia Gallup. It helps, of course, that "there're not a lot of large corporations around here," she says.

Sales reps often move on to positions in purchasing and technical support, and managers are liberal with their encouragement. "If you do a good job, people notice," says sales rep Damon. He admits that order entry can get repetitious but says the challenge of staying abreast of technical details and the fascinating variety of callers help to counter tedium.

### ■ Mixing It Up

PC Connection sells to about 14,000 entrenched corporate accounts, but when sales reps pick up the phones, they are as likely to take a teenager's order for game software as they are to sell a micro manager a hundred floppies, Hall says.

The mail-order house does most of its business in small quantities, and its typical home buyer spends less than \$1000 per year. Since margins on mail-order sales can be perilously thin—as low as 10 percent above manufacturer's price on really hot-selling items—PC Connection needs to attract hordes of customers in order to turn a profit. The company ships thousands of orders a day.

When magazine articles, special-interest-group discussions, and customer requests indicate an up-and-coming market, PC Connection tries to strengthen its offerings in that field. When demand simmers down, PC Connection keeps the products in stock—rarely dropping them for any reason other than shoddiness, Hall says—but advertises the items less aggressively.

From the start, Hall says, PC Connection has attempted to supply anything and everything a user needs for personal computing—except the PC itself. "We were plenty busy with what we were doing; we didn't need to get into computers," Hall explains. But now PC Connection is looking to expand and will offer PCs through the mail by year's end. Hall says he has no fears about shipping full systems. "Anything you buy in a store—how did it get there?" he asks.

Mail-order houses typically undercut retail prices 30 to 40 percent by combining high volume,

low overhead, and (usually) minimal customer support. With PC Connection's policy of full support has come a reputation for slightly higher prices, but Hall challenges that perception. "Do we charge more because we offer more services? No. Not intentionally."

### ■ On the Mail Trail

Hall and Gallup met on the Appalachian Trail in 1975, when lone hiker Hall joined up with Gallup's 17-member party. Hall later convinced Gallup to help him run his father's audio supply company. In 1982, the two formed PC Connection.

At start-up, Hall and Gallup never expected PC Connection's dramatic success, but they did figure that a mail-order house built on good service principles was bound to fill a need.

Many of the young company's policies arose from insults its founders had suffered as consumers. Hall was once told to send a stereo component to Japan for service. Another time, a mail-order outfitter prematurely charged his credit card for a backpack that took weeks to arrive. "We said, whoa, we never want this to happen to our customers," Hall says.

When the two began advertising, they chose to stress the company's rural setting. Their trademark raccoons and the town of Marlow (population: 540 or thereabouts) still figure heavily in ads. Most computer companies want shiny high-tech images, but Gallup and Hall felt uncomfortable advertising that way. "We were not like that," Gallup remarks. They also realized that the

pastel drawings would stand out in the crowd.

Mail order, an acquaintance told them, was a mysterious black hole. You pitched your ads into the hole, and orders came bounding out. "We wondered when that would start happening for us," Hall remembers. At first, orders merely trickled in, but the trickle soon turned into a steady stream.

Convincing software and accessories vendors to sign on with a start-up mail-order firm was a chore, and most established manufacturers required cash up front, Hall says. But newcomers like

■ *Everyone hired to handle the phones must hold a bachelor's degree, or an associate's degree in computer science or business.*

AST Research cooperated wholeheartedly. "It was starting up when we were," Hall says, and was happy to gain the exposure. As PC Connection gained momentum and a large customer base, major manufacturers began asking Hall and Gallup to peddle their wares.

Two years ago, the firm endured a two-month-long episode of mail-order bashing, Hall says. Out of the blue, major manufacturers and software developers tried to choke off supplies to mail-order firms. However, this quarrel has been patched up. "Many of the top ten hardware and software vendors were not interested in mail order at all," he says. "Now they're much more interested."

While many consumers continue to view such resellers with distrust, mail-order houses accounted for almost one-fifth of the \$6.5 billion in PC software sales last

year, according to Alice Brown, president of the market research firm Store Board in Dallas. International Data Corporation of Framingham, Massachusetts, puts mail-order computer sales at 4 percent of the market. Peripherals and accessories are more difficult to track because of the abundance of garage operations.

Providing loads of customer service is one of the strongest new trends in mail-order selling, adds Brown, who cites PC Connection, 800 Software, and Corporate Software as examples. While many bargain-basement outlets

fold up or slide into Chapter 11 reorganization, companies with more dedication to their customers seem likely to prosper, she predicts. Today, PC Connection employs 150 and is investing about \$4 million in a new headquarters and other facilities.

As other entrants crowd into PC Connection's niche, Hall emphasizes the need to keep broadening customer services. "Sooner or later, there comes a point where you can't keep doing new things," he says. "But I don't know where that point is." ●

|| *Becky Batcha is a freelance writer based in Boston.*



**“The little guy’s IBM,”  
Tandy Corporation owes  
its Fort Worth high-rise  
and \$3.5 billion in annual  
revenues to small business  
and home sales.**

# The Little Guy's Big Blue

»

Once almost counted out of the computer market, Tandy has struck it rich selling one PC at a time.

*Mark Henricks*

||||| As any big-ticket computer buyer among the Fortune 1000 will tell you, nobody ever got fired for buying IBM. On the other hand, signing a purchase order for a Tandy Corporation computer has typically been a less defensible decision along the corridors of America's largest corporations. Imagine telling the board or your boss, "We got ours at Radio Shack."

A tacky-tacky retail image, a propensity for backing the wrong operating system at the wrong time, and a reputation for trailing-edge hardware have kept the personal computer pioneer virtually locked out of downtown skyscrapers. So what do a bunch of hardball players from Fort Worth do when they can't break into the majors? They do what any good marketing organization would do: hit 'em where they ain't. And that, in brief, has been the company's winning strategy.

Tandy may not impress the three-piece-suit-and-wingtip crowd, but Radio Shack may well be the company store for the little guy. As market figures show, Tandy clearly speaks the language of the home user, the work-at-home business buyer, the small business owner or manager—anyone yearning for IBM compatibility on a shoestring budget. It has even burned its name brand onto the desktops of a few medium-size companies, typically those where the data processing department begins and ends with an office full of PCs.

"Tandy computer customers won't lose their jobs if the thing doesn't connect to the mainframe in 1990," observes the Gartner Group's Bill Kirwin, "because they probably won't ever have a mainframe." The same analysts and users who once considered Tandy out of step with the times and the standards—perhaps permanently—now are calling Tandy "the IBM of small business." David Bolotsky, computer industry analyst for First Boston Corporation, puts it another way:

"Radio Shack is to consumer elec-



Robb Kendrick/Onyx



Photographs by Robb Kemrick/Oryx

Tandy has spruced up its Radio Shack stores, moving electronic component shelves to the back and computers to the front so as to better appeal to small-business computer buyers.

tronics what 7-Eleven is to convenience food.”

John Roach, the Texas-born chairman of Tandy, doesn't argue with such characterizations, although he acknowledges that it's unfashionable for a computer company to admit that its target market is anything less than the Fortune 1000. Most manufacturers orient their R&D as well as their marketing toward making that big multiple-unit score. But Roach consoles himself with the knowledge that Tandy Corporation is the world's fourth-largest computer company. It sells over 200,000 computers a quarter, and it does it the hard way.

“We pride ourselves on being able to sell one machine at a time and make money,” Roach asserts. “But we would like to continue to broaden that to where we are more than just the small company's IBM. We'd like to be the computer of preference for many.”

#### ■ The Comeback

Roach couldn't always afford such ambitions. After a fast start, Tandy had several years of hitting dry holes—product problems and marketing miscues—before this focus on the little guy brought in a gusher.

Thanks to its nationwide retail electronics network, the company got an early jump on the micro-computer business, bringing out one of the first personal computers, the TRS-80 Model I, in 1977. With CPM machines like the

TRS-80, Tandy rode the personal computer ground swell right alongside other newcomers like Apple, Commodore, and a panoply of now-forgotten companies.

But Tandy saw its market share shrivel as IBM compatibles replaced first-generation iron, and other computer retail outlets began crowding the frontage along America's highways and byways. One estimate put Tandy's 1984 share at 10 percent, less than half what it was at the beginning of the decade.

Users had become disenchanted for several reasons: a computer line based largely on the obsolete Zilog Z-80 microprocessor, a sales force whose forte was hawking transistor radios, and, of course, a “Trash-80” (TRS-80) image that repulsed the largest buyers.

When Tandy finally responded to the IBM PC market in 1983 with a merely semicompatible Tandy 2000, some figured that the company would never get its shack in order. But the late-1984 introduction of the Tandy 1000 washed back the words of skeptics like a shot of tequila. It was a very merry Christmas at Radio Shack that year thanks to the 1000, and more have followed as Tandy has gone on to build one of the industry's broadest lines of DOS compatibles.

#### ■ Small Blessings

With \$3.5 billion in annual revenues, Tandy is the biggest little seller of personal computers in Texas, shipping a total of 550,000 units in 1986. About half of those

were non-MS-DOS machines—UNIX multiuser systems, CP/M machines like the Model 4, and the Color Computer. But Tandy also galloped past fellow-Texan Compaq Computer Corporation as the leading supplier of MS-DOS compatibles last year, selling 275,000 compared to Compaq's 259,000. The pace picked up 20 percent in the quarter ended June 30, 1987, according to International Data Corporation (IDC) of Framingham, Massachusetts.

IDC predicts that Tandy will continue its leapfrog pace this year, while IBM and Compaq unit shipments level off. Some analysts even see the 80286-based 3000HL as Tandy's key to the corporate suite.

"Since Tandy brought out its 3000 line, it has gained the recognition of [larger] business as a viable alternative to IBM," asserts Stella Kelly, microcomputer systems analyst at InfoCorp.

At present, though, Tandy finds its buyers in less glamorous computer markets. Home hobbyists carted off more than a third of the company's computers in 1986, reports IDC. Educators picked up 20 percent, and business and professional users were the biggest buyers with 45 percent. Most of those were businesses with fewer than 20 employees, many operating from the home, says Lloyd Cohen, IDC manager of market analysis.

Rick Mangekian, who heads the Boston Computer Society's Tandy special-interest group, tells a typical hobbyist's tale: He started buying from Radio Shack because he could get the most computer for his money. Price, availability, quality, and a broad



**Tandy's highly automated factories help it control product quality, keep both costs and prices down, and still achieve better overall margins than most of its competitors.**

## Unit Sales of the Top Three MS-DOS-Compatibles Vendors

Source: International Data Corporation



Tandy passed Compaq Computer in 1986 to become the leading shipper of MS-DOS compatibles, with the exception of IBM. Amounts are in millions.

\*Estimate

product line are cited again and again by Tandy users as the reasons they buy from Radio Shack. The company rarely leads the market in any of these categories, but it consistently delivers a superior combination, making it a user

Surprisingly, many customers like Foy got hooked on Tandy multiuser computers such as the early Model 16 and, more recently, the Model 6000, which runs Xenix. By 1983, about half of Tandy's \$400 million in annual

*Customers can carry a broken machine—even a Model I—into any of more than 7200 Radio Shack outlets for service.*

favorite. "They buy Tandy because there is no better value," concludes First Boston Corporation's David Bolotsky.

### Keeping 'Em Running

Hardware durability is a large part of the equation. Jim Foy, president of Tangent, a 400-member Tandy business user group, has been outfitting Tandy machines with data entry programs for the past nine years. One of Foy's first customers is still punching production line data into a well-worn Model I.

"That means I have to keep one going here at the office," he gripes. But Tandy reliability keeps him writing software for Tandy machines—and recommending the hardware to customers.

The support of a broad service network is another of Tandy's strengths. Customers can carry a broken machine—even a Model I—into any of more than 7200 Radio Shack outlets for service, parts, or shipment to one of 166 better-equipped product repair facilities. Telephone support is available for \$20 a month from one of 60 regional training and support locations.

computer revenues came from multiuser computers, and the company boasted of its status as the world's largest seller of UNIX-based systems.

These days, Tandy has been outdone in that market by companies like Altos Computer Corporation and NCR Corporation. In what seems a replay of its PC troubles, Tandy did not capitalize on its early UNIX-compatible lead and has failed to introduce bigger and better systems as the technology has improved. Roach is aware of customer dissatisfaction with the current 9-user limitation on the Model 6000, but doesn't plan to develop a 15-to-20-user machine like NCR's Tower because he feels that such equipment is more appropriate to the minicomputer market.

That doesn't mean that Tandy isn't interested in selling PCs to larger data processing shops. In 1984, Tandy established the Business Products Division and, a year

later, began developing a 1000-person outside sales force to target large corporate accounts. But these efforts have met with something less than unqualified acceptance.

"From our perspective, Tandy has geared its retail outlets and most of its service toward smaller organizations," says Fred Hill, an executive at Union Camp, a \$2 billion forest products company headquartered in Wayne, New Jersey. Officials at the Fortune 200 company gasped, says Hill, when a T-shirt-clad Tandy serviceman sauntered in. And it took Hill some time to impress upon Fort Worth that he needed to be called upon by someone with a little more authority than the manager of the nearby Radio Shack. But Tandy finally cleaned up its act and began flying out corporate representatives to deal with Union Camp's brass.

It isn't easy being a Tandy corporate customer, agrees Ken Wakeman, manager of mechanization systems coordination at Bell Canada, Tandy's largest Canadian business account. "We have whip marks on our backs because we went with Tandy," he says.

It's still tough for image-conscious Bell executives to get past the Radio Shack name on the cabinet, even though the company has been a Tandy customer since the days of the Model II. It now has a network of two dozen Model 6000 multiuser systems in its Toronto-based data processing department, where Wakeman works. Bell Canada has pushed its Tandy multiuser machines to the limit and wants more power, but isn't optimistic.

## Strength in Numbers

The Tandy name didn't always connote electronics. Founder Charles Tandy got his start in 1919 as a shoe-leather manufacturer and later sold craft kits for hobbyists. The company didn't sell its first electronic item until 1963, when it bought a floundering nine-store chain in Boston bearing the Radio Shack name. Within 13 years, Tandy had sold off all of its nonelectronics units in order to concentrate on Radio Shack.

With almost 5000 company-owned stores and another 2200 franchised dealers in the United States, Radio Shack is the biggest specialty electronics retailer in the world. All of those stores sell computers—but most sell only Tandy 1000, portable, and home computers, and most remain primarily retailers of components and stereo/video gear. Another 1700 Radio Shack stores are equipped with Plus Computer Centers, which

stock a broader range of the 800 Tandy computer items. Finally, there are 400 computer-only Radio Shack stores.

President Bernie Appel, a renowned merchandiser, oversees the purchase and pricing of more than 2700 consumer items from solar cigarette lighters to boom-box radios. The company claims that more than 30 million American households shop in its stores annually. But business computer buyers often find the racks of components and general consumer electronics clutter in Radio Shack stores unappetizing. —M. H.

## Cloning a Corporate Culture

Ask a Radio Shack employee how corporate prospects treat a "Radio Shack salesperson" these days, and you'll touch a nerve.

"I'm a representative of Tandy Corporation," bristled one blue-suited rep in response. "Radio Shack is just the name that happens to be on the front of the store."

Increasingly, "The Technology Store" is being added to the name as part of a 5-year, \$80-million remodeling program launched by chairman John Roach in 1985. He intends to turn the cluttered, component-strewn "Shacks" into eye-pleasing retailing outlets that a business customer wouldn't mind entering. Components racks are being pushed to the back; items like computers and stereos have been highlighted.

The prototype scraggly bearded sales clerk with a dozen pens crammed into a plastic pocket-protector has been replaced (at least in the computer cen-

ters) by a clean-shaven professional. The new salesperson is more comfortable calling on a New York Stock Exchange company than hunting up transistors for a hobbyist.

It's a change that has come about slowly, says Graham Beachum, the former vice president in charge of Radio Shack's Business Products Division, who recently moved on to Dell Computers. When he went to Tandy from IBM three years ago, he found a deeply entrenched retailing philosophy that considered outside sales calls alien and unnecessary.

"We ran an ad in the newspaper. Customers will come to see us if they want something,' I was told when I suggested sales calls," says Beachum. So, in a departure from its tradition of promotion from within, Tandy filled most of the more than 1000 outbound sales positions created in the last two years with recruits from the likes of IBM, Digital Equipment, and NCR.

The changes are not welcomed by everyone. A few of the 600 members

of the Boston Computer Society Tandy special-interest group mailed complaints to Fort Worth last year after some well-liked sales and service personnel left Radio Shack rather than conform to the new suit-and-tie dress code. But the dress code decision came directly from John Roach, and when the chairman speaks, action follows swift and sure at Tandy Center.

It was Roach who strode into a long-range planning meeting in 1984 and informed planners that their next computer would be a low-cost, fully IBM-compatible personal computer—the Tandy 1000, which turned the company around.

Roach, who never appears publicly in anything but proper corporate attire, also personally settled the internal argument over whether the computer centers would continue to bear the Radio Shack name. Unhappily for one image-conscious sales rep, they still do. —M. H.

"Now that Tandy's a leader in sales, we're afraid that it's going to become a follower in innovation," says Wakeman. "We aren't seeing anything new in its upcoming products."

### ■ A Product Cycle Built for One

While perfectly capable of moving quickly into a promising new market, Tandy has never specialized in cutting-edge technology for its own sake. Instead, the most popular term at Tandy Center is *product cycle*.

This focus is the major difference between Tandy and other retailers and manufacturers, says

middle of a technology and, unlike most manufacturers, isn't pushed to the cutting edge by the need to impress distributors or retailers.

"Tandy doesn't have to worry about being knocked off the shelf," observes analyst Gene Glazer of Dean Witter Reynolds.

### ■ Vertical Integration

Nor is the company as vulnerable to supplier snafus as many manufacturers are. It designs and manufactures most of its own computer components—everything from circuit boards to system cabinets. Most of Tandy's computers come from one of its 22 United

product assembly. The rest is filled by testing and quality assurance functions.

Roach, who came from Tandy's manufacturing side and is a big believer in quality, bristles at some of the knocks that Tandy has taken on its merchandise. "For whatever reason, they don't expect us to have the highest quality equipment on the market," he laments. His response has been to focus more intensely on quality control.

### ■ Looking Ahead

For a long time, Tandy has been the invisible leader in the PC industry. Now, it's being recognized as one of the survivors in a business that has seen more than its share of dropouts. "The survivors of a shakeout tend to be stronger coming out of it than going into it," notes Doug Cayne of the Gartner Group.

If the fortune-tellers are correct, Tandy, which found itself shuffling toward the poorhouse a few short years ago, will soon be knocking on the penthouse door. And maybe someday soon, computer buyers worried about their jobs will open the phone book and turn past the *I's* to *T*. ●

||| *Mark Henricks is a freelance writer deep in the heart of Texas.*

*Only about 25 percent of the floor space in the Model 1000 plant in Fort Worth is devoted to actual product assembly. The rest is filled by testing and quality assurance functions.*

chairman Roach. His goal is to fully exploit demand for a particular product without getting stuck with excess inventory once the market's appetite is sated.

Tandy was a little slow entering the market for MS-DOS-compatible computers because it wanted to make sure that the product cycle had room left to run. By the same token, the company is still selling the antiquated TRS-DOS-based Model 4s that run on an underpowered Z-80. But Tandy can make money staying in the

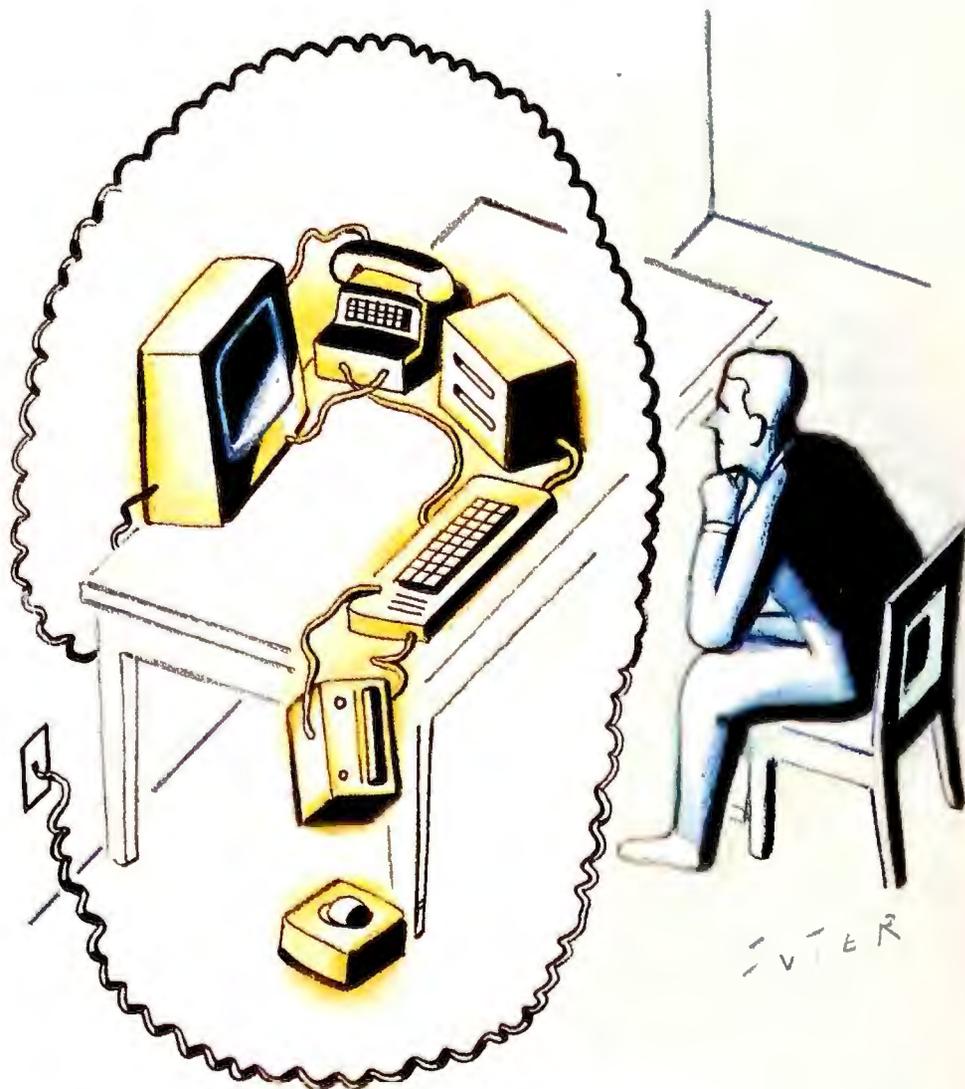
States plants, all of which are extensively automated, particularly their testing equipment. This has helped Tandy compete with low-cost foreign manufacturers without losing reliability. Being vertically integrated—from factory floor to store shelf—saves manufacturing costs and provides better R&D feedback. Best of all, Tandy can sell products at other dealers' break-even price—and still post a gross profit margin of 10 to 15 percent.

Automation also yields better control over quality assurance. Only about 25 percent of the floor space in the Model 1000 plant in Fort Worth is devoted to actual

# Computer Training: My Place or Yours?

What's the best way to train employees on computer applications? Should you do it in-house and keep control, or seek outside expertise?

*William Rodarmor*



||||| In most businesses, training employees to use hardware and software is a family affair. The office guru fine-tunes AUTO-EXEC.BAT files, launches beginners on 1-2-3, and answers distress calls. At some point, though, there are too many calls, too many crashes, too much to teach, and the guru—as well as the company—realizes something has to give. “When companies reach a certain critical mass, they get serious

about training,” says Barry Grossman, a training consultant in San Francisco. “It’s a kind of corporate coming of age.” You need only decide whether to celebrate the birthday at home or go out on the town.

As in boxing, where you train usually depends on how big you

are. Lacking the resources or expertise to do their own training, small companies most often send their employees to outside classes. The larger the organization, the more likely it is to have a formal in-house training program. Some firms straddle the issue, maintaining an internal training coordinator to both teach employees and keep current on training developments in the outside world. An intelligent mix of methods tends to produce the best results. For in-house training in popular applications, promote your gurus; for specialized needs, go shopping in the great beyond.

**■ The Merits of Training**  
 Regardless of their size, some businesses seem to resist training on principle. "Some companies view training as a necessary evil," says Marvin Bates, a marketing manager with Advanced Systems of Arlington Heights, Illinois. "They have the philosophy that they hire people with the right skills and turn them loose, but all that begins to crumble when the mix of employees and technology changes."

Resistance is usually due to the amount of time and money training can eat up. "You have to consider how much you are willing to invest to bring people up to their former level of productivity and then train them to surpass it," says Ann Beck of Entré Computer Centers, a national chain of training franchises based in McLean, Virginia. Yet the company that downplays training may need it the most. Since it takes about 100 hours to master a program like 1-2-3, an untrained employee may flounder for months before learning to use it effectively—making undetected errors all the while. This translates into poor productivity, bad morale, and sloppy customer service. Even big companies find they need outside training when they make major investments in new hardware or programs. Some companies turn to outside trainers for personalized training, such as one-on-one consulting for busy managers. Others start by sending their key staff

trainers to outside classes, then gradually start doing more training in-house.

**■ In-House Training: You Keep Control**  
 Morrison and Foerster, a California law firm with over 300 attorneys, recently bought new hardware and software and is determined to keep pace with both. "It would be ridiculous to invest in all this equipment and not keep our skills up," says Nancy Siegel, the firm's director of administration. "Besides, our clients expect us to be at least as automated as they are."  
 At the firm, a full-time coordinator oversees an extensive program designed to train first the secretaries and then the attorneys, mainly in word processing. "There's a tremendous difference between the two groups' training," says Siegel. "We take the secretaries away from their desks for two weeks; the attorneys get 15 hours of training." Because both groups are trained on the same programs and equipment, however, their skills dovetail nicely.

In-house training by company staffers provides control down to the lowest level of the business, and it can be personalized. Trainers know the students and their jobs and adapt material accordingly. "We try to tailor classes to the kind of work we do," says Nina Schmidt, a staff trainer with the large Kaiser Permanente health maintenance organization in Walnut Creek, California. "In our 1-2-3 worksheets, for example, we use hospital beds instead of apples and oranges." Scheduling tends to be simpler with in-house training: Just move into the conference room for a couple of hours, at a time that suits employees. Finally, one of the main benefits of staying in-house is that the training can embody the philosophy of the company. "We don't want to train people to use a tool in a vacuum,"

*Training materials were once the domain of traditional book publishers, but increasingly the training field is generating its own materials.*

says Nancy Siegel, "but to show them how to use it at Morrison and Foerster."

If you are committed to doing it right, however, in-house training can be both expensive and inconvenient. You have to pay staff trainers to find or develop materials and keep them up to date. Getting equipment can be a problem; you can't just commandeer a half-dozen computers for the afternoon. Finally, keeping current with a fast-changing field puts

pressure on the office trainer. You need someone who can do the necessary hand-holding and does not blanch when a department head walks in with a brand-new piece of software and asks, "Can you teach my people this?"

#### Outside Help:

##### Expertise on Demand

Many organizations do some training themselves but turn outward when a small number of employees need to be trained on sophisticated applications. "If it's a matter of training 20 people maximum and a one-shot deal, Wells Fargo won't do it using in-house trainers," says Marty O'Keefe, technical training officer for the bank's information services in San Francisco. "Especially for technical subjects, we pick people with a lot of experience in

staffers in advanced 1-2-3, for example, it supplies the teacher, who brings along an outline, trainer's guide, student workbooks, overhead transparencies, and data disks with exercises.

#### Multimedia Choices:

##### Something for Everyone

If you need training in such subjects as LAN applications or exotic telecommunications programs, word of mouth will turn up the right training organization. But what if you want to train employees in a half-dozen popular applications without spending a fortune? So many training resources are available, the problem isn't whether but which (for a sampling of resources, see the sidebars "Hitting the Books" and "Now See the Movie").

Training materials were once the domain of traditional book publishers, but increasingly the training field is generating its own materials. Advanced Systems, for example, is not only a large training company but also a major publisher; it has created more than 3000 courses, most with ancillary videotapes, computer-based training (CBT) disks, and interactive videodiscs. Interestingly, the medium people choose often has a lot to do with their feelings about the subject matter. "The people who come in for instructor-led training tend to be computerphobic," says Ann Beck of Entré. "They need a human instructor who can respond to looks of fear or confusion and set the tone for learning."

The training environment also helps define the most suitable medium. Among nonpaper media,

a given area, and they just come in and start teaching."

Even a company with extensive training facilities sometimes chooses to go outside. Kaiser Permanente Computer Services' 20 staff trainers annually train some 2000 employees from Kaiser's northern California network of hospitals, clinics, and regional offices. "We teach the generic applications ourselves," says Nina Schmidt, "but we hire out for instructors in advanced courses, and they bring their own courseware." When Know How Incorporated of San Francisco trains Kaiser

videotapes are a natural for class settings, whereas CBT is most helpful to individuals at their desks. For example, American Training International of Los Angeles distributes a line of Quick-Ref CBT disks with pop-up help menus to succor the stranded. Top executives who might feel awkward sitting in a class with more experienced juniors may opt for the self-paced privacy of audio-cassette/disk combinations.

### Training Is Where You Find It

In the final analysis, good training always comes from people, whether within the company or outside. Says Advanced Systems' Marvin Bates, "Someone in personnel may take a new employee aside and say, 'I'm not a 1-2-3 expert, but I can show you how to bring up a worksheet and create a graph.'" Members of more formal training classes are likely to help each other after graduation. Once you've spent time in a training course with fellow employees—especially in a small class with lots of hands-on work—you have someone to call when you forget how to use a style sheet in *Microsoft Word*.

Sadly enough, it often pays *not* to train employees in the subjects that most appeal to them. "You have to distinguish between needs and wants," says the in-house trainer at a large West Coast publishing company. "Everybody here wants to learn about desktop publishing, but the company would probably be better off if the employees just improved their typing." ●

## Now See the Movie

*William Rodarmor and  
Scott Spanbauer*

▷

While books are still the most popular training medium, other media are fast catching up. Audio-tapes and videotapes simulate live teaching, computer-based training (CBT) offers help at the keyboard, and interactive training videodiscs are breaking new ground. Combining the storage capacity of the disk with the power of the PC, videodiscs can score tests, accumulate information about the trainees, and tailor instruction while it's under way.

### PC Basics and DOS

*The Complete PC  
Tutorial*

*Intouch Computing  
clo Driver Canning  
1000 Quail St. #190  
Newport Beach, CA  
92660  
714/851-6202  
CBT; \$79.95*

*DS Tutor 1.1  
Design Software*

*1275 W. Roosevelt Rd.  
West Chicago, IL 60185  
800/231-3088  
CBT; \$39.95*

*Introduction to MS-DOS  
Servcom Training  
1717 W. 16th St.  
Tempe, AZ 85281  
800/448-8669, :  
602/968-2699  
Videotape; \$245*

*Learning DOS  
Microsoft Press  
16011 N.E. 36th Way,  
Box 97017  
Redmond, WA  
98073-9717  
206/882-8080  
CBT; \$49.95*

*MS/PC-DOS Set (Intro-  
ductory and Advanced)  
Anderson Soft-Teach  
2680 N. First St.  
San Jose, CA 95134  
408/434-0100  
Books, disks, videotapes;  
\$495*

*PC Instructor  
Individual Software  
1163-I Chess Dr.  
Foster City, CA 94404  
415/341-6116  
CBT; \$49.95*

*(continues)*

*William Rodarmor is an  
Assistant Editor for PC World.*

*PC Primer*  
 American Training Int'l  
 12638 Beatrice St.  
 Los Angeles, CA 90066  
 213/823-1129  
 Videotape; \$295

*Professor DOS*  
 Individual Software  
 CBT; \$59.95

*Running MS-DOS*  
 American Training Int'l  
 Videotape; \$495

*Teach Yourself DOS 3.2*  
 American Training Int'l  
 CBT; \$49.95

*Video DOS*  
 Telemedia Concepts  
 702 Washington St. #5  
 Marina Del Rey, CA  
 90292  
 213/394-8301  
 Videotape; \$49.95

### Word Processing

*All-Hands-On*  
*WordPerfect*  
*Hands-On Learning*  
 3 Courthouse Ln.  
 Chelmsford, MA 01824  
 800/537-0040  
 CBT; \$81

*DisplayWrite 4.0*  
 Anderson Soft-Teach

*Books, disks, two*  
*videotapes; \$495*

*DisplayWrite Learning*  
*System*  
 American Training Int'l  
 Videotape; \$495

*Using WordStar*  
 Telemedia Concepts  
 Videotape; \$95,  
 executive edition \$195

*WordStar*  
 Comprehension Research  
 89 Sturges Hwy.  
 Westport, CT 06880  
 203/255-6539  
 Audiotape-CBT; \$195

### 1-2-3

*Advanced Training for*  
*the Lotus 1-2-3*  
*Program*  
 Intellisance Corp.  
 1885 Lundy Ave.  
 San Jose, CA  
 95131-1899  
 408/432-0430  
 CBT; \$124.95

*All About Lotus 1-2-3*  
 Houghton Mifflin Co.  
 2 Park St.  
 Boston, MA 02108  
 617/725-5000  
 CBT; \$110

*All-Hands-On 1-2-3*  
*Hands-On Learning*  
 CBT; \$81

*Inside 1-2-3*  
 Hayden Book Co.  
 4300 W. 62nd St.  
 Indianapolis, IN 46268  
 800/428-7267  
 CBT; \$49.95

*Introduction to Lotus*  
 1-2-3  
 Servcom Training  
 Videotape; \$245

*Lotus 1-2-3 Learning*  
*Systems (versions 1a*  
*and 2)*  
 American Training Int'l  
 Videotape; \$495

*More About Lotus 1-2-3*  
*Commands*  
 Servcom Training  
 Videotape; \$245

1-2-3  
 Comprehension Research  
 Audiotape-CBT; \$195

*Teach Yourself Lotus 1-2-3*  
 Intellisance Corp.  
 CBT; \$124.95

*Templates of Doom*  
 Solar Systems Software  
 8105 Shelter Creek  
 San Bruno, CA 94066  
 415/952-2375  
 CBT; \$49.95

Using Lotus 1-2-3  
Telemedia Concepts  
Videotape; \$95,  
executive edition \$195

## dBASE

dBASE III  
Comprehension Research  
Audiotape-CBT; \$250

dBASE III Learning  
Systems  
American Training Int'l  
Videotape; \$495

dBASE III Plus  
Comprehension Research  
Audiotape-CBT; \$250

Individual Training for  
dBASE III  
Individual Software  
CBT; \$69.95

Individual Training for  
dBASE III Plus  
Individual Software  
CBT; \$69.95

Inside dBASE III  
Hayden Book Co.  
CBT; \$49.95

Using dBASE III  
Telemedia Concepts  
Videotape; \$95,  
executive edition \$195

Using dBASE III Plus  
American Training Int'l  
Videotape; \$495

Using dBASE III Plus,  
Telemedia Concepts  
Videotape; \$95,  
executive edition \$195

## Miscellaneous Applications

Desktop Publishing  
Learning Systems  
American Training Int'l  
Videotape; \$495

Multiplan  
Comprehension Research  
Audiotape-CBT; \$195

SuperCalc  
Comprehension Research  
Audiotape-CBT; \$195

Symphony Learning  
System  
American Training Int'l  
Videotape; \$495

Teach Yourself Multiplan  
on the IBM PC  
Intelligence Corp.  
CBT; \$99.95

# Hitting the Books

William Rodarmor and  
Scott Spanbauer

"Training is everything,"  
writes Mark Twain. "The  
peach was once a bitter  
almond; cauliflower is  
nothing but cabbage with  
a college education."  
Books were Twain's own  
specialty and still reign  
as the kings of portable  
knowledge.

## PC Basics and DOS

Inside the IBM PC  
Peter Norton  
Brady Books/Prentice  
Hall, New York, 1986  
\$21.95

MS-DOS Bible,  
2nd edition  
Steve Simrin/The Waite  
Group  
Howard W. Sams & Co.,  
Indianapolis, 1987  
\$22.95

MS-DOS User's Guide,  
2nd edition

(continues)

*Chris DeVoney*  
*Que Corp., Indianapolis,*  
 1987  
 \$21.95

*PC-DOS Workbook*  
*Sheila Ewing*  
*Que Corp., Indianapolis,*  
 1985  
 \$24.95

*Running MS-DOS,*  
*2nd edition*  
*Van Wolverton*  
*Microsoft Press,*  
*Redmond, WA, 1985*  
 \$21.95

*Tricks of the MS-DOS*  
*Masters*  
*John Angermeyer, Rich*  
*Fahringer, Kevin Jaeger,*  
*and Dan Shafer/The*  
*Waite Group*  
*Howard W. Sams & Co.,*  
*Indianapolis, 1987*  
 \$24.95

*Understanding MS-DOS*  
*Kate O'Day and John*  
*Angermeyer/The Waite*  
*Group*  
*Howard W. Sams & Co.,*  
*Indianapolis, 1986*  
 \$16.95

*Using PC-DOS versions*  
*3.0 and 3.1*  
*Chris DeVoney*  
*Que Corp., Indianapolis,*  
 1987  
 \$22.95

*Working with MS-DOS 3.2*  
*Weber Systems Inc. staff*  
*Weber Systems,*  
*Chesterland, OH, 1987*  
 \$19.95

### Word Processing

*Advanced WordPerfect*  
*Eric Alderman and*  
*Lawrence Magid*  
*Osborne/McGraw-Hill,*  
*Berkeley, CA, 1987*  
 \$18.95

*The Best Book of*  
*WordPerfect*  
*Vincent Alfieri*  
*Hayden Book Co.,*  
*Indianapolis, 1987*  
 \$19.95

*Microsoft Word Style*  
*Sheets*  
*Peter Rinearson and*  
*JoAnne Woodcock*  
*Microsoft Press,*  
*Redmond, WA, 1987*  
 \$17.95

*Using DisplayWrite4*  
*David Busch*

*Que Corp., Indianapolis,*  
 1987  
 \$19.95

*Using Microsoft Word,*  
*2nd edition*  
*Masha Zager and Claire*  
*Chase*  
*Que Corp., Indianapolis,*  
 1987  
 \$19.95

*Using WordPerfect,*  
*3rd edition*  
*Walton Beacham and*  
*Deborah Beacham*  
*Que Corp., Indianapolis,*  
 1987  
 \$19.95

*Using WordStar*  
*Steven Ditlea*  
*Que Corp., Indianapolis,*  
 1987  
 \$18.95

*Word Processing Power*  
*With Microsoft Word,*  
*2nd edition*  
*Peter Rinearson*  
*Microsoft Press,*  
*Redmond, WA, 1986*  
 \$19.95

## 1-2-3

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*The Best Book of Lotus  
1-2-3 version 2.0,  
2nd edition*  
Alan Simpson  
Howard W. Sams & Co.,  
Indianapolis, 1986  
\$19.95

*Douglas Cobb's 1-2-3  
Handbook*  
Douglas Cobb  
Bantam Books, New  
York, 1987  
\$22.95

*Instant Lotus 1-2-3*  
Lawrence MacKinnon  
and Lynne Lawson  
Weber Systems,  
Chesterland, OH, 1987  
\$7.95

*Lotus 1-2-3 Release 2.0:  
ASAP, a Self-Teaching  
Guide*  
Andrew Williams  
John Wiley & Sons,  
New York, 1986  
\$19.95

*1-2-3 Tips, Tricks, and  
Traps, 2nd edition*  
Dick Andersen and  
Douglas Cobb

*Que Corp., Indianapolis,  
1986  
\$19.95*

*Using 1-2-3, special edition*  
Douglas Cobb and  
Geoffrey LeBlond  
Que Corp., Indianapolis,  
1987  
\$24.95

## dBASE

*The Complete Guide  
to dBASE III, a Self-  
Teaching Guide*  
Phil Greenberg and Rita  
Greenberg  
John Wiley & Sons,  
New York, 1986  
\$22.95

*dBASE III Plus Handbook,  
2nd edition*  
George Chou  
Que Corp., Indianapolis,  
1986  
\$19.95

*dBASE III Plus, Things  
the Manual Didn't  
Tell You*  
Neil Dunlop  
Weber Systems,  
Chesterland, OH, 1987  
\$19.95

## Miscellaneous Applications

*Desktop Publishing Bible*  
The Waite Group (James  
Stockford, ed.)  
Howard W. Sams & Co.,  
Indianapolis, 1987  
\$24.95

*R:base System V Users  
Guide, 2nd edition*  
Allen Taylor  
Que Corp., Indianapolis,  
1987  
\$19.95

*Using Enable, 2nd edition*  
Charles Spezzano  
Que Corp., Indianapolis,  
1987  
\$21.95

*Using MultiMate  
Advantage, 2nd edition*  
Kate Barnes  
Que Corp., Indianapolis,  
1987  
\$18.95

|| Scott Spanbauer is a  
PC World Editorial  
Assistant.

# The Billion-Dollar Bet

Boom and bust industries produce dramatic stories. Witness this tale of Bill Millard's ComputerLand—from its obscure origins to its lucrative heyday to its complex court battles.

*Jonathan Littman and  
Marlene Nesary*

*From Once Upon a Time in  
ComputerLand by Jonathan  
Littman, © Jonathan Littman  
Published by Price Stern Sloan  
Inc., Los Angeles, CA*

||||| *In 1984 Forbes declared Bill Millard the 27th richest man in America. Millard himself boasted, "I am the biggest winner of all in the microcomputer industry." There's no doubt that Millard was an early winner—incorporated in 1976, his ComputerLand took off with the introduction of the IBM PC. Sales swelled from \$61 million in 1981 to over \$1.4 billion in 1984, and by 1984's close, more than 783 ComputerLand franchises operated in 24 nations.*

*But just as suddenly Millard's luck seemed to run out. The market for personal computers slumped, ComputerLand's sales fell off dramatically, and through a strange twist of fate, a \$250,000 promissory note threatened Millard's vast empire. By 1985 Forbes had a new tag for Millard: "The Beleaguered Billionaire."*

In 1973, on the edge of what was to become Silicon Valley, Bill Millard formed a computer consulting company called IMS Associates. At first, it was a one-man show, with Millard marketing his

experience with IBM mainframes to people who wanted custom applications. But he wasn't worried about the modest start; Bill Millard had plenty of confidence. It was even rumored that he was the only person ever to flunk the IBM sales school and still be allowed to continue in the company. He was simply a born salesman.

In the early 1970s Millard took a self-improvement course from another born salesman, Jack Rosenberg, who had formerly sold Grolier encyclopedias and used cars. Before long, Rosenberg changed his name to Werner Erhard and went into the seminar business. Est—an acronym for Erhard Seminars Training—was one of the most popular self-improvement seminars of the era.

Millard always kept nearby a little tan pamphlet of aphorisms written by Erhard. His favorite:

If you keep saying it  
the way it really is  
eventually your word  
is law in the universe.



Ed Kashi

Bill Millard eyed the early computer market with the same keenness and clarity he directs toward the camera.

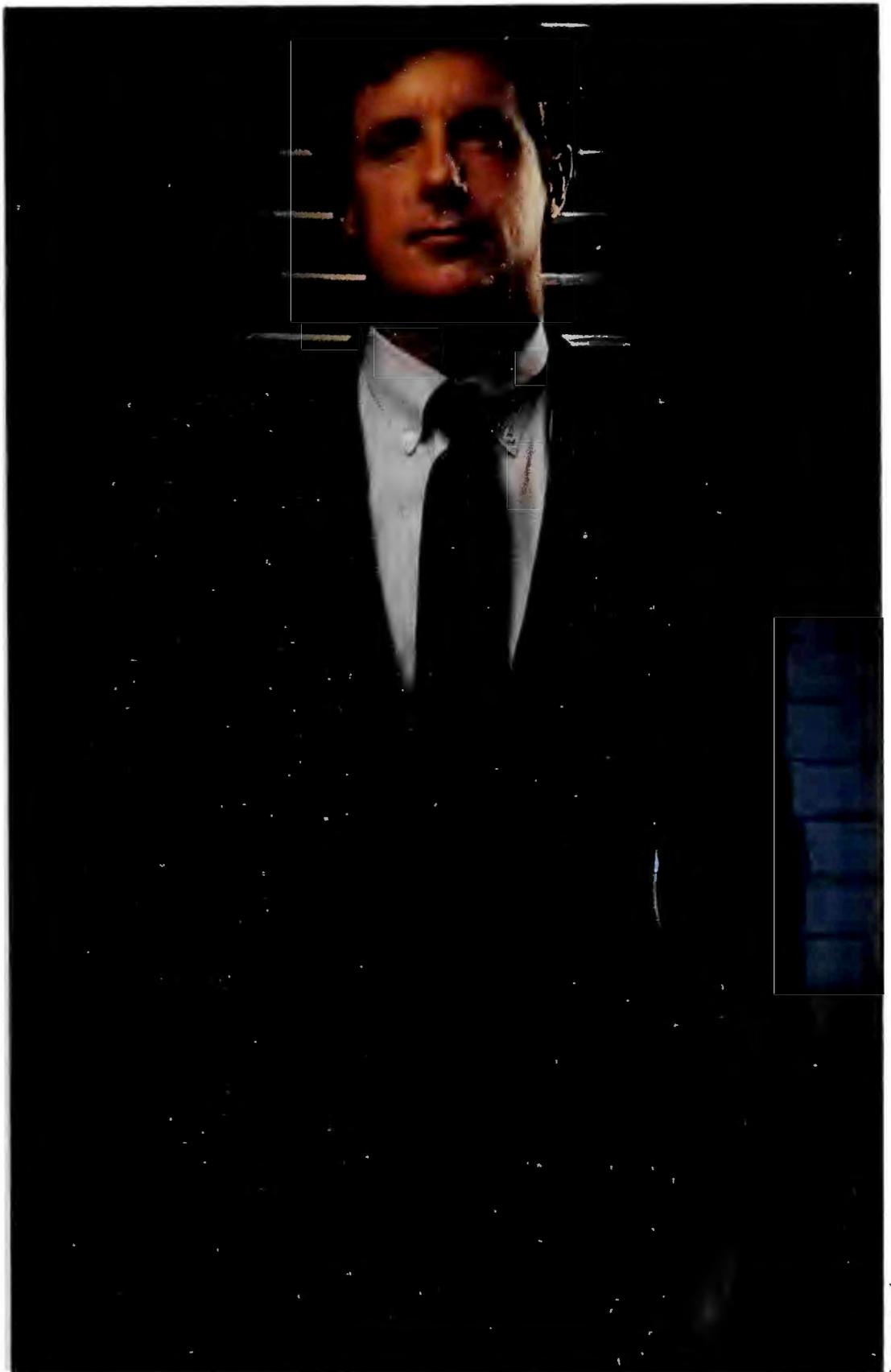
### ■ First Partner

In 1974, Millard met Philip Reed III, a New Mexico car dealer who had been struggling to tie his offices together with Wang computers. Wang referred Reed to Millard's consulting firm in Northern California in the hope that IMS could help with Reed's networking idea.

Reed and Millard quickly struck up a deal—and a friendship. Reed would finance the networking project, and Millard would pay him royalties if the technology sold to a broader market than auto dealerships.

The solution to Reed's networking problem came from an unexpected quarter. Soon after a 1975 *Popular Electronics* issue featured the MITS Altair micro-computer on the cover, IMS engineers Joseph Killian and Bruce Van Natta came to the conclusion that perhaps they could use the Altair to help link Reed's network of dealerships. An idea began to crystallize: develop a network for Reed using the Altair (or something like it), but retain the rights to sell it outside the automotive dealer business.

They went to Millard with the scheme of building their own microcomputer. Millard tossed in a bit of advice: make sure it was rugged and commercial. Killian called up one of Millard's part-time engineers and asked if they could use his Altair to help design their own computer. He agreed. Killian defined the structure of the Altair, laid out the accessory boards that would fit inside, designed the front panel, did all the chassis drawings, and wrote the 4K BASIC software programs that the thing would run on.



Van Natta carried it one step further: IMS had money problems, right? Why not put an ad in *Popular Electronics* and sell their own computer kit? The MITS Altair was already selling 1000 units a month. If IMS sold only 50 computers a month at \$500 each, with say, a \$200 profit margin—that would be \$10,000 a month!

The ad in *Popular Electronics* was small and the print fine, but it included prices for the IMS kit as well as several other computer products. No one at IMS worried

In 1975 Philip Reed's networking problem sparked the IMS computer kit.

that the products weren't available, or that Killian hadn't even finished the design for the computer. They took deposits for their as-yet-unfinished computer, and set their first shipping date for November 1975.

## The Pace Picks Up

How it started nobody quite remembers, but Van Natta noticed that in a long hallway in IMS's offices, as people moved from one office to another, they were picking up the pace. One day as he trotted down the hall, he noticed somebody else trotting by him. "What in the world is that person running for?" he wondered. Only then did Van Natta realize that he too was running.

*Reed and Millard quickly struck up a deal—and a friendship. Reed would finance the networking project, and Millard would pay him royalties if the technology sold to a broader market than auto dealerships.*

Travel time "was an interruption," he remembered. "It was no-time."

Lunch was also no-time. It helped that Killian, Van Natta, and Reed didn't eat much lunch. Millard always kept peanut butter and soda crackers in his lower right desk drawer. If anybody was hungry, Millard would dole out a cracker topped with peanut butter. One day an old refrigerator appeared, then a redwood picnic table. Jelly was added to the menu, and there was milk to wash it down. Later, cold cuts were provided. The enthusiastic Van Natta saw a practical reason for the free lunch: "If we kept good food in there, people wouldn't wander out for lunch, and you'd get more work out of them."

Christmas was bountiful for Bill Millard and IMS. They had shipped 50 computer kits, more or less on time, and Millard projected they would ship 250 in Jan-

uary. They had met their first challenge, and the future seemed rich with opportunity. Millard rewarded himself with nearly a \$5000 raise to \$48,000 per year.

## The Note

Reed knew that rapid growth required outside capital. He had learned that lesson with his auto dealerships and was learning it in the computer business. If in the first month you ship

50 computer kits, and in the second month you plan to ship 250, the deposits on the first 50 kits simply won't pay for the parts you need for the next month's 250. You need outside capital as soon as possible. It was basic economics, but Reed also knew that Millard didn't really believe in economics.

On January 22, 1976, the day before what came to be known as Black Friday, Millard wrote in his inexpensive, paperback diary: "I don't know if IMS can last another 60 days. This a.m. I didn't see how we could make the 2/1 payroll. . . . Current income may be 'below critical mass.' IMS has no equity—and a \$50K negative net worth. No cushion exists. Plan to cut staff from 44 to 27 tomorrow."

IMS was losing more than \$1000 a day, and Bank of America had given Millard a "final, final decline" to extend an additional loan to the company.

"You're right, Phil. We've got to have money in here next week," Reed recalled Millard suddenly saying a few days later. Reed wondered whether it was too late. He couldn't put a business plan together and get funding in three days with venture capitalists. He and Millard would have to go to people they already knew and raise the money on their personal reputations.

According to Philip Reed, that requirement eliminated "almost everybody that Bill knew." But Reed felt there was one chance—his father, Loring Reed. As president of Marriner & Co., Loring Reed was interested in diversifying. Philip Reed thought he, or somebody he knew, might have some money to invest. He called his father and discovered that, indeed, Marriner was interested. Loring Reed had been following the project since its inception.

Loring Reed suggested that if Marriner were going to invest the money, it would want to do it in the form of a convertible note. It was not an easy decision for Millard. When Millard parted with equity in his first company, System Dynamics, he'd lost control and the company went bankrupt. But Loring Reed was not interested in the deal unless the investment would eventually give Marriner the option of a share in Millard's company. "They weren't willing to make a straight loan," said Philip Reed. The reason was, as his father recalled, "It was very promising and very risky."



One-time holder of a disputed \$250,000 note on ComputerLand, Loring Reed relaxes with his dog on the Maine coast.

Henry Hilliard

*'Phil returned from Boston with an offer from his dad's company for a five-year convertible debenture—12 percent for \$250,000, convertible to 20 percent of the company stock.... I accepted the offer.'*

On January 30, 1976, Millard wrote in his diary: "Phil returned from Boston with an offer from his dad's company for a five-year convertible debenture—12 percent for \$250,000, convertible to 20 percent of the company stock.... I accepted the offer."

#### High on Est

Millard hired new people. He preferred people who had taken est training. People who understood that this was more than

a job. People who understood that he wasn't talking about work or wages, but life. He was looking for those who shared his vision.

By March 1976, IMS had taken on the persona of its main product, the IMSAI 8080, and was known by customers and employees alike as IMSAI. Despite occasional cutbacks, the staff had swelled from 4 employees to about 75, yet IMS retained its small-company feel. Est and something as simple as the free lunch seemed to keep them together.

By now 20 or more people would lunch each day at picnic tables set up in the warehouse. People would talk about the latest est seminar they'd attended, or the est project they were involved in.

At lunch, on break, in the parking lot—everywhere at IMS, the pitch was, "Why don't you come to the seminar tonight?" Est had free guest seminars, which were essentially "advertisements" for the \$300, four-day, three-night, full-scale training. Graduates rose at the guest seminars and testified to how est had changed their lives and made them more productive, focused, and happy. Inevitably, many guests signed up for the real thing. Enrolling in the next seminar required prepayment. When

Van Natta was invited to his first guest seminar, he took the precaution of not bringing his wallet.

IMS's help-wanted ads stated a preference for est graduates. As IMS grew, however, many employees, especially in the production and manufacturing department, had not taken the seminars.

Those employees often thought est a little strange. They noticed how people who took the training seemed to change. They spoke a peculiar jargon, known as estianese, and seemed to pay more attention to appearance and dress. The more abrasive, enthusiastic converts came to be known as estholes.

In the spring of 1976 the company meetings began. Employees who had taken est didn't find them unusual. They were set up very much like est seminars; employees sat in little chairs and Millard stood in front. People could raise their hands and "share" with the group. Julie Banuelos, who'd worked for Erhard before coming to IMS, remembers standing up and telling Millard that she was really glad she worked for him and couldn't think of a better place to be. The group clapped after she was finished. That was called acknowledgment. You were always acknowledged after you "shared."

Yet Millard's intensity and enthusiasm—powerful weapons of motivation in one-on-one encounters—seemed to fizzle in front of a group. "When he was standing in front with everybody sitting around as an audience," recalled Van Natta, "Bill came off very poorly." Millard was not a good speaker. He seldom prepared remarks beforehand, though he of-

ten spoke for 30 minutes or more. He strung together est concepts like "sharing," "space," "vision," and "acknowledgment," neglecting verbs and other necessary parts of speech. Even some est graduates admitted to losing track of the point. >

*Each time they raised the price, the phones rang off the hook. People were calling and wanting to open stores. Faber watched monthly gross sales expand from \$35,000 in December 1975 to several hundred thousand dollars in April 1976.*

Meetings were about good news. An unwritten rule said that if problems were not dwelt on, they would, like bad moods, simply fade away. If everyone concentrated on the positive, the company would succeed.

#### Volume Deals

In the spring of 1976, shipments were up and sales were booming. Ed Faber, a former IBM staffer, had been brought on to run sales; he handled the phones with two others. It was the reverse of telephone solicitation. Hobbyists, engineers, and other "techies" called in, itching to buy the IMSAI 8080. IMS was selling a lot of kits, but Faber noticed that it was selling them just one at a time.

Faber had started talking to a Southern California businessman in late December 1975 who wanted to buy several IMSAI kits at once—at discount—and then sell

them through his storefront. "Well, that was a silly idea," recalled Faber. "Just silly enough so that I said, 'Yeah, let's see if we can make that one work.'"

Soon after, Faber found it easy to sell 10 or 15 machines at a time. The only problem was that

with the kit priced at \$439, there wasn't room for more than a 10 percent discount. Faber and Millard talked it over and raised the base price to \$499. Up went the discount to 15 percent. Lo and behold, a couple of other guys wanted to get in on the action. "This is a great idea," recalled Faber. "So I talked to Bill some more and we raised the price again in March, to I think \$599, and passed along another 10 percent." By now the discount was 25 percent.

Each time they raised the price, the phones rang off the hook. People were calling and wanting to open stores. Faber watched monthly gross sales expand from \$35,000 in December 1975 to several hundred thousand dollars in April 1976.

#### The Franchise Man

In early 1976, John Martin, a former car salesman who had franchised his own line of employment agencies, wanted in on the burgeoning computer market. His

basic idea was to franchise computer stores much like McDonald's franchises fast-food restaurants.

At home in New Hampshire, he started developing plans for a concept he called Computer Shack. During the first three months of 1976, Martin developed franchise business plans, investment guides, and direct-sales systems. He even instructed his attorneys to start trademarking the Computer Shack name and create a corporation.

Martin began to realize that the idea was bigger than he was. His plan had been gathering dust for weeks when he went to Windsor, Connecticut, for the opening of the first franchised computer store in America. While there he bought one of the first copies of *Byte* magazine.

He thumbed through the magazine, trying to understand the computerese. On the back page he saw an ad that said, "Altair users step up to an IMSAI." Martin dialed the San Leandro, California, number and asked for the president. The next day he flew out to San Francisco, took a helicopter to Oakland, and by 2 p.m. was talking to Bill Millard.

John Martin's initial meeting with Bill Millard led to another meeting with IMS's major decision-makers. No one questioned the fact that Martin's ideas were attractive. He had thought out the whole thing and presented a neat package. Sell franchises to dealers for \$10,000 to \$15,000 apiece. Sell them IMSAI computers, and then collect 5 percent of everything rung up on their registers.

Millard wanted the franchises to sell only IMSAI computers. Martin wanted the franchises to

sell a variety of products. The IMSAI 8080 would be the catalyst, Martin emphasized, but to be really successful, franchises would have to be more than one-product operations.

It took some doing, but Martin finally figured out a way to convince Millard that the franchises

**Only five months after Marriner had poured a quarter of a million dollars into it, IMS was facing more money troubles.**

should carry other manufacturers' products. "How would you like to be the only guy making a profit on your competitors?" he asked Millard.

They struck a deal. Martin would create a standard franchise contract, file the appropriate papers, solicit the first franchise owners, and help them set up their stores. In return for these services, Martin would be paid \$30,000. By fall of 1976, Computer Shack—the precursor to ComputerLand—was a corporate entity with Martin as the only official full-time employee.

#### Another Transfusion

Despite sales of several million dollars in 1976, prospects for IMS, Millard's older company, didn't seem so bright. Only five months after Marriner had poured a quarter of a million dollars into it, IMS was facing more money troubles. "IMS is really under the gun cash-wise," Millard wrote in his diary on July 22, 1976. The company needed a

\$100,000 loan to keep going. Partly due to Loring Reed's help, Union Bank in Oakland agreed to lend IMS \$100,000.

Meanwhile, Killian and Van Natta were being spread too thin. The pressure and the long hours were taking their toll, and mistakes were cropping up in their

work. IMS viewed problems—like a virus—as potentially contagious. It was best to turn them over to someone else. IMS began to rely on subcontractors to design some of the tricky parts of new products. "They were notorious, flamboyant, and many were less than talented," recalled Todd Fischer, who ran customer service. "IMSAI chose to let other people handle its problems."

Loring Reed wrote Millard, warning of a serious cash crunch that he predicted would strike on September 15. Millard, however, was not greatly concerned. His latest financial officer was Werner Erhard's former business manager. Millard felt IMS was in good hands.

#### Panama Shuffle

1976 was a busy and eventful year for Millard. He had the fledgling franchise business to tend to and troubles with IMS to worry about; and though they remained friends, Philip Reed had become concerned enough about Millard's executive style to pull out of IMS operations. With Reed gone, Millard began spending a lot of time with Harry Margolis,

then thought by some to be one of the country's leading tax attorneys.

Margolis had done some rather astonishing things for Werner Erhard and est. Under Margolis's direction, the est company sold what they called "the body of knowledge" to corporations located in foreign countries. The distant corporations then rented back the body of knowledge to est for use in the day-to-day activities in such a way that est's profits seemed minimal. Millard was impressed. He hired Margolis to reorganize his expanding circle of companies.

Margolis's plan for Millard was elaborate: The old Millard company, IMS, would be liquidated by one of Margolis's Panamanian companies and its assets transferred to the new company, IMSAI. IMS would disappear. One hundred percent of the stock of the new corporation, IMSAI,

lard would save thousands, perhaps millions, of dollars in taxes, guarantee himself and his wife lifetime income, fuel the expansion of his companies, and "improve the trade deficit," as one of his lawyers later said—all with nothing but money leaving the Bay Area. Even the stock certificates of Millard's companies would go no farther than Margolis's office. None of the buildings or equipment would be sent to Panama or the Virgin Islands or the island of Jersey. It was knowledge and money that were moving magically, circling the globe.

#### Meeting Obligations

As part of the original IMS loan agreement with Loring Reed and his company, Millard's new corporate structure had to be reported to Marriner. It took several weeks for the documents describing the Panama deal to arrive

The liquidation and related matters, regardless of the form chosen by the attorneys, was not and is not intended at any time to get in the way of full, fair performance and acknowledgment of these responsibilities to you."

Reed and Marriner weren't pacified. In December of 1976, Bailey sent a letter notifying Millard of Marriner's intention to call in the \$250,000 note. Under the threat of a Marriner lawsuit, Millard called off the Panama deal. He instructed his attorneys to abandon the liquidation of IMS; the California secretary of state returned the application papers unfiled. To prevent Millard from attempting further international reorganizations, the Marriner note was renegotiated in the spring of 1977. Now the note extended to ComputerLand and any other companies Millard might incorporate with the help of Marriner's money.

On February 18, 1977, opening day for ComputerLand's first store in Morristown, New Jersey, 112 people walked through a tiny showroom—without having seen advertising or even a sign on the door. Soon, store number 2 opened in Hayward, California, and number 3 in West Los Angeles. In all, Martin signed up a total of 17 new franchisees within the first few months of 1977. By May of 1977, though, Faber was well entrenched as president of ComputerLand and Martin was gone.

#### The Good Neighbor

Not all of Millard's companies fared well after the attempted Panamanian reorganization. Although sales for IMSAI—the newly incorporated seller

*On February 18, 1977, opening day for ComputerLand's first store in Morristown, New Jersey, 112 people walked through a tiny showroom—without having seen advertising or even a sign on the door.*

would then be issued to a trust company on the island of Jersey, in the English Channel. The Panamanian company, Presentation Musicales, which held the IMSAI body of knowledge, would grant IMSAI a license for "know-how." In return for the license, IMSAI would pay royalties.

The idea was that with the money defined as royalties, Mil-

lard would save thousands, perhaps millions, of dollars in taxes, guarantee himself and his wife lifetime income, fuel the expansion of his companies, and "improve the trade deficit," as one of his lawyers later said—all with nothing but money leaving the Bay Area. Even the stock certificates of Millard's companies would go no farther than Margolis's office. None of the buildings or equipment would be sent to Panama or the Virgin Islands or the island of Jersey. It was knowledge and money that were moving magically, circling the globe.

on the desk of Reed's attorney. When his attorney, Andrew Bailey, inspected them, he was worried. Bailey told Loring Reed that it was just as Reed had suspected: Millard was "trying to take the company right out from under Marriner."

According to Millard, that was the farthest thing from his mind. He wrote Loring Reed: "My intention has been that you should have all the rights and options appropriate to the Marriner note....

of the IMSAI 8080—reached \$2,679,000 in the eight months from February to September 1976, the company couldn't seem to pay its bills.

Vendors were complaining. Many suppliers would no longer do business with IMSAI, forcing it to buy chips, computer boards, and other critical parts in parking lots and other outposts of the evolving computer black market.

IMSAI may not have had enough money to buy chips, but

*Many suppliers would no longer do business with IMSAI, forcing it to buy chips, computer boards, and other critical parts in parking lots and other outposts of the evolving computer black market.*

Millard decreed that it had enough to help ComputerLand in a pinch. "Occasionally, an advance from IMSAI kept us going ...they were our parent company," remembered one ComputerLand employee in charge of accounts payable. If a ComputerLand order came into IMSAI, it was filled first. If there was an emergency at ComputerLand, IMSAI's top management went into a huddle, sometimes shunting IMSAI production staff across the back lot to help out. By 1979, plagued by debts and computers that didn't work, IMSAI went bankrupt.

ComputerLand itself was untouched by IMSAI's bankruptcy. The timing was uncanny. In 1980, Sparky Sparks of IBM called on ComputerLand with a provocative idea. IBM was building a personal computer—would ComputerLand like to help sell it?

#### Return of the 20 Percent Note

Meanwhile, John Martin, far from tiring of the computer business, had set up his own franchise company. Bitten by the industry bug and unemployed, Philip Reed signed on as a consultant.

At the same time, Marriner had been trying to sell Millard the \$250,000 note for a slight premium—\$300,000. Millard thought the price high and refused the offer. Since he knew Marriner was

looking to sell it, Philip Reed arranged with his father for Martin's Micro/Vest group of investors to buy the Marriner note—now convertible into 20 percent of ComputerLand.

The rest is a tale that seems as though it will never end. In 1981, Martin, Reed, and the other Micro/Vest owners sued to get their 20 percent of ComputerLand. Four years later, an outraged jury awarded the Micro/Vest group 20 percent of ComputerLand and \$141 million in punitive damages. When Millard appeared more willing to bankrupt ComputerLand than negotiate a settlement both parties could live with, ComputerLand franchisees threatened mutiny. Millard was forced to resign his

operational role in the company.

The last development is the strangest of all. Ousted from ComputerLand, Millard relocated on the tax-free South Pacific island of Saipan. Last summer, at a sparsely attended island press conference, he announced his intent to sell ComputerLand. The locals quickly passed a bill so that they would get the taxes Uncle Sam would miss. Furious, Millard publicly accused the government of attempted bribery; he had already called the FBI. The government of Saipan had its own response. It introduced a bill to declare Millard persona non grata and threatened to subpoena him to name the alleged corrupt officials who tried to bribe him.

The drama is far from over. At press time, ComputerLand was slated to be sold to a large New York investment firm. Millard is scheduled to testify before a grand jury convening on government corruption on the tiny South Pacific island. ●

*Jonathan Littman is a journalist who has covered high technology for several years. Marlene Nesary is an Assistant Editor for PC World.*

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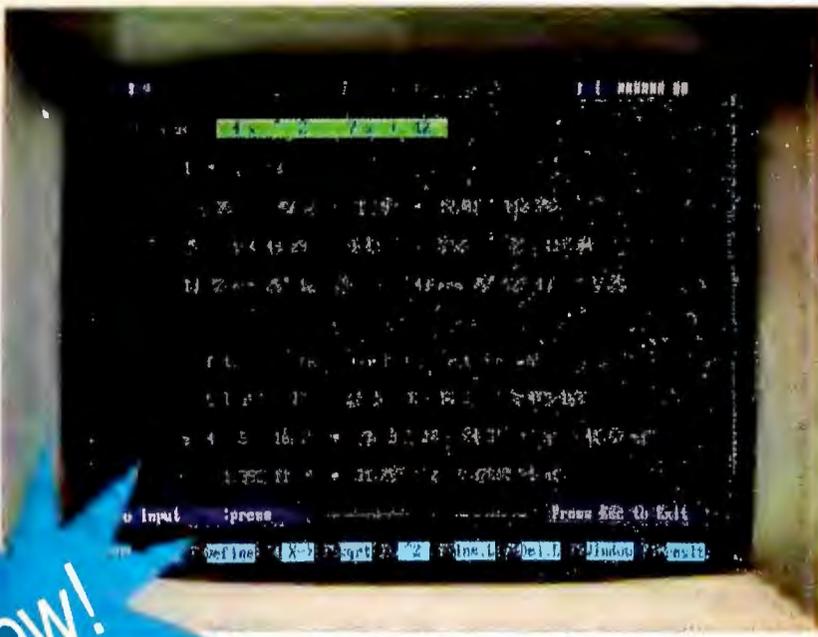
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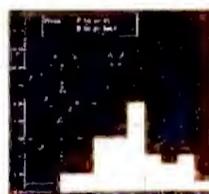
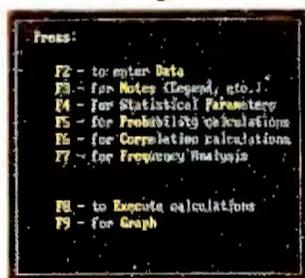
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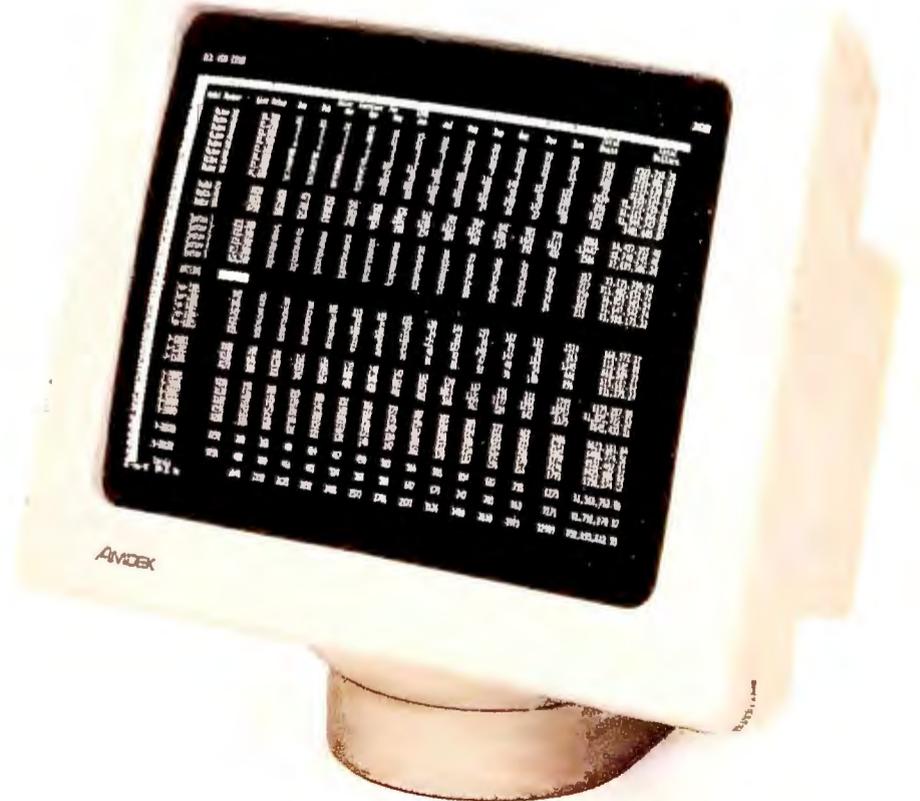
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# 1-2-3: Looking Up

1-2-3's lookup functions can help automate applications that draw data from a table of values. A product order model shows you how.

*Charles R. Ryan*

**||||** A well-designed worksheet is, by definition, automated. Data feeds smoothly from one part of the worksheet to another, formulas crunch numbers to produce needed results, and graph and print macros await the user's command.

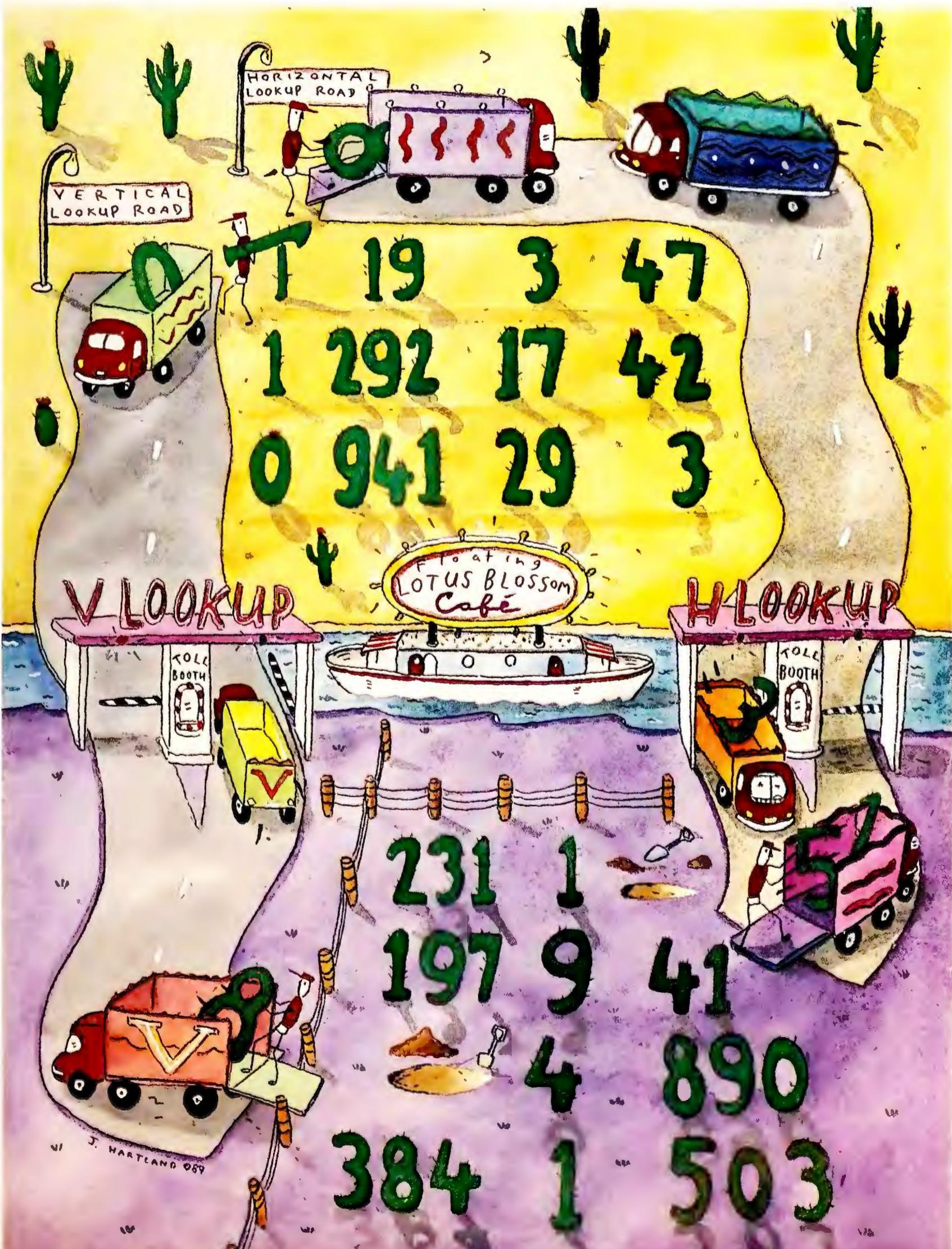
Sometimes, automating a worksheet for a specific application requires 1-2-3's more esoteric functions. If you frequently have to pull figures from a large, complex table of numbers, for example, the functions @HLOOKUP and @VLOOKUP can streamline the process. These lookup functions extract just the figure you're looking for from a table of values, making it easier to pinpoint needed data and use it in calculations.

**■** **Just the Facts—and Fast**  
The classic lookup problem is one familiar to everyone: finding the amount of income tax owed on a particular level of income, given a certain number of deductions. Using a tax table supplied by the IRS, you would scan

the far left column to find the appropriate row for your income level, then read across that row until you reached the correct column for the number of deductions.

1-2-3's lookup functions seek out information in the same way. If you were a financial planner who wanted to enter each client's income tax on a master planning form, you could use a lookup function to automatically retrieve that data from an electronic copy of the IRS tax table. After entering a lookup formula in one of the cells on the form, you'd simply type in the client's income level and the number of deductions. 1-2-3 would then seize the figure for income tax owed from the tax table (located elsewhere on the worksheet) and place it on the form.

To create a lookup function for the previous example, you would use the following syntax: @VLOOKUP (*income level, cell*



HORIZONTAL  
LOOKUP ROAD

VERTICAL  
LOOKUP ROAD

T 19 3 47  
 1 292 17 42  
 0 941 29 3

V LOOKUP

Floating  
LOTUS BLOSSOM  
Cafe

H LOOKUP

TOLL  
BOOTH

TOLL  
BOOTH

231 1  
 197 9 41  
 4 890  
 384 1 503

J. HARTLAND 089

Jessie Hartland

B5: (C2) [W10] @VLOOKUP(UNITS,PRICE TABLE,@HLOOKUP(METHOD,METHOD TABLE,1)) READY

	A	B	C	D	E	F	G
1							
2	Units:	52			Quantity	Shipped	Picked Up
3	Method:	s			-----		
4					0	\$10.00	\$9.00
5	Price per unit:	\$8.00			20	\$9.00	\$8.10
6	Total:	\$416.00			50	\$8.00	\$7.20
7					100	\$7.00	\$6.30
8					500	\$6.00	\$5.40
9					1000	\$5.00	\$4.50
10							
11			Method	P	S	P	S
12			Column #	2	1	2	1
13							
14							
15							
16							

Figure 1: In this basic model illustrating look-up functions, the clerk enters the number of products ordered and whether the product will be shipped or picked up; the lookup formula then returns the correct price per unit into cell B8.

coordinates of tax table, number of deductions). In 1-2-3 parlance, the syntax is @VLOOKUP (test variable, table range, column offset number) or @HLOOKUP (test variable, table range, row offset number). The only difference between the functions is that @VLOOKUP is used with a table in which the index column (such as a set of income levels) is the vertical column along the left side of the table; @HLOOKUP is used when the index row is a horizontal row along the top.

### Testing the Waters

It's useful to think of @VLOOKUP's test variable as one of the conditions that determine what value ultimately will be plucked from the table. (In 1-2-3 release 1A, only numeric values can be tested; release 2.x allows for a string, such as a name.) In the case of a numeric test variable, the @VLOOKUP function finds

the row that has an index column value greater than the test variable and then backs up to the previous row. For example, if the test variable is 23 and the left column of the lookup table has the following values:

- 0
- 10
- 20
- 30

@VLOOKUP chooses the third row, since 23 falls between 20 and 30; the result would be the same if the test value were 29.9. However, if the test value is a string, the exact match, including the same use of lowercase and uppercase letters, must be present in the index column to prevent an error message.

Note, however, that lookup tables won't generate reliable results with index values that are out of numeric or ASCII sequence or not unique, and you can't perform wild-card searches. Stick to 1-2-3's data query commands if you require such applications or if you plan to create models that extract information from several fields simultaneously.

### What's in a Table?

As the name implies, the table range contains the tabular data. The specified range must consist of at least two adjacent cells, one of which, of course, is the row or column containing the index values. Usually it's easier to reference the table if you give it a range name instead of using cell references.

With @VLOOKUP, once the index column for the test variable has been located, the column offset number finds the correct adjoining column for the search. (With @HLOOKUP, the row offset number finds the correct adjoining row.) If the column offset number is 1, 1-2-3 will seek the value one column to the right of the index column; if the column offset number is 2, it will look two columns to the right. In the vertical table in Figure 1, for example, a column offset number of 1 returns a value from the column labeled Shipped; an offset number of 2 provides a value from the Picked Up column.

## Easy Does It

Suppose you wanted to encourage customers to buy more products by offering them a quantity discount, as well as lowering the price if they pick up the products instead of having them shipped. The simple example in Figure 1 allows you to quickly determine the cost of a product given those conditions.

Here's how the model works. When a customer calls in an order, the clerk enters the number of units ordered (the test variable) in cell B2. Then, if the customer wants the product shipped, the clerk types *S* into cell B3; if the customer will pick it up, the clerk types *P*.

Based on the letter typed into cell B3 (which is assigned the range name METHOD), the horizontal lookup function @HLOOKUP (METHOD, METHOD TABLE,1) returns the appropriate value from METHOD TABLE (the range D11..G12, that is, the *P*'s and 2's and the *S*'s and 1's). In other words, the horizontal lookup function returns the number from METHOD TABLE that is "1" row below the index row value that matches METHOD; *S* or *s* elicits a 1, and *P* or *p* extracts a 2. This value is the column offset number for cell B5's vertical lookup function (shown at the top of Figure 1).

The vertical lookup function searches the index column of PRICE TABLE (range E4..G9) for the first value greater than UNITS (cell B2), then backs up one row and returns the value on that row

	A	B
1	Order process date:	19-Nov-87
2	Product # ordered:	1006
3	Quantity ordered:	2
4	Qty. in stock before order:	1
5	Qty. in stock after order:	0
6	-----	
7	Customer Packing Slip	
8		
9	Quantity ordered:	2
10		
11	Quantity shipped:	1
12	Price per unit:	\$3,300
13	Shipping cost:	\$150
14		
15	Total amount due:	\$3,450
16		
17	Quantity back-ordered:	1
18		
19	Est. date to ship back order:	08-Dec-87
20	-----	
21	Warehouse Picking Order	
22		
23	Date to pick:	19-Nov-87
24	Product # to pick:	1006
25	Product name:	Square large
26	Warehouse location:	81
27	Quantity to pick:	1
28	-----	
29	Vendor Order	
30		
31	Date ordered:	19-Nov-87
32	Product # ordered:	1006
33	Product name:	Square large
34	Quantity ordered:	4
35	Vendor #:	951
36		
37	-----	

under Shipped (the first offset column) or Picked Up (the second offset column) as determined by METHOD and the @HLOOKUP function. Thus, as Figure 1 illustrates, if UNITS is 52 and the customer wants the product shipped, the @VLOOKUP function (with its nested @HLOOKUP counterpart) returns a price per unit of \$8.

## Seek and Ye Shall Find

Although useful as an example, the problem in Figure 1 is too simple to merit a lookup table. But a complex application can use a lookup table that has far more indices and columns.

Say you work for a business that sells several products and wants to draw on inventory infor-

mation to fill customer orders from stock. When an order is received, the company plans to generate three documents: a customer packing slip listing the products that are being shipped as well as any out-of-stock products that are back-ordered; a warehouse "picking" order that tells an employee what product to pick and where to find it in the warehouse; and an automatic vendor reorder form if there's not enough of a product to fill the existing order or if inventory falls below a specified quantity. Ideally, an employee using the

Figure 2: Lookup functions can automate sophisticated data retrieval tasks, as illustrated here. The salesperson simply enters the product number and quantity ordered; the lookup formulas seek out the data needed to complete the Customer Packing Slip, the Warehouse Picking Order, and the Vendor Order.

	G	H	I	J	K	L	M	N	O
38									
39									
40									
41									
42									
43	PRODUCT TABLE	1001	Round small	\$1,500	\$100	2	A1	10	123
44		1002	Round medium	\$2,000	\$125	2	B2	15	258
45		1003	Round large	\$2,500	\$150	0	B3	10	123
46		1004	Square small	\$3,000	\$100	3	A3	15	564
47		1005	Square medium	\$3,200	\$125	0	A3	10	852
48		1006	Square large	\$3,300	\$150	1	B1	20	951
49		1007	Rectangle small	\$1,200	\$100	0	C4	15	258
50		1008	Rectangle medium	\$1,500	\$125	2	B1	10	654
51		1009	Rectangle large	\$1,700	\$150	1	D4	20	741
52		1010	Triangle small	\$4,000	\$100	3	D2	15	951
53		1011	Triangle medium	\$4,500	\$125	2	A2	25	741
54		1012	Triangle large	\$5,000	\$150	1	D1	25	123

Figure 3: By drawing from a table like this one, a lookup formula can retrieve a wealth of data.

model would simply enter the correct product model number and the quantity ordered to generate all the desired information.

Figure 2 shows how such an order would be processed. In the data entry area, a clerk types in the product number (1006) and the quantity (2). Cell B4 immediately shows that only one of the items ordered is in stock; so one item will be shipped and the other will be back-ordered, as illustrated by cells B11 and B17. The Customer Packing Slip also indicates that only one item is being shipped and billed, and that the back-ordered unit should be available by December 8 (cell B19). On the Warehouse Picking Order, the warehouse employee is given the product number, the product name (Square large), and the warehouse location (B1). Finally, the Vendor Order specifies that four units (one back-ordered plus three to re-

plenish inventory) should be ordered from vendor #951.

The beauty of this model is that once the worksheet is set up, only two items must be entered to set it in motion. To create the model, you build a table such as the one in Figure 3 to store the necessary information about the products your company sells; then you design a form like Figure 2, which uses @VLOOKUP functions to find information in the data table that will complete the desired reports.

The vertical lookup table in Figure 3 consists of eight columns (0 through 7, that is, columns H through O) that contain the required information: product number (the index column), product name, price, shipping cost, quantity in stock, warehouse location, number of days needed for reordering, and vendor number. The range name is PRODUCT TABLE (cells H43..O54). Note that the table is located far from the activity of the main worksheet, which ends in cell B37. Distancing the table makes it less susceptible to accidental changes.

Both the @VLOOKUP function and the @IF function in Figure 4 are used to extract information from PRODUCT TABLE. If you're not familiar with the @IF function, here's a quick tutorial. The syntax @IF(*condition*, *x*, *y*) stipulates that if *condition* is true, *x* appears in the cell containing the formula; if the condition is false, *y* appears.

#### Order Input Area

In Figure 4, the order input area is cells A1 to B5. It's the only spot where the salesperson will enter data; most of the information on this worksheet will be generated using formulas. Range names are used to simplify the process of referencing cells. Cell B1, for example, bears the range name PROCESS DATE, as shown in cell C1; the @NOW function in cell B1 is used to generate today's date. (All formulas and range names are shown in Figure 4 to clarify how the model works.)

	A	B	C
1	Order process date: @NOW		PROCESS DATE
2	Product # ordered:		ORDER
3	Quantity ordered:		QTY ORDERED
4	Qty. in stock before order: @VLOOKUP(ORDER,PRODUCT TABLE,4)		QTY BEFORE
5	Qty. in stock after order: @IF(QTY BEFORE-QTY ORDERED<0,0,QTY BEFORE-QTY ORDERED)		QTY AFTER
6	-----		
7	Customer Packing Slip		
8			
9	Quantity ordered: +QTY ORDERED		
10			
11	Quantity shipped: @IF(QTY ORDERED<=QTY BEFORE,QTY ORDERED,QTY BEFORE)		QTY SHIPPED
12	Price per unit: @VLOOKUP(ORDER,PRODUCT TABLE,2)		UNIT PRICE
13	Shipping cost: @VLOOKUP(ORDER,PRODUCT TABLE,3)		SHIPPING COST
14			
15	Total amount due: (UNIT PRICE+SHIPPING COST)*QTY SHIPPED		
16			
17	Quantity back-ordered: +QTY ORDERED-QTY SHIPPED		QTY BACK-ORDERED
18			
19	Est. date to ship back-order: @IF(QTY BACKORDERED>0,@VLOOKUP(ORDER,PRODUCT TABLE,6)+PROCESS DATE, "NA")		
20	-----		
21	Warehouse Picking Order		
22			
23	Date to pick: +PROCESS DATE		
24	Product # to pick: +ORDER		
25	Product name: @VLOOKUP(ORDER,PRODUCT TABLE,1)		
26	Warehouse location: @VLOOKUP(ORDER,PRODUCT TABLE,5)		
27	Quantity to pick: +QTY SHIPPED		
28	-----		
29	Vendor Order		
30			
31	Date ordered: +PROCESS DATE		
32	Product # ordered: +ORDER		
33	Product name: @VLOOKUP(ORDER,PRODUCT TABLE,1)		
34	Quantity ordered: @IF(QTY AFTER<2,3+QTY BACKORDERED,0)		
35	Vendor #: @VLOOKUP(ORDER,PRODUCT TABLE,7)		
36			
37	-----		

Figure 4: To illustrate the inner workings of the form in Figure 2, all formulas are exposed here. For clarity, range names are shown next to the ranges they designate.

To process an order, the salesperson enters just two items: the product number (cell B2) and the quantity ordered (cell B3). In cell B4, the first lookup formula finds the product number on the table shown in Figure 3 and reports the number of units available in stock (from offset column 4 in Figure 3). Next, the @IF function in cell B5 calculates the number of units remaining in stock after this order is filled. The formula is set up so that it won't report a negative number. That is, the @IF function specifies that if the quantity in stock minus the quantity ordered is less than 0, 0 is entered in cell

B5; otherwise, the quantity ordered is subtracted from the quantity in stock, and that result is entered.

#### Customer Packing Slip

This form (cells A7 through B19 on Figure 4) reminds the customer of the number of units ordered and their cost. The @IF formula in cell B11 calculates the quantity available to ship with this order. Then the lookup formula in cell B12 looks up the product number and reports the unit price (offset column 2 in Figure 3); the function in cell B13 looks up the product number and reports the shipping cost (offset column 3). Next, the formula in cell B15 calculates the price of this shipment.

Once the formula in cell B17 calculates whether more units have been ordered than are available to ship, the @IF formula in cell B19 determines if units should be ordered. If so, it looks up the product number, reports the number of days required to receive new inventory (offset column 6), and adds this figure to today's date to estimate when the back order will be shipped. If no back order is generated, the string NA is reported. (Remember, 1-2-3 release 1A cannot report a string variable.)

## Painless Macros

With macros, printing out the customer order forms described in the article is a matter of pressing a few keys. The macros shown in Figure A are cleverly linked so that the Warehouse Picking Order and the Vendor Order are printed only under certain conditions; namely, the ordered product must be in stock for the Warehouse Picking Order to be printed, and inventory must be low for the Vendor Order form to be printed. For easy reference, the macros in Figure A bear range names: <Alt>-P for the first macro; PICKPRINT for the macro that prints the Warehouse Picking Order; and VENDORPRINT for the macro that prints the Vendor Order.

Here's how the macros work. Starting with the first macro in cell P58, the command */Print*

*Printer Clear All Range (/ppcar)* is used to clear all previous print settings and to bring up the 'print range' prompt. PACK is specified as the range to be printed; then with *Align Go Print Quit (agpq)*, the macro is di-

DORPRINT. PICKPRINT works like the first part of the macro; the range PICK is printed out and then 1-2-3 is directed to VENDORPRINT. Once there, a conditional statement stipulates that the Vendor

	P	Q	R
57	Alt -P	PICKPRINT	VENDORPRINT
58	/ppcar	/ppcar	/xiB34>0-ppcar VENDOR-agpq
59	PACK-	PICK-	
60	agpq	agpq	
61	/xiB27>0-/xgPICKPRINT-	/xgVENDORPRINT-	
62	/xgVENDORPRINT-		

Figure A: With these macros, the clerk can automatically print out three forms—Customer Packing Slip, Warehouse Picking Order, and Vendor Order.

rected to print out the Customer Packing Slip. In cell P61, the /xi macro command (or the IF macro command in 1-2-3 release 2.x) is used to create a conditional statement. If cell B27 in Figure 4, the quantity to pick, is greater than 0 (indicating that the product is available to be picked and shipped), /xg directs 1-2-3 to the macro PICKPRINT. Otherwise, a second /xg directs 1-2-3 to the macro VEN-

Order will be printed only if cell B34, the quantity-ordered cell on the Vendor Order, is greater than 0 (meaning that new products are needed to beef up inventory).

To create the macros, begin in cell P57, a fair distance from the worksheet's main activity (see Figure A). Name the ranges (shown in Figure

4) that should be printed -PACK for the Customer Packing Slip (cells A7 through B19); PICK for the Warehouse Picking Order (cells A21 through B27); and VENDOR for the Vendor Order (cells A29 through B36). Then, type in the labels and macro code shown in Figure A (use an apostrophe before slashes). Next, with the cursor in cell P57 use */Range Name Labels Down* < Cursor-Right > < CursorRight > < Enter > to specify range names that identify where the first cell of each macro begins. Finally, test the macro by pressing <Alt>-P to make sure it works as intended. —C. R. R.

### Warehouse Picking Order

The Warehouse Picking Order uses two lookup formulas. The lookup formula in cell B25 reports the product name (offset column 1). Another lookup function in cell B26 looks up the product number and reports its location in the warehouse (offset column 5) so that it will be easy to find.

### Vendor Order

The first lookup function in the Vendor Order, as in the Warehouse Picking Order, simply reports the product name. Then the @IF statement in cell B34 determines whether less than two items are left in inventory; if so, three new items (the standard number of replenishments) are added to the number of items back-ordered (if any) to determine how many products to order. Finally, the lookup formula in cell B35 looks up the product number and reports the vendor's code number (offset column 7). If you wanted to expand the application, this code number could be used as the test variable for another lookup table containing vendor names and addresses to complete the re-ordering paperwork.

### Smooth and Quick

Creating the customer order model just described is simple. First you build the price table in Figure 3 by typing in the information as shown. Then, put the cursor in cell G43 and identify the

table range as PRODUCT TABLE using */Range Name Label H43..054*. Next, create the form in Figure 4 by entering the labels in column A, the formulas in column B, and the range names in column C. To identify the ranges, place the cursor in cell C1 and use */Range Name Label* < PgDn > < Enter > .

To streamline this application, you can add the print macros described in the sidebar "Painless Macros." The macros are set up using conditional commands so that the Warehouse Picking Order and the Vendor Order are printed only if necessary. Once these macros are in place, the model will be completely automated, helping to speed lookup procedures, cut down on order entry time, and make the application simple to use. ☺

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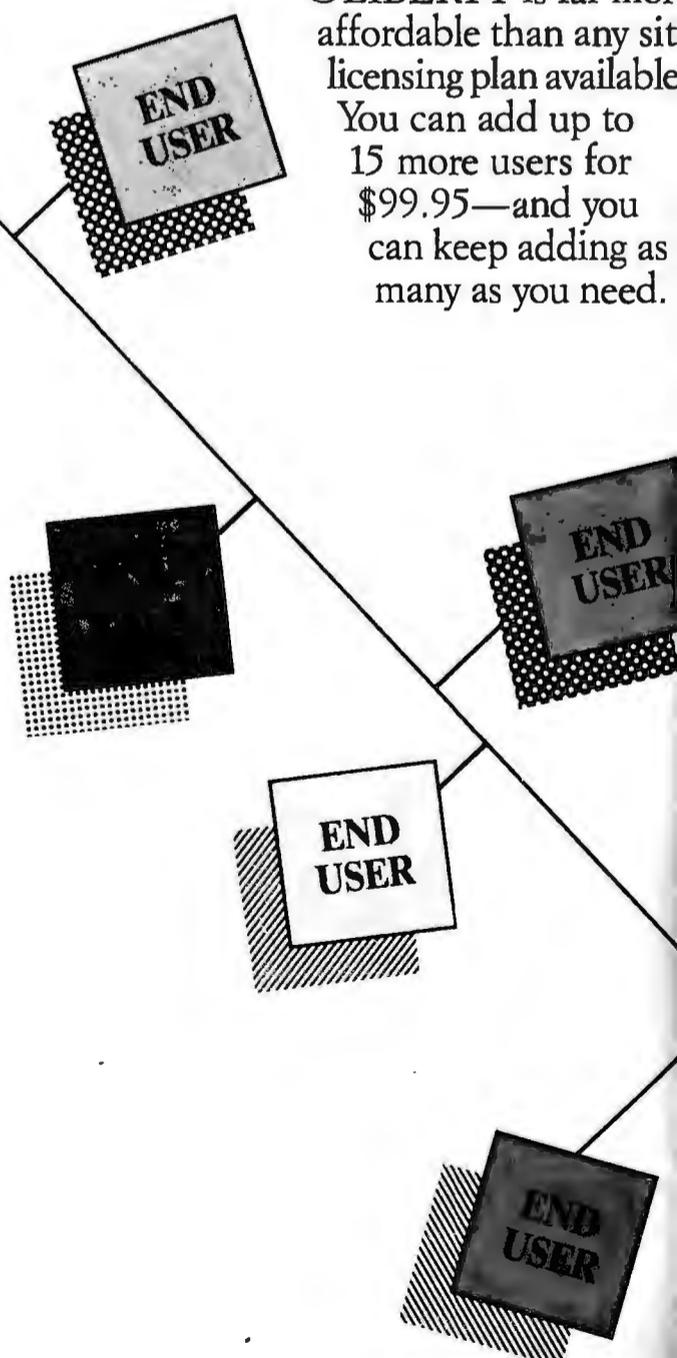
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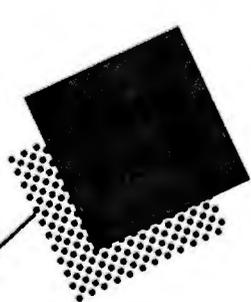
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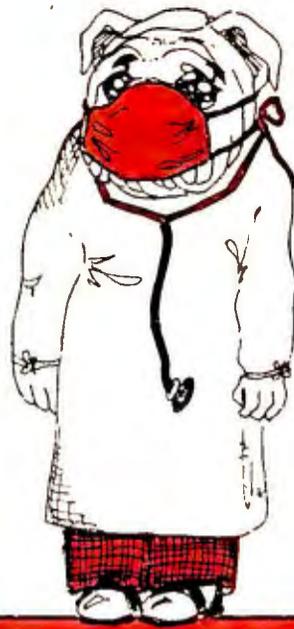
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Western Digi. 30 mb drive card	589
Western Digi. 20 mb drive card	549
Plus Hard Card 40	859
Plus Hard Card 20	625
Priam 60 mb AT	869
Priam 43 mb AT	685

## MODEMS

Everex 1200/2400 int.	99/199
Everex 2400 external	239
Hayes 1200/2400	299/419
Hayes V96	879
US Robotics 2400 direct internal	179
Ventel Half Card 1200 w/Crosstalk	259
Ventel Half Card 2400 w/Crosstalk	369
Ventel 1200 Plus	239
Ventel 2400 Plus	369

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410	\$155
Color 722	455

PRINCETON	
MAX12	149
HX12	419
HX12E	459

IBM	
Mono 850	\$199
Color Display 8512	449
Color Display 8513	515
Color 8514	1150
NEC Multisync	549

## SOFTWARE

Chartmaster	\$209
Clipper	379
Corefast	99
Crosstalk XVI	99
D Base III	399
DBXL	129
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Fastback	89
Foxbase +	199
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IBM Display Write IV	289
Lotus	309
Lotus Hal	109
Managing Your Money 3.0	125
Microsoft Word 3.1	229
Multimate Advantage II	249
Multiplan	119
Office Writer 5.0	259
Paradox	399
PFS Prof Write	119
PFS Prof File	145
PFS 1st Choice	99
R Base System V 1.1	419
Revelation	575
Super Calc IV 1.0	269
Symphony 1.2	439
Ventura Desktop Publishing	525
Volkswriter III	149
Word Perfect 4.2	205
Wordstar 2000 +	229
Wordstar Pro 4.0	249

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external	635
Genoa Galaxy 60 mb internal	799
external	929
Achives 40 mb internal	359
Sysgen Quic 60 internal	949
external	995
Sysgen 20 mb internal	575
external	650
Tallgrass 20 mb int/ext	395/550
Tallgrass 20 mb internal tape plus 25 mb hard disk	995
Tallgrass 60 mb external tape	1050

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 And In Georgia Call: 404-860-7364



# BULLDOG

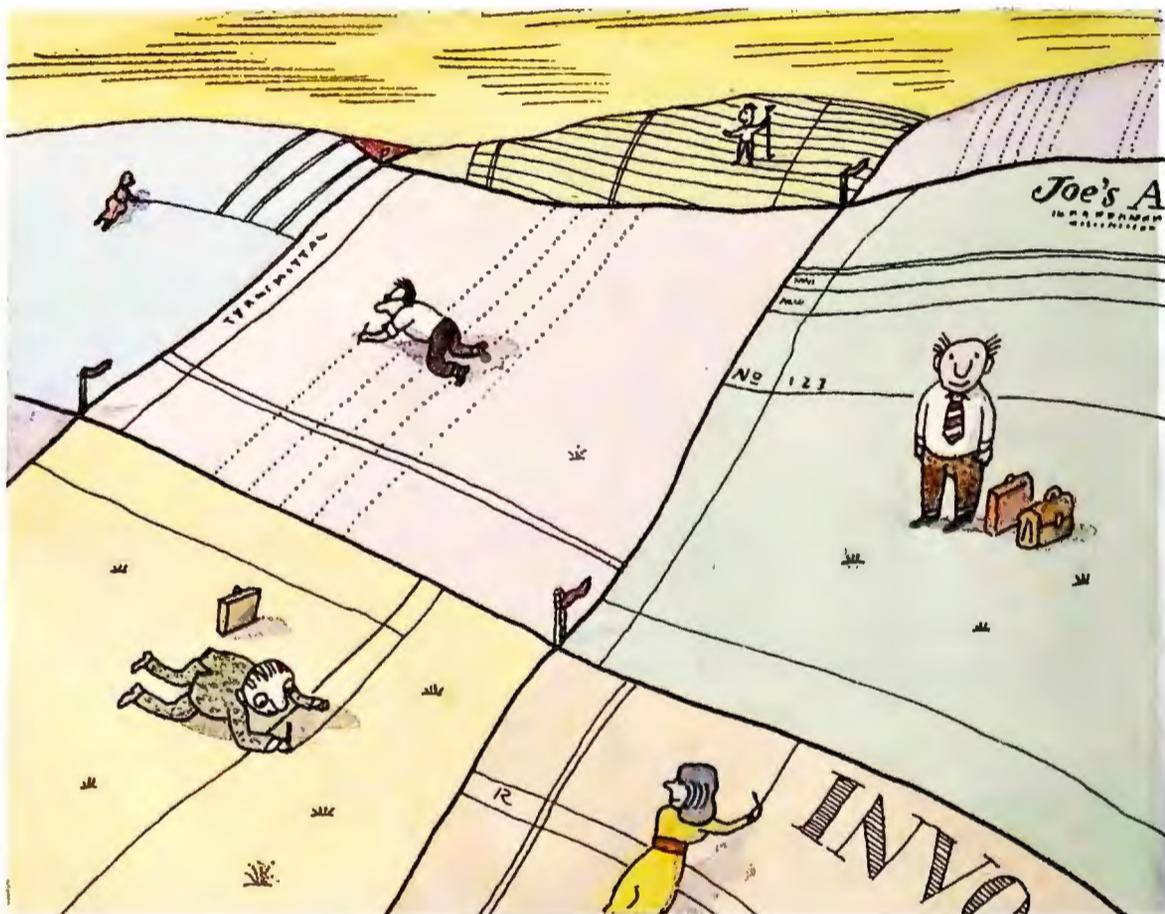
COMPUTER PRODUCTS

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# Create Business Forms With WordPerfect

Tired of using prefab forms that just don't fit your business? With WordPerfect, the HP LaserJet, and some fancy fonts, you can go your stationery store one better—and save a bundle.



Ralph Blodgett

||||| In architecture, form follows function; in business, function requires forms. As innocuous as they may seem, interoffice memos, invoices, sales order forms, and expense reports are the backbone of daily business activity. Now, thanks to WordPerfect's Line Draw function, if you can draw a box, you can create a form and roll it out of your printer.

Line Draw, introduced in version 4.1 of WordPerfect, enables you to plot the horizontal and vertical lines that make up any business form. Of course, you could purchase dedicated form-making

programs such as *FormTool* or *Polaris Forms*, but with Line Draw, you can avoid learning yet another program and save yourself a few dollars to boot.

This article will show you how to use the Line Draw function to create a simple customer invoice and print it out on a Hewlett-Packard LaserJet printer using the T font cartridge. The same principles apply to building almost any business form and printing it on almost any graphics printer.

## Line Draw Basics

Line Draw is about as simple as PC-based graphics gets. To activate the function, press **< Ctrl > - < F3 >**, select **2** from the Screen menu, and *WordPerfect* displays a miniature smorgasbord of available graphics characters (see Figure 1). You can choose to draw with a single line, a double line, and an asterisk; select Change from this menu, and eight additional "lines" of varying thickness and design are presented. Pick a character, and you can plot lines with the cursor keys to your heart's content. If you get tired of holding down a cursor key, merely supply the line's endpoint and *WordPerfect* does the rest.

If you are so inclined, you can draw a form with other ASCII characters your printer supports. Simply choose option **9 (Other)**, and enter the character from the keyboard or supply the appropriate ASCII value from the numeric keypad. In most cases, however, the handful of graphics characters *WordPerfect* offers will be all you need.

## Printer Principles

Although Line Draw works with any display, not all graphics printers can properly translate and print the characters shown on screen. The problem? The character sets found in some dot matrix printers, laser printers, font car-

tridges, and disk-based downloadable fonts don't always match the standard ASCII character set displayed by *WordPerfect*. For example, a border created with **=** (ASCII 205) would print out on a LaserJet (using the printer's internal Courier font) as a string of **è**'s. But if you choose the right LaserJet cartridge or soft font, or if your dot matrix printer is compatible with Epson FX and EX printers, you can generate forms without a hitch.

To determine whether your dot matrix printer can print out the proper Line Draw graphics characters, load the ASCII character table FONT.TST from the *WordPerfect* Learning disk, and print it by pressing **< Shift > - < F7 >** and selecting **1**. The resulting chart should match the character set shown in Figure 2, or at least the key graphics characters in lines 160 through 220. Gaps in a chart indicate characters the printer can't produce.

The sharpest-looking forms are naturally produced on an HP LaserJet, LaserJet Plus, or LaserJet Series II, and HP has obligingly devised a Line Draw font that contains all the graphics characters needed to generate forms. You won't find this font in the LaserJet's internal character sets, but

HP's G, H, R, T, U, V, W, and X font cartridges and the DA disk font all include it (see Table 1).

Of course, forms also include text—titles, directions, footnotes, and the like—so consider the suitability of the text fonts that share the cartridge. For example, the G and H cartridges offer only Prestige Elite and Courier typewriter typefaces, respectively, which may be passé in your office. The R cartridge is limited to bold Presentation and Letter Gothic fonts in 14-, 16-, and 18-point sizes, while the W and X cartridges are designed with bar-code applications in mind. The T, U, and V cartridges, which offer Helvetica in various bold and medium styles, are probably the best of the lot for forms.

The T cartridge used in this example is perhaps the most versatile, since it contains not only a Line Draw font and proportional Helvetica text fonts ranging from 6 to 14 point, but a special symbol set for reproducing IRS tax forms. All the T cartridge's fonts are designed for an 8½-by-11-inch page (called portrait orientation), so if you want to print forms in landscape mode, you must turn to the V cartridge.

To configure *WordPerfect* so it recognizes the T cartridge, display the Print menu with **< Shift > - < F7 >**, and select **4** to elicit the

**Table 1: Eight LaserJet font cartridges and one disk-based soft font contain the Line Draw font needed to create WordPerfect forms.**

	Fonts	Sizes	Spacing	Orientation
Cartridge G	Elite	7, 10	Fixed	Portrait
Cartridge H	Courier	7, 12	Fixed	Portrait
Cartridge R	Presentation/Letter Gothic	14, 16, 18	Fixed	Portrait/Landscape
Cartridge T	Helvetica	6, 8, 10, 12, 14	Proportional	Portrait
Cartridge U	Helvetica/Gothic	6, 8, 9.5, 10, 12, 14	Proportional	Portrait
Cartridge V	Helvetica/Gothic	6, 8, 9.5, 10, 12, 14	Proportional	Landscape
Cartridge W	Gothic/OCR/Bar code	9.5, 12, 14	Fixed	Portrait
Cartridge X	Gothic/OCR/Bar code	9.5, 12, 14	Fixed	Portrait
Soft Font DA	Gothic/Presentation	9.5, 12, 14, 16, 18, 24, 30	Fixed	Portrait/Landscape

various Printer Control options. Select option **3** and you're asked to assign a printer number to the T cartridge—in this case, **1**. To install the proper printer driver, press **< PgDn >**, and *WordPerfect* will prompt you for a Printer disk. Page through the list of drivers until you find the LaserJet T cartridge driver, enter the correct number at the prompt, press **< Enter >** three times, and you're ready to roll. To view the available fonts, select **2** at the Printer Control menu and supply the printer number, **1**.

### ■ Mixing Text and Line Draw Fonts

The easiest way to spit out forms with *WordPerfect* is to use any dot matrix printer that emulates the Epson character sets. You simply type in the text for the form, draw lines around it using Line Draw, and print it. What you see on screen will be what you get on paper. Unfortunately, most dot ma-

trix printers—even in double-strike mode—can't produce output sharp enough for office use.

This is hardly a problem with laser printers, and those that harbor typographic-like fonts (such as the LaserJet series) can add elegance to staid forms. But generating a form that combines a fixed 10-pitch font (such as Line Draw) and a fancy proportionally spaced text font (such as Helvetica) takes some extra effort.

Each Line Draw graphics character occupies the same amount of space; 10 such characters placed side by side on a printed page span exactly 1 inch. But proportional text in the T cartridge is just that—wide letters such as *W*, *M*, and *O* take up more space on a line than small letters such as *i*, *l*, or *j*. Depending on the text font and point size, as few as 6 characters and as many as 18 can take up

an inch on the printed page. As you may imagine, properly aligning proportionally spaced text with the vertical lines in a form can be difficult.

Fortunately, *WordPerfect* comes to the rescue with the Advance Line command, a nifty function nestled within the Super/Subscript menu. Advance Line is normally used to squeeze subscripts or superscripts between lines of text; here it essentially allows you to create two pages in the same file and forces the LaserJet to superimpose one page over the other at print time (see "Tighter Boxes for WordPerfect" in this issue's \*.\*). When you create a form using this technique, you enter the text in the top portion of a *WordPerfect* document, issue the Advance Line command, draw the form with Line Draw on the "second" page, and print the combined result. To prevent the form's horizontal and vertical lines from covering text, you must remember which rows and columns text occupies.

## The Form Maker's Macro Toolbox

Before you touch the keyboard, sketch out the form you want to generate. Then anticipate the steps you'll have to repeat over and over again as you build the form, and automate them with *WordPerfect* macros. For example, as you enter the text for the customer invoice in Figure 3, you'll have to switch back and forth between the 10-point and 12-point Helvetica bold fonts. Later, you'll want to flip to the Line Draw font so you can draw the form. *WordPerfect* lists these fonts as 1, 2, and 8 respectively, so name the macros that select those fonts as F1, F2, and F8.

Start from a clear screen and press **< Ctrl > - < F10 >**. At the 'Define Macro:' prompt, enter the name of the first macro, **F1**, and press **< Enter >**. The flashing 'Macro Def' prompt indicates *WordPerfect* is now recording your keystrokes. To select the Helvetica 10-point font, press **< Ctrl > - < F8 >** (which displays the Print Format menu), select **1**, and enter **13\*** as the pitch (the asterisk indicates a proportional font) and **1** for the font number. Press **< Enter >** twice to exit this menu, and shut off the macro recorder with **< Ctrl > - < F10 >**. Follow these steps to generate macros that select the Helvetica 12-point and Line Draw fonts.

If you plan to generate a lot of forms, you'll probably want to create a general-purpose *named* macro that draws vertical lines. (Unlike the macros we just created, a named macro is a document, and thus its contents can be edited so you can change the length of vertical lines for other

forms. You don't run a named macro, but rather retrieve it and merge it into the file you're working on.) Since the customer invoice in Figure 3 includes five horizontal lines that are 70 columns wide, a named macro that draws such a line would speed up form construction considerably.

Set the left margin at column 5 and the right margin at column 85. Select the single-line character from *WordPerfect*'s Line Draw menu and enter **< Esc > 70 < CursorRight >**; *WordPerfect* draws a line across the screen to column 75. Add a space under the line to speed up line drawing when you create the form's vertical lines. A hard return will throw off the alignment of the vertical lines, so select the Move function by pressing **6**, and move the cursor down one line with **< CursorDown >**. Exit Line Draw, and return to the top of the document by pressing **< Home > - < Home > - < CursorUp >**.

Before you save the line macro, display the format codes with the Reveal Codes function (**< Shift > - < F3 >**) and position the cursor to the right of the left-margin symbol. This circumvents a *WordPerfect* quirk that interprets a margin code as an extra space at print time.

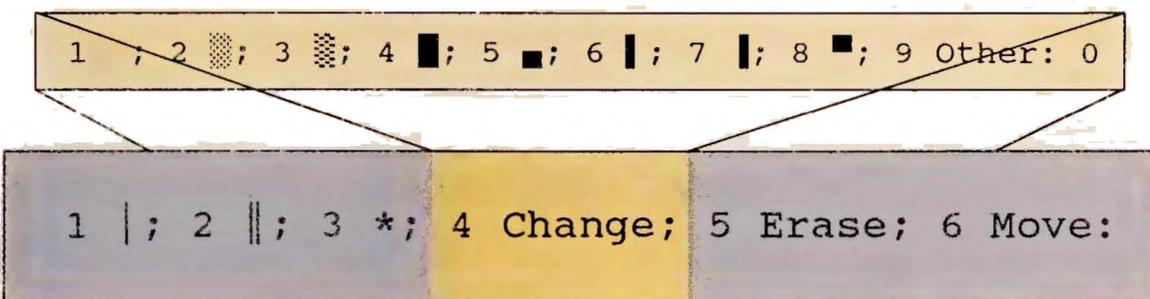


Figure 1: *WordPerfect*'s Line Draw menus make 11 line designs immediately available for form generation. The Other option enables you to draw with any ASCII character supported by your printer.

To save the line as a named macro, return the cursor to the beginning of the line by pressing **< Home > - < CursorLeft >**, activate the Block function by pressing **< Alt > - < F4 >**, shoot the cursor to the end of the line with **< End >**, and press **< F10 >**. When the Block Name prompt appears, type **LINE** and press **< Enter >**. The named macro is tucked away and can be executed later with **< Shift > - < F10 > LINE**.

## Entering the Text

As with any *WordPerfect* document, you must do a little preparation before entering text for the form. Take the LaserJet off line, slip the T cartridge into the LaserJet, and press **< Shift > - < F7 > 411** so *WordPerfect* knows the cartridge is there. Then set the document's left margin at 9 and its right margin at 96.

You can't reliably position proportional text with the **< Space >** bar, so you must instead turn to *WordPerfect*'s C tabs, which center text around a tab setting. To set C tabs at columns 39 and 65, select 1 or 2 from the Line Format menu. When *WordPerfect* pops up the tab ruler, sweep the cursor to the left by pressing **< Home > -**

< **CursorLeft** >, and clear out previous tab settings with < **Ctrl** > - < **End** >. To set the first C tab, type **39**, press < **Enter** >, and then type **C**. Repeat the process for the tab in column 65. Quit the tab menu by pressing < **F7** >, the Exit key.

It's easiest to enter text in top-down, left-to-right fashion. Starting at line 4, press < **Tab** > to position the cursor at column 39, press < **F2** > to select font 2 (Helvetica 12 point), and type **YOUR STORE'S NAME**. Jump the cursor to the C tab at column 65 by pressing < **Tab** > again, press < **F1** > to select the Helvetica 10-point font, and type **Invoice Number**. Press < **Enter** > to move to line 5,

press < **Tab** >, and type **321 Main Street**; on line 6, press < **Tab** > and type **Anytown, State 54321**.

As you continue down the form, you follow basically the same process. Skip to line 8, press < **Tab** > twice, and type **Invoice Date**. On line 9, flush with the left margin, type **Sold To:**. Go to line 12, < **Tab** > twice, and type **Customer Number**; repeat the process on line 16 and enter **Purchase Order Number**. At this point, you'll see that the four items are centered on the rightmost C tab.

Labels in the lower two-thirds of the invoice require four new tab settings. Go to line 20, clear out the previous tab settings, and set new C tabs at 13, 44, 76, and 90. Switch to font 2 and type in the Quantity, Item, Unit Price, and Amount labels. The last two labels, Notes: and Total Due, begin

on line 44 and use font 1. To check the alignment of all the labels in the form, print out the page. With the text in place and properly lined up, you're ready to create the actual form with Line Draw.

### ■ The Line Forms Here

When you approach any design-oriented task, be it formatting a worksheet or laying out a page with *Ventura Publisher*, do the big things first and worry about the small stuff later. In this case, that means setting margins, laying down the five horizontal lines in the form, and drawing the boundaries.

Move the cursor to line 46, just below the Total Due label. Open the Super/Subscript menu by pressing < **Shift** > - < **F1** > and select **6**, the Advance Line function. At the 'Adv:' prompt that follows, type **2** < **Enter** >, and *WordPerfect* resets the line indicator (the 'Ln:' indicator in the lower left corner of the screen) at line 2. Set new left and right margins at 5 and 80, respectively, and switch to the Line Draw font. Now you specify where *WordPerfect* should lay the form over the text at print time. Since the label YOUR STORE'S NAME begins on line 4, the top border of the form should begin on line 3.

The next order of business is slapping down the 5 identical horizontal lines. Move the cursor down to line 3, and retrieve the LINE macro by pressing < **Shift** > - < **F10** > and entering **LINE** at the prompt. Press < **Enter** >, and the line zips across

	0																			1
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040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{		}	~	⌘	ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï
140	î	ì	Ë	À	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ç	£	¥	₹	f
160	á	í	ó	ú	ñ	Ñ	•	◊	∩	∪	½	¼	⅓	⅔	⅕	⅖	⅗	⅘	⅙	⅚
180	┌	┐	└	┘	├	┤	┼	┴	┬	┴	┬	┴	┬	┴	┬	┴	┬	┴	┬	┴
200	┌	┐	└	┘	├	┤	┼	┴	┬	┴	┬	┴	┬	┴	┬	┴	┬	┴	┬	┴
220	■	▣	▤	▥	▦	▧	▨	▩	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ
240	≡	±	≥	≤	↑	↓	÷	≈	°	·	·	·	√	η	²	·				
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
	0																			1

Figure 2: Before you generate a form, print out WordPerfect's FONT.TST ASCII table and see how closely it matches this table. If nothing else, your printer must support the keyboard characters and the Line Draw graphics characters.

line 3	Column 9 Ctab	Column 39 Ctab	Column 53	Column 65 Ctab
	YOUR STORE'S NAME 321 Main Street Anytown, State 54321			Invoice Number
line 7				Invoice Date
line 8				
line 9	Sold To:			
line 11				Customer Number
line 12				
line 15				Purchase Order Number
line 16				
line 19	Column 13 Ctab	Column 44 Ctab	Column 56 Ctab	Column 70 Ctab
line 20	Quantity	Item	Unit Price	Amount
line 21				
line 43				Total Due
line 44	Notes:			
line 45				
line 52				

Figure 3: With attention to the proper alignment of text and lines, the HP LaserJet and WordPerfect's Line Draw can produce printshop-quality business forms like this.

the top of the screen. Follow the same steps at lines 19, 21, 43, and 52.

To draw the form's left vertical border, move the cursor back to the beginning of line 3. Turn on Line Draw, select the single-line character, and enter `< Esc > 49 < CursorDown >`; *WordPerfect* drops a border straight down to line 52. To move the cursor across the bottom of the screen without drawing a line, select the Move function from the Line Draw menu. Scoot the cursor to column 75, select Line Draw again, enter `< Esc > 49 < CursorUp >`, and *WordPerfect* rockets a line 49 spaces up the right side of the form.

With the boundaries in place, you can now draw the shorter vertical and horizontal lines inside the invoice. Select Move and shuttle the cursor to column 53 on line 3. Select 1 from the Line Draw menu, enter `< Esc > 45 < CursorDown >`, and *WordPerfect* draws a vertical line to where the Total Due label will be. Make a right turn with `< CursorRight >`, and continue the line across the screen to the invoice's border. Draw the remaining miscellaneous lines, using the row and column coordinates shown in Figure 3.

When you're done, save the file and print it.

The process outlined here merely hints at the possibilities with Line Draw and the HP LaserJet. With a little practice and patience, you can whip up just about any form you like. Of course, *WordPerfect*-generated forms may not fit everyone's needs, but they can certainly fit anyone's pocketbook. ●

*Ralph Blodgett is a magazine editor and freelance writer in Hagerstown, Maryland.*

# Pictures for WordPerfect



Philip Anderson

The job of mixing graphics and text is usually reserved for desktop publishing programs. But thanks to a little-known command, WordPerfect 4.0 can bring the two together with a minimum of fuss.

*Paul Reitman*

■ ■ ■ ■ Few word processing programs are equipped to integrate text and graphics. To patch a 1-2-3 pie chart or a *Reflex* graph into a report, you usually have to drag out the scissors and glue and literally cut and paste the images onto the page.

However, with *WordPerfect's* Insert Printer and Retrieve commands, you can merge images generated by a graphics program into a document as *WordPerfect* prints it out. The process involves opening a document, using the Insert Printer command to embed the Retrieve command where you want a graphic to appear, supplying the name and location of the graphics file, and printing it. When *WordPerfect* encounters a Retrieve command, it stops printing the text, copies the specified graphics file to the printer, then resumes printing the document. Admittedly this is integration on the cheap, but if you don't want the hassles of a *Ventura Publisher*, it's a quick alternative.

### ■ Caution: Graphics Merge Ahead

Limits apply, of course. Since graphics are not truly incorporated into a document but merely retrieved and printed, you can't

display images and text together on screen. (*WordPerfect's* character-based nature would preclude this anyway.) Thus *WordPerfect* can't wrap text around an image, much less place pictures and text in adjacent columns. You can't size or finely position an image within *WordPerfect* either. And to center, scale, or add white space to a picture, you must use a graphics package and then pass the graphic along.

Keep in mind that *WordPerfect* doesn't work with just any graphics file. The Insert Printer/Retrieve combination is confined to *print files*—files produced by graphics programs that can redirect printer output to disk. Print files contain not only the data to be printed but also the necessary Escape sequences that control the printer. (Most word processors can likewise “print” a document to disk; to output such files to a printer, you can simply type COPY *filename* PRN at the DOS prompt. *WordPerfect's* Insert Printer function relies on this same technique to print graphics files.) As you might imagine, *WordPerfect* and the graphics program you use must be configured to support the same printer. If the two don't match, the printer will spew out gobbledygook—or fail to print at all.

Even though this technique falls far short of desktop publishing,

jazzing up *WordPerfect* documents can be as easy as pie. You won't find the recipe in the *WordPerfect* manual, but all the necessary ingredients are within easy reach.

### ■ Integration Secrets

*WordPerfect's* user manual discusses the Insert Printer and Retrieve commands but never draws a connection between the two. The Insert Printer discussion focuses primarily on embedding printer control codes in text for strike-through, italics, and other effects; the discourse on Retrieve notes its talent at merging text files but never mentions graphics. Pair this dynamic duo, and you can proficiently mix words and pictures.

If your graphics program can print an image to disk, folding pictures into *WordPerfect* is simple indeed. To indicate where a graphic should appear in text, open the document in question and position the cursor on the line where the picture should begin. Press < Ctrl > - < F8 > to display the Print Format menu, and select A for the Insert Printer feature.

*WordPerfect* asks you to supply a command. Press < Shift > -

Programs that can generate print files

Type of program	Program	Generates graphics print file
CAD	AutoCad	◆
	Generic CADD	
	ProDesign II	
	VersaCAD	
Data management	Reflex	
Graphics	Atlas Graphics	◆
	Autosketch	◆
	Chart-Master	◆
	Diagraph	◆
	Dr. Halo	
	Diagram-Master	◆
	Energraphics	◆
	Freelance Plus	
	Harvard Presentation Graphics	
	Map-Master	◆
	Microsoft Chart	◆
	PC Paintbrush	◆
	PC Paintbrush +	◆
	PC Storyboard	◆
	Publisher's Paintbrush	◆
	Show Partner	
	Sign-Master	◆
Windows Graph	◆	
Windows Draw	◆	
Integrated	Framework II	
	The Smart System	
	Symphony	
Spreadsheets	1-2-3	
	Javelin	
	Multiplan	◆
	SuperCalc 3	
	VP-Planner	

< F10 > to enter the Retrieve command, followed by the name of the graphics file, drive, and path, such as D:\graphics\figure4.prt. Press < Enter > and the Retrieve command is embedded in the document. If you press <Alt>-<F3> (Reveal Codes), you'll see the line '[Cmnd: <126>D:\graphics\figure4.prt]' nestled in the text.

If you forget to specify the drive or path, *WordPerfect* will search the current drive and directory for the graphics file at print time. If the program comes back empty-handed, *WordPerfect* will blithely print out the document sans graphics—without flagging the error.

**Laying Out the Page**

Sounds simple, doesn't it? Unfortunately, *WordPerfect* does not automatically compensate for the text an inserted graphic displaces. In order to preserve the position of page numbers, headers, and footnotes throughout the document, you must determine how many lines each incorporated graphic consumes and adjust the pages accordingly.

The quickest method is to size an image with the graphics package, print it out, lay it next to a sample page from the document, and gauge how many lines the image will soak up. *WordPerfect's* default printed page is 51 lines long. So, if a Retrieve command is placed on line 21 and the referenced graphic takes up 10 lines, you must count down 20 lines past the Retrieve command to what will be the 51st line and insert a hard page break (<Ctrl>-<Enter>) to indicate the end of the page. If you'd rather measure the graphic with a ruler, remember that there are 6 lines to an inch.

*WordPerfect 4.2* users take note: Since the Insert Printer and Retrieve commands are invisible unless you use the Reveal Codes function, it's a good idea to flag them in a document by inserting nonprinting comments on screen. Position the cursor directly above the Retrieve code and press <Ctrl>-<F5> to display the Text In/Out menu. Select B for Create Comment, and a comment box appears at the top of the screen. Type in a description of the graphic (such as the number of lines it occupies on the page) and press <Enter> (see Screen 1).

### Using Graphics From Lotusland

If your graphics package can size images and produce print files, you can stop here. However, if you use *1-2-3* or *Symphony*, be prepared to take a few more steps—and spend some money.

The most important item on the agenda is obtaining a package such as *PC Paintbrush* that can import Lotus's .PIC files, size images, and print them to disk. Having a paint program around is also handy if you want to touch up a ho-hum *1-2-3* or *Symphony* graph. Once you've grabbed a .PIC file with *PC Paintbrush*, you can add colors, shadings, patterns, fancy fonts, and more to the graphic before passing it along to *WordPerfect*.

The *PC Paintbrush/WordPerfect* duo can produce impressive results. In the creation of Figure 1, for example, a *1-2-3* .PIC file was pulled into *PC Paintbrush*, and after several test printouts, scaled to fit into a 7-line space. The labels and legends were then enhanced

with *PC Paintbrush's* Text Tool feature. The final image was sent to disk and printed out under *WordPerfect's* aegis on an IBM Proprinter.

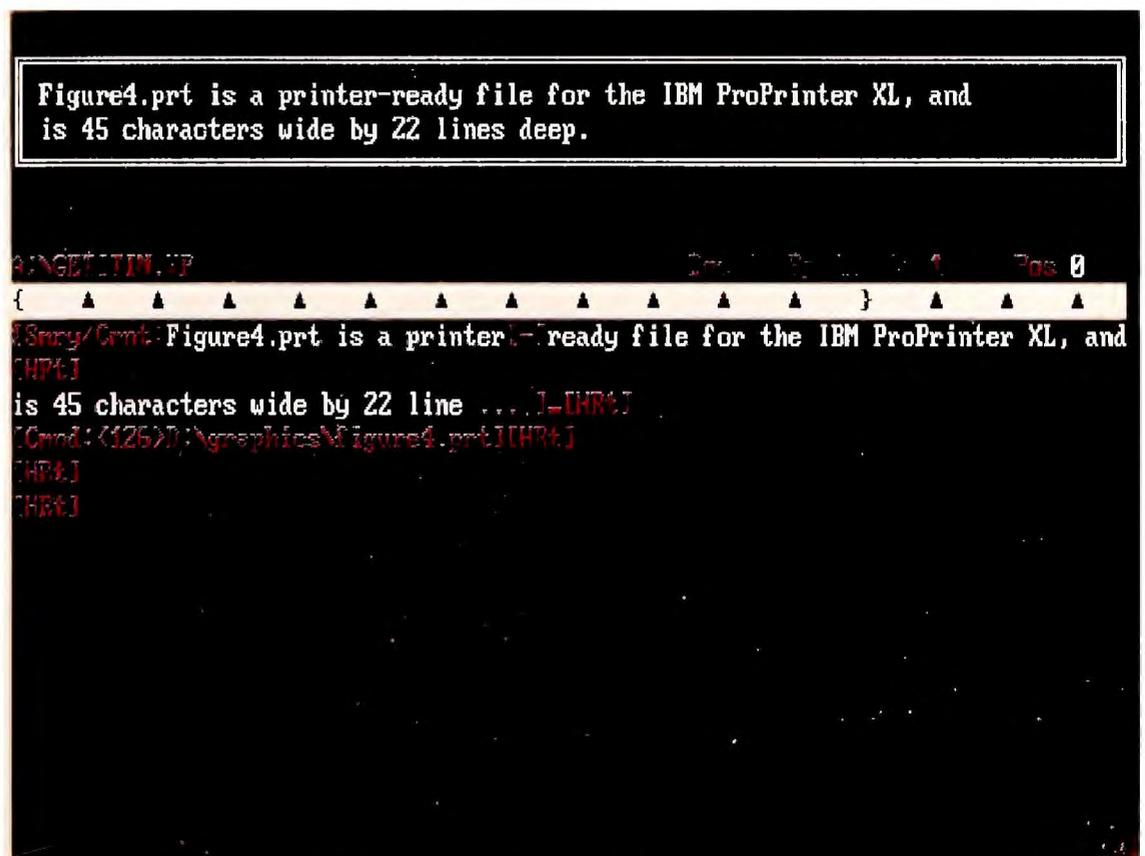
### The Screen Snapshot Alternative

If *1-2-3* or *Symphony* isn't your graphics mainstay, or you'd rather not buy a seven-course graphics package for a snack, you can always turn to dedicated screen-capture programs (see "Print That Screen," *PCW*, March 1987). Symsoft's RAM-resident *Hotshot*, for instance, can snag images displayed on almost any video setup. Once an image is snared, you can size and crop it and add symbols and borders before printing the picture to disk.

Most screen-capture programs work basically the same way. To capture a *1-2-3* chart with *Hotshot*, for example, you load *Hot-*

*shot*, then *1-2-3*, display the chart, and press <Alt>-P. With the image captured, you press <Alt>-H to access functions such as Erase, Shade, Left Margin Cropping, Annotate Text, and Draw. (Once you activate Erase, for example, you simply wipe out areas by sweeping the cursor across the screen.) Type CVRT at *Hotshot's* prompt, and the Convert menu pops up; enter the drive and path where graphics files are stored, press <F2>, and the chart is printed to disk.

*Hotshot* is a full-service utility for graphics-hungry *WordPerfect* users, but at \$199 it's a little pricey. Screen-capture programs under \$100, such as *Grafplus* or *Inset*, will probably suffice in most cases. Just remember that the screen-capture program you choose must be able to size im-

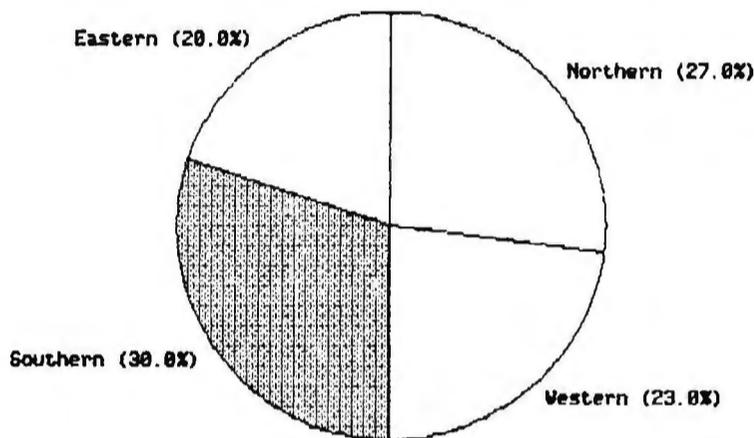


Screen 1: The Insert Printer and Retrieve commands remain invisible unless you use the Reveal Codes function, but *WordPerfect 4.2* users can mark the location of the commands with nonprinting comments.

**TastyPie Annual Report**  
**Regional Sales**  
**July 1987**

**Improvements**

Last year was a spectacular year for TastyPie; our regional sales showed a marked improvement over the previous years of bitter baking. Our new line of filled pies is expected to do even better in the upcoming fiscal year. Much of the improvement comes from our Southern region, where the percentage of growth since 1986 was outstanding in comparison with our other regions.



**Summary**

The region boasting the highest sales dollars in 1987 was the Southern region, with a total exceeding the 11,000 target. Sales are attributed to the new line of **SPICE FRITTERS** shipped this year, and next year's report should show an even greater improvement.

Figure 1: 1-2-3 graphs can be embellished and printed to disk with PC Paintbrush, then merged with WordPerfect text.

ages and work with the graphics modes supported by the system's video controller.

Clearly this patchwork approach to page composition won't put *PageMaker* and *Ventura* out of business. But if your business documents need a little pizzazz, this is one way to stretch *WordPerfect* without straining your budget. ●

*Paul Reitman writes PC- and host-based software documentation for IBM in Boulder, Colorado.*

*Grafplus version 2.6*  
*Jewell Technologies, Inc.*  
*4740 44th Ave. SW*  
*Seattle, WA 98116*  
*206/937-1081*  
*List price: \$49.95*  
*Requirements: 13K, one disk drive, graphics adapter and monitor, DOS 2.00 or later version*  
*Not copy protected*

*Hotshot version 1.1*  
*Symsoft*

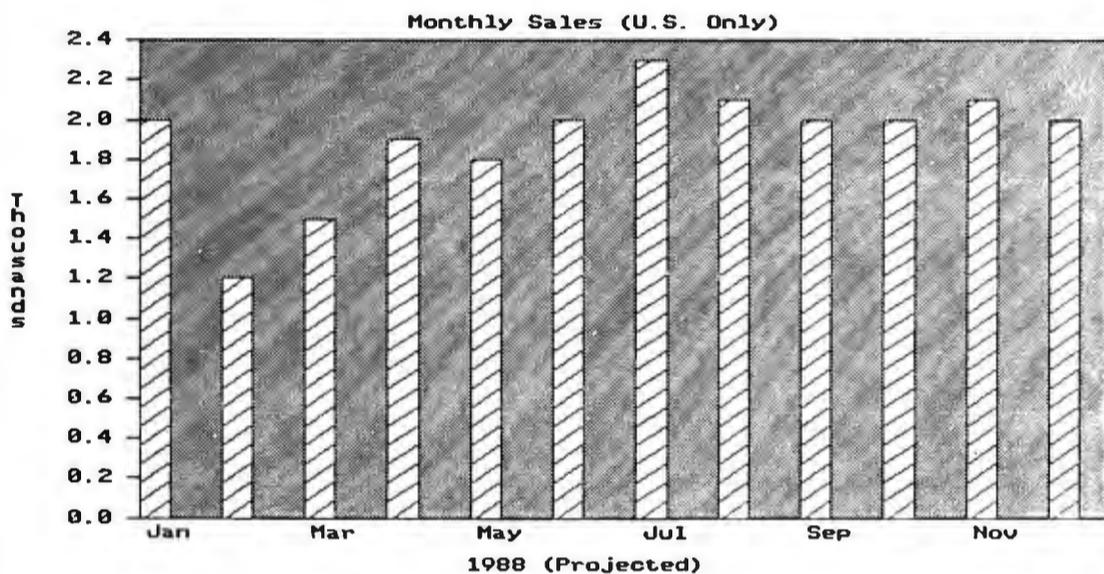
*P.O. Box 4477*  
*Mountain View, CA 94040*  
*415/941-1552*  
*List price: \$199*  
*Requirements: 60K, one disk drive, graphics adapter and monitor, DOS 2.00 or later version*  
*Not copy protected*

*Inset version 2.0*  
*APG Software*  
*12 Mill Plain Rd.*  
*Danbury, CT 06811*  
*203/794-0333*

**Widget Manufacturing Sales Projection**  
United States Sales  
1988

**Projection**

Next year's projections for U.S. distribution are no doubt aggressive, but our sales force is committed to putting a Widget in every pot. The demand for our new line of *improved* Widgets is unprecedented, and we expect our sales to peak in July of 1988 with a high of 2300 units. We expect the yearly "February slump," but the new incentives announced below should help our sales force beat that glum projection.



**Incentive Plan**

Since February has always been a slow time at Widget, this year there will be a 15% increase in commissions for the month of February. In addition, one free Widget will be shipped to all salespersons who fulfill their quota. We hope these incentives will push the actual sales of Widgets to 1800 units. If the February incentive plan proves successful, it will be extended into the month of March.

Figure 2: WordPerfect can combine text with 1-2-3 graphs snared by screen capture programs such as Hotshot.

List price: \$99  
Requirements: 85K, one disk drive, graphics adapter and monitor, DOS 2.00 or later version  
Not copy protected

PC Paintbrush  
ZSoft  
1950 Spectrum Circle #A495  
Marietta, GA 30067  
404/980-1950  
List price: \$95

Requirements: 320K, one disk drive, graphics adapter and monitor, DOS 2.00 or later version  
Not copy protected

PC Paintbrush +  
ZSoft  
List price: \$149  
Requirements: 320K, one disk drive, graphics adapter and monitor, DOS 2.00 or later version  
Not copy protected

WordPerfect version 4.2  
WordPerfect Corp.  
288 W. Center St.  
Orem, Utah 84057  
801/225-5000  
List price: \$495  
Requirements: 256K, two disk drives (hard disk recommended), DOS 2.00 or later version  
Not copy protected

# Workstations Tailored to Fit

If working with your PC is causing you aches and pains, a few ergonomic accessories may bring you some much-needed relief.

*Steve Cummings*

 The PC has changed the way we do our work, but it's also added a few twists to what our work does to us. Eyestrain, muscular pain, and other maladies can plague people who spend the majority of their work time planted in front of PCs. To combat these PC-related afflictions, manufacturers of office products and PC peripherals have turned to the science of *ergonomics*.

Also referred to as *human factors engineering*, ergonomics is the study of furniture, tool, and office designs that keep people comfortable and healthy while they work. As research from such groups as the 9 to 5 National Organization of Working Women points out, proper posture, a glare-free CRT, and noise control lie at the heart of the ergonomic PC work environment. Although PCs generally lag behind mainframe terminals in ergonomic design, specially constructed chairs, screen filters, monitor pedestals, and quiet power-supply fans can help bring a PC workstation up to ergonomic standards.

## Sitting Pretty

Desk-bound PC users are particularly prone to aches and pains resulting from poor posture. Frequent stretching and regular breaks help, but you should also consider buying furniture that keeps your body at an even keel.

A good chair is basic to on-the-job comfort. Features to look for in an ergonomically sound chair are adjustable seat and backrest heights, a back-tilt mechanism with variable tension, sturdy lower-back support, a contoured seat bucket with a rounded front edge to reduce pressure on the thighs, and firm padding.

Acco International's Ergonomizer, for example, has a pneumatically adjustable seat so you can sit with your feet squarely on the floor—a simple but vital component of good posture. The flexible backrest provides continuous support whether you're sitting fully erect or leaning back.

Other chair designs take a more radical approach to better posture. One promising newcomer, Congleton Workplace Systems' Pos-Chair, looks something like a tractor seat and comes in separate models for men and women. The seat bucket can be angled forward to keep your back erect and your knees flexed less than 90 degrees.



Sharmen Liao

According to the chair's designer, this reduces strain on the lower back and minimizes pressure on the thighs.

Keyboard height and monitor position are also vital to good posture. The 9 to 5 guidelines recommend keeping the keyboard at elbow level so your forearms are

parallel to the floor. A keyboard positioned too low or, more commonly, too high can eventually cause shoulder and wrist pain.

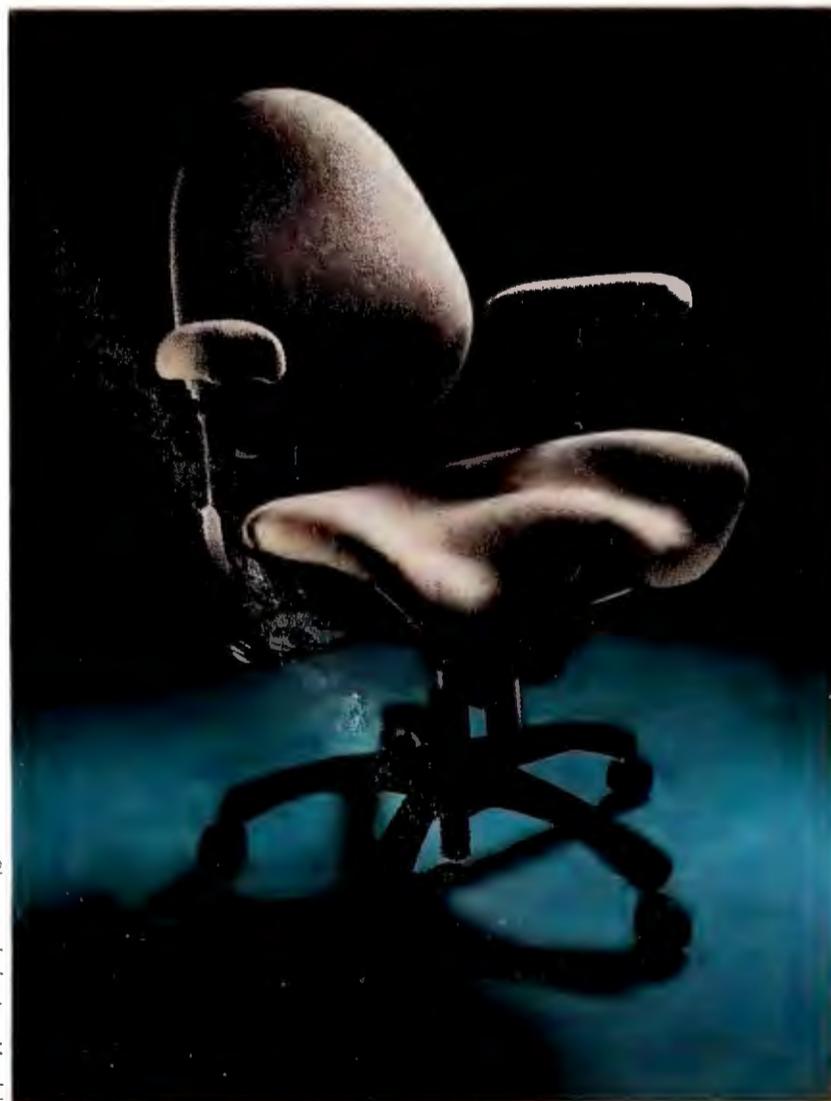
Your monitor should also be properly aligned, with the center of the screen situated an inch or two below eye level. Straining to peer into a poorly positioned monitor can throw your posture out of alignment and cause undue back and neck strain.

One way to prevent these ailments is the Adjustable Personal Computer Table from Ergonomic Computer Products. The table's separate keyboard and CPU/monitor platforms adjust for height, tilt, and depth to help you find a

The Ergo Dec II from Ergonomic Computer Products, Acco International's Anti-Static Wrist Rest, and the Roland DG MB 142 monitor



The Pos Chair from Congleton Systems features an innovative seat design.



Photographs by Stan Alusick

comfortable working position. If you already have a desk, the Ergo-Dec II (also from Ergonomic Computer Products) provides an add-on base for CPU and monitor and an adjustable keyboard shelf.

A flexible monitor stand such as the Universal Swivel Arm from Ergonomic Computer Products is another easy way to control display height. The metal arm clamps on to the edge of a desk or table and connects with a tilt-and-swivel platform that adjusts to fit any monitor. A hand crank raises the monitor platform from 5 to 14 inches high, and the hinged arm pivots for front-to-back and side-to-side positioning.

Once you have these workstation essentials in place, you can add refinements like a wristrest or a footrest. The Acco Anti-Static Wristrest clamps on to the front of your desktop and has a padded support bar that keeps your wrists from slumping during a long typing stint. To help blood circulate to your feet and prevent undue strain on the muscles in your thighs and the back of your legs, a footrest such as the Foot-Flexor from Ergonomic Computer Products is a wise investment.

**■ Monitor Your Vision** Anyone doing detail work is subject to eyestrain, but screen glare and poor monitor resolution pose special vision problems for PC users. You should be able to comfortably view the screen from a minimum distance of 14 to 20 inches. If you wear reading glasses, which usually have a

shorter focal length, you're likely to need a special prescription for a well-focused view of your PC. Room lighting should be diffuse and not overly bright. You should also use a separate lamp to illuminate printed material while you work with your PC.

Use a monitor that's easy to read. Amber monitors are said to be easier on the eyes than green screens, but this has never been proven. Still, as a matter of personal preference, the color of a monochrome display may affect your productivity during a long day's work.

If you need a color monitor, choose one that's compatible with the IBM Enhanced Graphics Adapter (EGA) rather than the Color/Graphics Adapter (CGA). The CGA is notorious for its coarse graphics and fuzzy text display. If you must use a CGA monitor, consider using a separate monochrome monitor for text-only applications.

The new monochrome monitors with "paper white" displays produce black characters on a white background, much like the Apple Macintosh. Ostensibly, this makes a screenful of text easier to read because it bears a close resemblance to a printed page. Users who must scan back and forth between hard copy and a PC screen may find this monochrome scheme easier on their eyes. However, most black-on-white displays that sport high resolution for desktop publishing applications also sport a high price tag.

If a black-on-white screen sounds like the answer to your viewing problems but you don't

need a high-resolution, high-priced display, consider the MB-142 from Roland DG. The MB-142 is compatible with the IBM Monochrome Display Adapter and displays both text and graphics. It measures 14 inches diagonally (2 inches larger than most monochrome screens) and switches to a white-on-black display at the flick of a button.

Regardless of screen color, the display problem you're most likely to encounter is glare from reflected ambient light in your workplace. The simplest solution is a screen filter that covers the monitor's viewing surface. There are two types of filters, each with advantages and drawbacks.

Filters such as the Sun-Flex SuperScreen cut glare dramatically by using a fine fabric mesh, usually nylon, which causes incoming light to bounce off at sharp angles rather than reflecting it back to your eyes. SuperScreens provide a low-cost glare solution and come in shapes and sizes that fit almost any monitor.

**Ergonomic Designs' Adjustable Computer Table** provides one-stop workstation flexibility.



Mesh filters, however, are often incompatible with high-resolution color monitors. They sometimes create optical distortion patterns that interfere with screen visibility as much as glare does. They may also make your color display appear dim. In addition, mesh filters—for color and monochrome monitors alike—must be frequently cleaned since dust readily collects in them.

The alternative is an optically coated glass screen such as the Glare/Guard Vantage from Optical Coating Laboratory. The coating on this kind of filter allows light to pass through without reflecting it back to the viewer. Unlike mesh filters, optically coated filters work equally well with color and monochrome monitors. On the other hand, glass filters like the Glare/Guard smudge easily and are more expensive than mesh screens.

A more subtle problem with CRT displays is the static electrical

charge that inevitably develops on and around the screen surface. You've probably heard a static crackle when you touch a monitor's screen; that same electrical charge attracts a hoard of airborne dust particles. Although there are no proven health risks, skin rashes have been blamed on the static-induced dust cloud.

PC monitors also produce another potential problem in the form of very low frequency (VLF) and extremely low frequency (ELF) electromagnetic waves. Highly controversial studies have implicated VLF/ELF radiation as a cause of birth defects. Although manufacturers and government officials insist that no danger exists, new monitors are required by law not to leak VLF and ELF waves. The waves, however, still escape through the screen at measurable levels.

Both VLF and ELF emissions can be countered with special

antiglare filters, which contain an electrically conductive material in the fabric mesh. Connecting the filter's ground wire to an appropriate grounding post (such as the CPU cover) neutralizes both static and electromagnetic emissions. Sun-Flex makes a grounded mesh filter called the Protector. Optical Coating Laboratory also offers the Glare/Guard Professional, a grounded, optically coated glass filter that performs the same dual function.

#### ■ Silent Service

For PC users in a typical office, noise doesn't pose the obvious problem that it does for workers in airports, foundries, and factories. All the same, incessant noise from computers or their peripherals can be distracting and irritating.

The PC's two sources of constant noise are the hard disk drive and the fan in the power supply. You'll likely find that the fan

drowns out any noise from the hard disk drive. To check noise levels before you buy your PC, power it up in the dealer's showroom to see if the sound bothers you.

Be advised, however, that what seems like a gentle purr in a store can become a nagging whine in the close confines of an office. You can get a less annoying replacement fan for power supplies from PC Cooling Systems. The Silencer 150 is 84 percent quieter than the fan in a standard PC, while the Silencer 200AT provides a 67 percent reduction of an AT's noise.

A more obvious source of racket is the clatter from impact printers. If you can't move the printers out of earshot, the next best alternative is using a sound enclosure like the Acoustical Control Enclosure from MKM Manufacturing or the Printer Sound Enclosure from Quiet Print. These enclosures have several walls lined with high-density, sound-absorbing foam, which tone printer noise down to a low murmur.

Whether you're faced with excessive noise, posture problems, or screen irritants, ergonomic difficulties are a given in today's workplace—at least until PC designers and office managers decide to make the human factor paramount. In the meantime, smart office planners help ensure the health and comfort of workers on the job by investing in ergonomic accessories. Although a chair or fan may not have the glamour of state-of-the-art hardware and software, ergonomic devices can be every bit as important to the PC user's productivity. The payoff for careful thought and prudent shopping is reduced stress, less strain, and better performance on the job. ●



Cut down extraneous printer sound with the Noise Control Enclosure from MKM Manufacturing.

Photographs by Stan Musilek

Steve Cummings is a freelance writer in Davis, California, who frequently writes about computers.

*Acoustical Control Enclosure*  
MKM Manufacturing, Inc.  
1290 Holm Rd.  
Petaluma, CA  
800/253-2830, 707/763-0981  
List price: \$279 to \$549

*Adjustable Personal Computer Table*  
Ergonomic Computer Products  
1850 Union St. #125  
San Francisco, CA 94123  
415/673-5757  
List price: \$199

*Anti-Static Wristrest*  
Acco International, Inc.  
770 S. Acco Plaza  
Wheeling, IL 60090  
312/541-9500  
List price: \$59

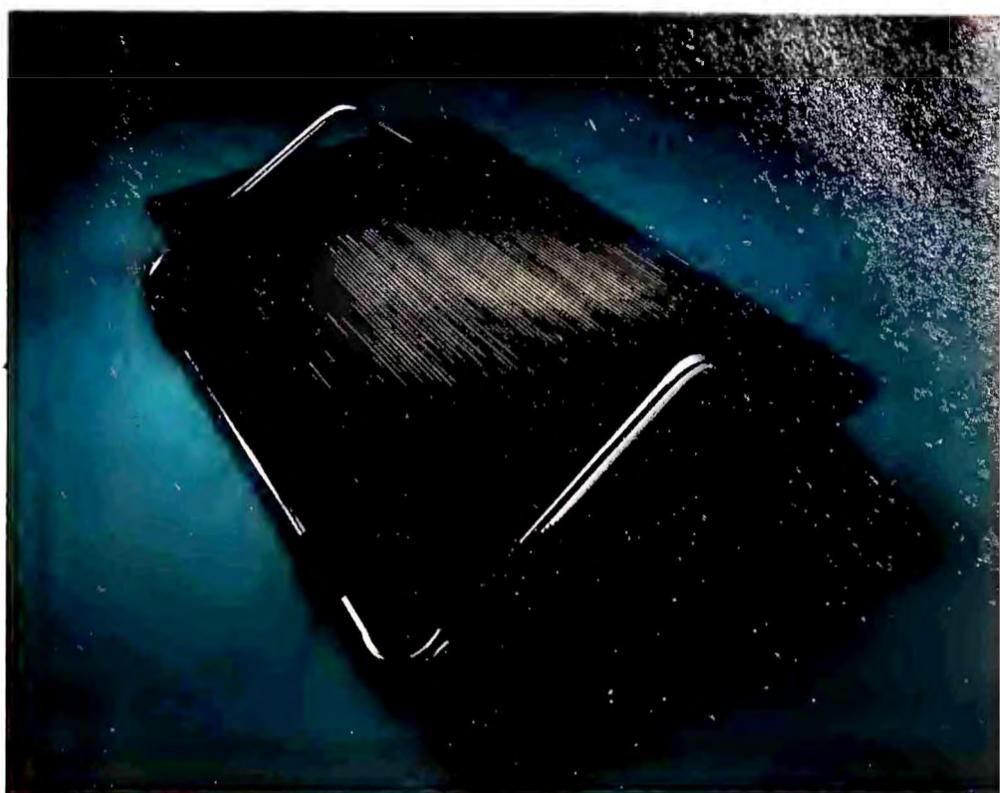
*Ergo-Dec II*  
Ergonomic Computer Products  
List price: \$169

*Ergonomizer*  
Acco International, Inc.  
List price: \$189

*Foot-Flexor*  
Ergonomic Computer Products  
List price: \$29.95

*Glare/Guard Professional*  
Optical Coating Laboratory, Inc.  
Santa Rosa, CA 95407  
800/654-1881, 707/545-6440  
California  
List price: \$99

*Ergonomic Computer Products' Foot Rise*  
reduces strain on the calves and thighs.



*Glare/Guard Vantage*  
Optical Coating Laboratory, Inc.  
List price: \$59

MB-142  
Roland DG  
7200 Dominion Circle  
Los Angeles, CA 90040  
213/685-5141  
List price: \$399

9 to 5 National Organization of Working Women  
614 Superior Ave. NW  
Cleveland, OH 44113  
216/566-9308

Pos-Chair  
Congleton Workplace Systems  
3900 S. Texas Ave. #106  
College Station, TX 77840  
409/693-9356  
List price: \$790 to \$1120

*Printer Sound Enclosure*  
Quiet Print, Inc.  
20 Mill St.  
Healdsburg, CA 95448  
800/221-7933, 707/527-8180  
List price: \$174 to \$397

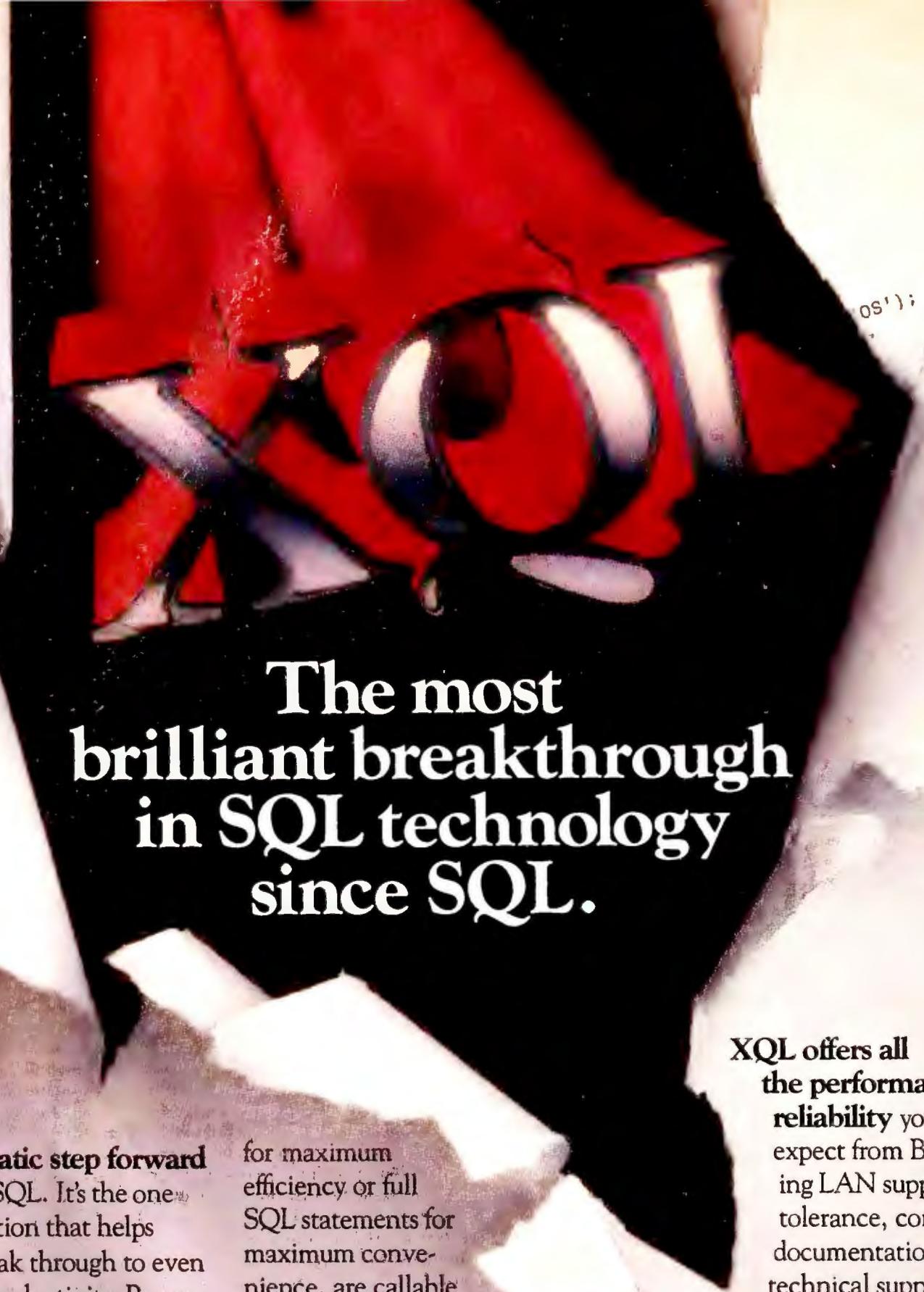
*Protector*  
Sun-Flex Co., Inc.  
20 Pimentel Ct.  
Novato, CA 94947  
800/321-1659, 415/883-1221  
List price: \$49.95

*Silencer 150*  
PC Cooling Systems  
Bonsall, CA 92003  
619/723-9513  
List price: \$149

*Silencer 200AT*  
PC Cooling Systems  
List price: \$179

*SuperScreen*  
Sun-Flex Co., Inc.  
List price: monochrome \$29.95, color \$34.95

*Universal Swivel Arm*  
Ergonomic Computer Products  
List price: \$199



# The most brilliant breakthrough in SQL technology since SQL.

**XQL is a dramatic step forward** in the history of SQL. It's the one unique SQL solution that helps programmers break through to even higher levels of productivity. Powerful yet easy to use, XQL minimizes your coding time and lets you focus on building better applications.

**XQL extends the power of Btrieve**, SoftCraft's high-performance file manager, by allowing access to multiple records at a time. It frees your application from physical file characteristics by providing true relational capabilities with data independence, data descriptions, data integrity and security.

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Austin, Texas 78766

(512) 346-8380 Telex 358 200

XQL, \$595; Btrieve, \$245; multiuser Btrieve, \$595. XQL requires Btrieve and PC-DOS or MS-DOS 2.X or 3.X. XQL is a trademark and Btrieve is a registered trademark of SoftCraft, Inc.

Circle 134 on reader service card

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(but you won't buy better performance)



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...w Fortis DM2010t or  
...M2015t.

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...u a lot, but they'll give  
...u a lot more performance  
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...t? At 240 characters per  
...ond in draft, or in our  
...w high speed Near  
...tter Quality mode rest  
...ured your work will be  
...ne in a hurry. And for  
...its quickness the Fortis  
...ar quieter than printers  
...t cost much more.

We also feature a wide range of multi-font cards. That's three type styles on one card — quite unique in our price category. And all character fonts, plus print pitch, can be controlled from the front panel.

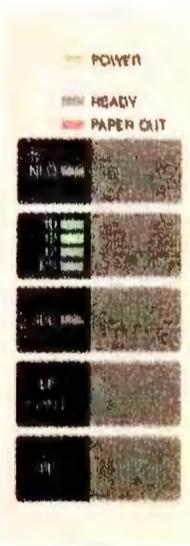


Another important feature is the built-in 7K buffer. It takes 2½ pages at a clip, lets your computer work harder.

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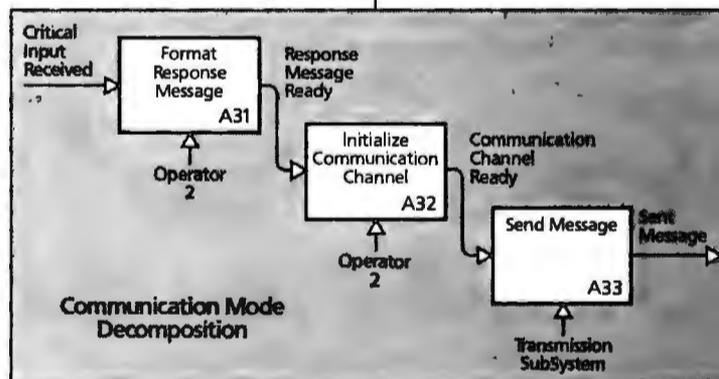
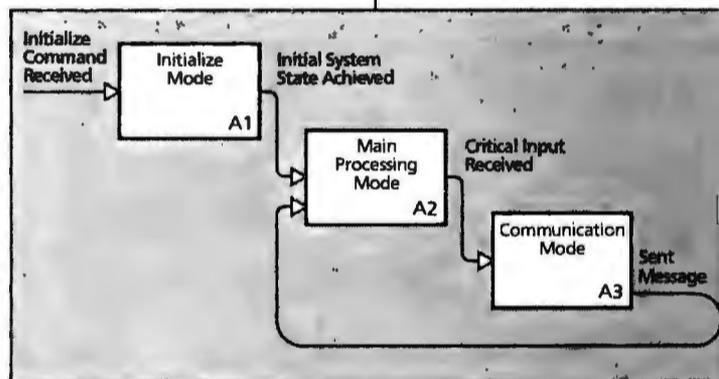
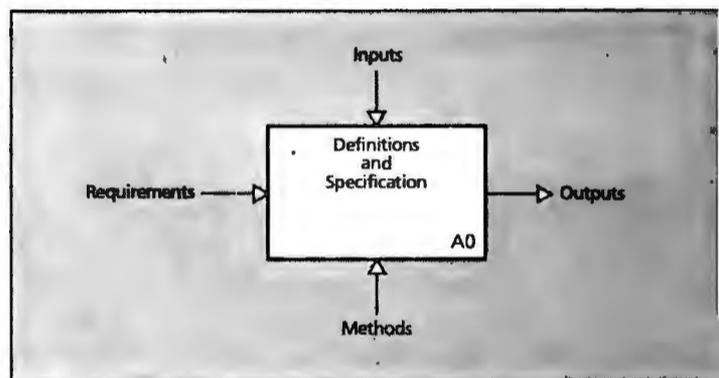
*Design* lets you create understandable graphic representations of projects and processes on your Macintosh™ or IBM® PC. So you can organize quickly, analyze effectively, and communicate clearly.

Draw flow charts, organizational charts, computer programs, communication networks, presentation graphics and production line processes—in record time. Once you connect one object to another in a diagram, it stays connected, no matter where you move it. *Design* makes it easier to establish, maintain and understand logical relationships.

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*Design* is available for the Apple® Macintosh™ 512, 512E, Plus, SE and II at \$250 as well as the IBM® PC/AT and compatibles at \$350. PC World 11/87

# The Upgrade Path

*Hands-on advice for upgrading PCs, compatibles, and peripherals*

The Upgrade Product of the Year and twice the motherboard memory for the Compaq Portable

Robert Luhn

## The Ultimate Turbo Board

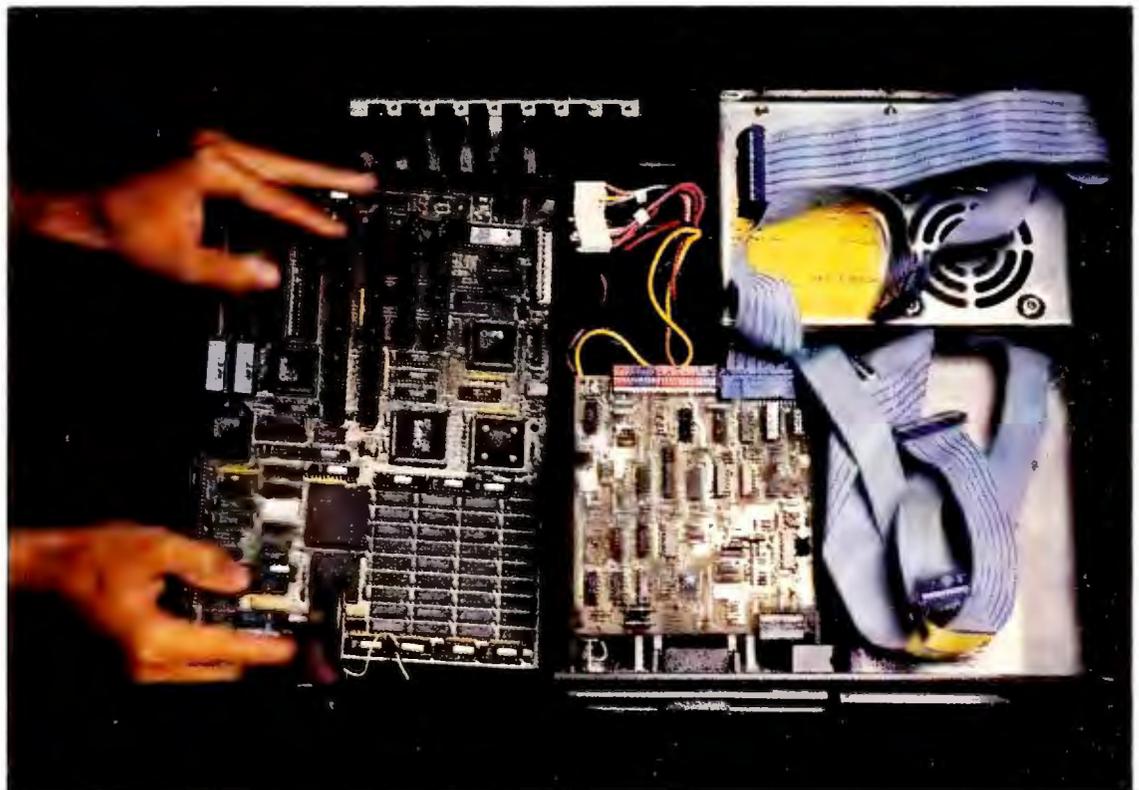
This column is not inclined to exult. Although many upgrade products offer budget-conscious users a reasonable way to stretch their machines, few provide a quantum leap in performance or utility. With the release of the Hauppauge 386 Motherboard for the IBM PC, XT, and compatible systems, that truism is shattered. Judged on price, performance, and ease of installation, the Hauppauge 386 Motherboard is easily the Upgrade Product of the Year.

The concept is simple, the installation straightforward, the performance gains startling. Instead of churning out a me-too 80386-based accelerator board for AT users, Hauppauge founders and former Intel engineers Ken Plotkin and Ken Aupperle consid-

ered the millions of PC and XT users searching for both a speed boost and OS/2 compatibility. The result is a replacement motherboard for \$1495 that packs a 16-MHz 80386 microprocessor, an AT-compatible Award BIOS ROM, 1MB of zero-wait-state 32-bit motherboard RAM, and five or eight slots (one 32-bit, one 8/16-bit, and the rest 8-bit) for the PC and XT, respectively. Although the company's proprietary 32-bit connector accepts memory boards holding up to 12MB of high-speed RAM, Hauppauge supplies only 1MB and 2MB memory boards at the moment. The 386 Motherboard examined here includes a 16-MHz 80387 coprocessor; a 80287 option is also available.

Hauppauge has taken pains to ensure that the 386 Motherboard

*(continues)*



Hauppauge's 386 Motherboard is a snap to install in a PC or XT. Remove all expansion boards and power plugs, undo two screws, slide the old motherboard out, and put the new one in. The 386 Motherboard can also be used in compatibles that mimic the size and general design of the PC's motherboard.

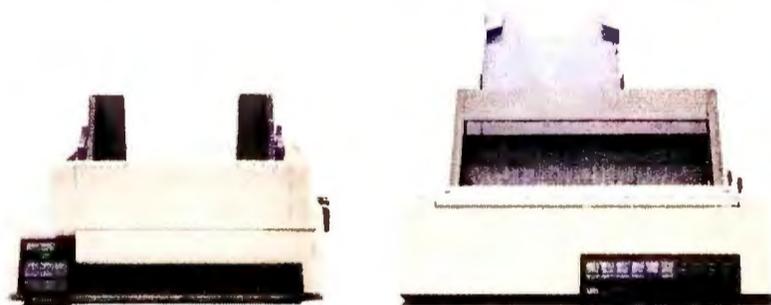
Pierre-Yves Gouquet

# Five ways to improve

No matter what your printing needs or budget, IBM® has a personal printer to help see that your ideas look great on paper, and in the public eye.



The popular IBM Proprinter II (left) and the IBM Proprinter XL24, ideal for printing on wide paper (right).



The IBM Proprinter X24 with optional sheet feed (left) and the IBM Quietwriter III Printer with single-drawer sheet feed (right).

To begin with, there's the newest member of the best-selling Proprinter™ family—the IBM Proprinter II. With Fastfont™, an extra-fast draft mode, this economical, hardworking printer handles general printing chores faster than ever.

With the IBM Proprinter X24 and wide-carriage Proprinter XL24, you can produce letter quality text and superb graphics in a hurry. When compared to best-selling, comparably priced 24-wire printers, they printed 1½ to 2



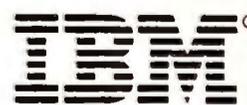
The IBM SolutionPac for Personal Publishing includes IBM's high-quality laser printer, the Personal Pageprinter.

times the draft output in the same amount of time.\*

For even higher quality text and graphics, consider the IBM Quietwriter III Printer. It whispers along at nearly twice the speed of its predecessor and is available with either a single- or dual-drawer sheet feed, for added paper-handling convenience.

If you're looking to design and print documents with a professional look, we offer the IBM SolutionPac™ for Personal Publishing. This compact, desktop publishing system comes with everything you need—the hardware, software, service and support—to design and print eye-catching presentations, newsletters, memos and more.

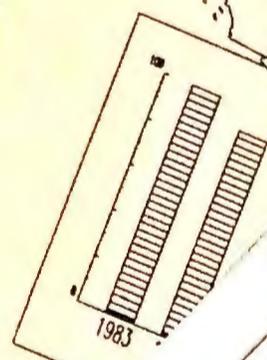
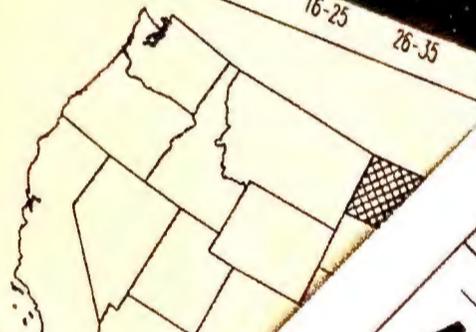
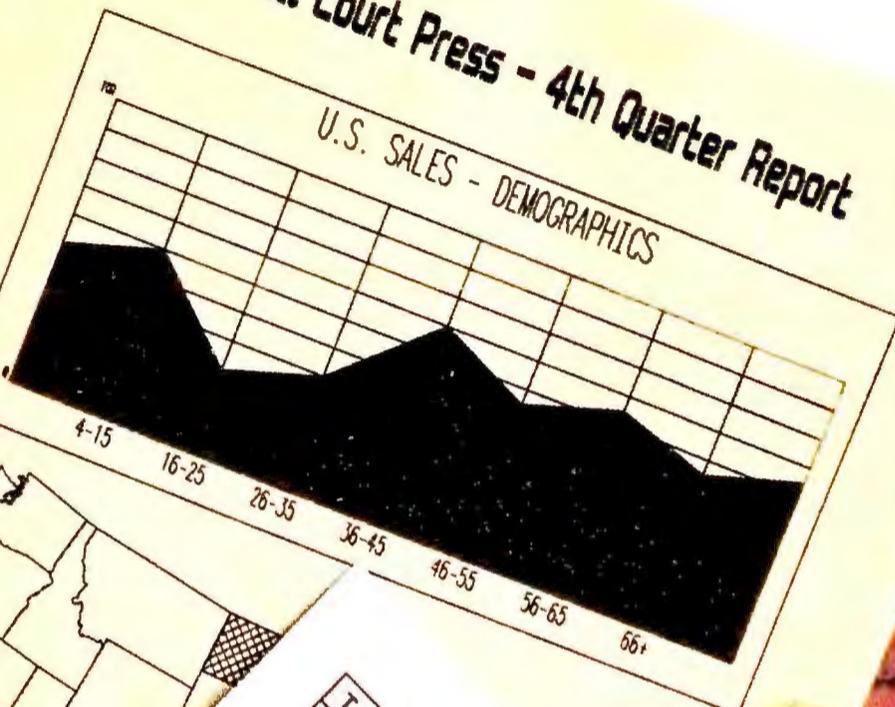
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## THE COMPANY NEWSLETTER

# All-Stars Clinch Division Title

### Heavy hitting powers All-Stars to the top



Last night, the All-Stars won the game, the title and a chance to shuffle off to Buffalo next week for the championships. The All-Stars powered themselves to the top with a 9-5 victory over the Grass Stains, who had been tied with the All-Stars for first place. The game was tight until the bottom of the fourth when the All-Stars blasted into the lead with two home runs to the upper deck in left field.

The game was highlighted by a most improbable play in which three All-Star players, each running at different speeds, ended up on third base at the same time. Fortunately, the third baseman missed the throw from centerfield, allowing two of the runners to score.

"I can't believe we pulled it off," exclaimed the All-Star manager. "A three-man pileup near third base, and they didn't even get one man out!"

The company will hold a pep rally for the All-Stars on Thursday at 2:00 p.m. in the conference room.

## All-City League Final Standings

East Division		North Division		West Division	
W	L	W	L	W	L
Waterlords	15	1	All-Stars	14	2
Bruisers	14	2	Grass Stains	13	3
Watercoolers	10	6	Maulers	9	7
Print Outs	7	9	Backstops	8	8
Balmen	4	12	Smashers	5	10
Overachievers	3	13	Generals	2	17
Staffers			V.I.P.'s	1	14
				Coffee Spills	14
				Crunchers	12
				Ramblers	11
				Hot Shots	8
				Go-Getters	7
				Trappers	5
				Operators	2

Apocrypha Books

Dear Miss Madigan,  
We were happy to receive the Month offering for by Nancy Bink.

We hope that hours of reading.

Since February including a de case with all selected from listening

If fill out

The P by D Two

Daniel Dine

## Hauppauge's 386 Motherboard Exposed

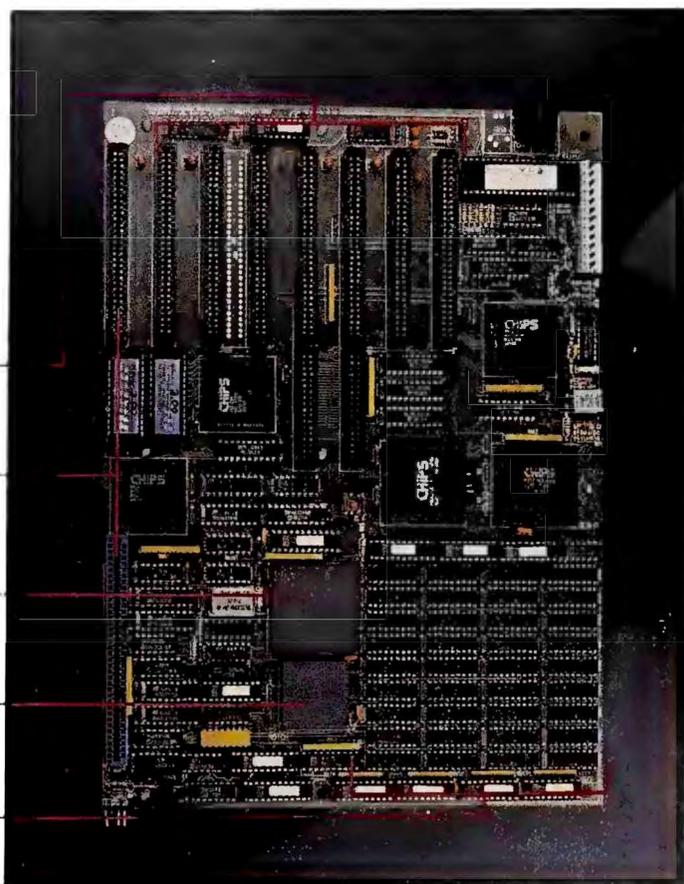
8- and 8/16-bit slots

32-bit slot

80386 microprocessor

80387 coprocessor

1MB of motherboard RAM



Pierre-Yves Coatec

is compatible with current and future standards, and has tested it with the OS/2 developer's kit (which is fussier than OS/2 is expected to be), *Windows 386*, and UNIX System V. The company also insists on using only 80386 microprocessors that Intel certifies can perform 32-bit math operations. (According to Claude Leglise of Intel, earlier versions of the 80386 chip lack this capability—a flaw that may prevent 386-specific operating systems and applications from running on systems equipped with older versions of the chip.) Hauppauge admits, however, that the 386 Motherboard can't currently run PC-MOS/386. A forthcoming BIOS ROM upgrade that corrects this oversight will be supplied to registered owners free of charge.

You might think installing a new motherboard is a daunting

project. But thanks to the PC's design and Hauppauge's illustrated step-by-step manual, you can make this upgrade in little over an hour with a small flat-blade screwdriver and a pair of needlenose pliers. The process essentially requires you to remove the system's expansion boards, undo two screws, slide the old motherboard out, slide the new one in, and return the boards to their slots. Once the 386 Motherboard is up and running, hold on to your keyboard—some programs may run 900 percent faster than before.

The first step toward warp-speed computing is rather mundane: If you're upgrading a machine with a hard disk drive, make sure the read/write heads are parked. Then turn off the system, ground yourself, remove all external cables, slide off the hood, and ground yourself again. Since you'll be swapping motherboards, you must naturally extract all installed expansion boards. How-

ever, you don't have to store the floppy and hard disk controllers on a shelf; merely pull each board out of its slot and, with the ribbon cables still attached, lay them on top of the hard disk drive. Finally, pop off the white power connectors attached to the back of the motherboard and the wire at the front that connects the XT's speaker to the system.

To make the big move, you undo two screws that sit on silvery pads on the motherboard. One is located immediately to the right of the keyboard connector, the other between the speaker and the floppy disk drive. Take out both screws, swivel the XT around so the disk drives are facing to the right, and grasp a couple of slot connectors. Gently shimmy the motherboard about half an inch toward you, then lift straight up to release it from the metal clips holding it to the chassis.

Before you pack the old motherboard away with your fedora, turn it up on its side and remove the five white plastic feet attached to the underside, noting their positions. If one of them won't budge, take a pair of needlenose pliers and pinch its top from the other side. But be careful—it's easy to damage adjacent components on the board.

Slide the Hauppauge 386 Motherboard out of its static-resistant bag and lay it on top. Unplug the flimsily attached battery pack (which powers the clock/calendar chip that stores system setup information) and set it aside for

(continues)

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now. Take the plastic feet you removed from the XT's old motherboard and insert them into the corresponding holes on the 386 Motherboard.

In true state-of-the-art fashion, there aren't any switches to set, but you must indicate the monitor type by moving a jumper on the black SW1 jumper block next to the keyboard connector. If the system uses a monochrome or Hercules video controller, cover the two pins closest to the edge of the motherboard; if color is your game, cover the other pin pair.

As you might guess, splicing the 386 Motherboard into the XT requires more or less the opposite of the steps outlined above. Line up the plastic feet on the bottom of the 386 Motherboard with the clips in the XT's chassis, lower the board into these metal slippers, and push it gently toward the power supply. Lift up the edges of the board to make sure all the feet are secure, and then gently tighten it down with the screws that held the original motherboard in place. To finish the job, reconnect the white power supply plugs to the motherboard (P8 is closest to the backplane), the speaker wire to the pins jutting out at the front of the motherboard, and the battery pack to the three pins immediately to the left of the power plugs. Since space is at a premium inside the XT, mount the battery pack on the side of the power supply.

Don't jump the gun at this point—you can't reassemble the XT and crank it up just yet. You must first test the 386 Motherboard and then configure it. Plug in the power cable and turn the

*(continues)*

## The XT Before and After the Hauppauge 386 Motherboard

- IBM PC XT with Hauppauge 386 Motherboard
- IBM PC AT
- PC XT

Find all prime numbers less than 1000 in interpreted BASIC



Find all prime numbers less than 10,000 in compiled BASIC



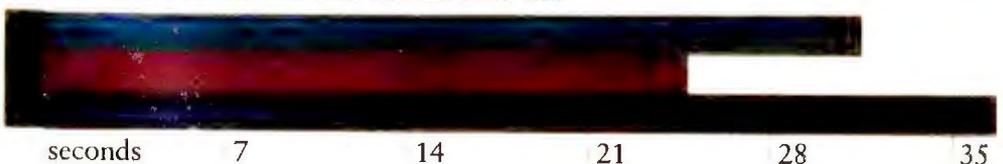
Reformat a 150K WordStar document



Recalculate a 243K 1-2-3 release 2 worksheet



Sort a 76K 712-record dBASE III Plus file

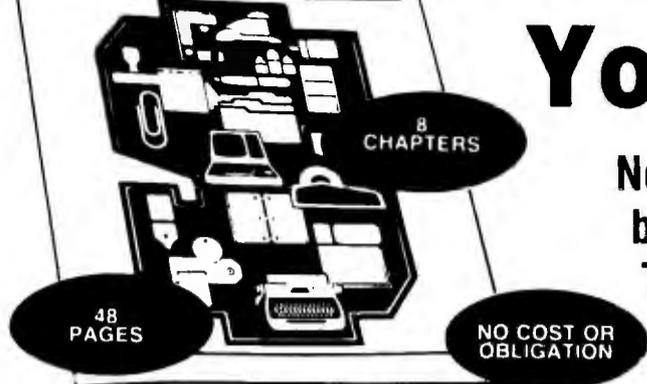


Performance tests were run on three systems: a 640K IBM PC XT equipped with a standard 65ms 10MB hard disk drive; an 8-MHz IBM PC AT with 512K RAM and a 40ms 30MB hard disk drive; and the transformed XT with the Hauppauge 386 Motherboard. The 386 Motherboard includes a 16-MHz 80386, a 16-MHz 80387, and 1MB of 32-bit RAM; the XT's original 10MB hard disk drive was retained for all tests. Since the 386 Motherboard lacks BASIC in ROM, GW BASIC 3.11 was used with the board for the interpreted BASIC test.

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XT on. If the motherboard is working properly, the XT's speaker should blat out one long beep and two short ones. Turn the XT off. Reattach the keyboard, slip the display adapter into a slot, and connect the monitor. (Keep in mind that the 386 Motherboard isn't as durable as the XT's original, so be gentle, especially with the keyboard connector.) Turn on the system again, and BIOS, copyright, and company information flash on the screen, followed by messages hailing installed RAM as 'good' and noting that the hard disk controller can't be initialized and that SETUP must be run.

Hauppauge's setup utility is stored in a motherboard ROM and can be run any time simply by pressing <Ctrl>-<Alt>-<Esc>. (To avoid conflicts, *SideKick* users should redefine this pop-up's <Ctrl>-<Alt> hot key to

board in an XT or a compatible system with an 8-bit hard disk controller, select 'NONE' as the hard disk drive type. Note, too, that the 'Error Halt' and 'Speed Select' options are not implemented and can be ignored.

Once the 386 Motherboard is properly configured, save the settings, exit SETUP, and turn the system off. Plug the rest of the expansion boards into place, reattach the external cables, put the cover back on, and you're ready for computing—1987 style.

Of course, every upgrade has its hidden costs. Because the 386 Motherboard comes with its own complement of memory, conventional memory boards are useless, although their serial and parallel ports will function. Be prepared as well to part with some additional cash to bring your renovated system fully up-to-date.

*The 386 Motherboard is simple, the installation straightforward, the performance gains startling.*

<Shift>-<Shift>.) At the SETUP screen you specify all pertinent system details, from number and type of floppy disk drives to conventional and extended memory allocations. In some fields, the values are already supplied. For example, the field for the first floppy disk is set at 360K; press <CursorRight> or <CursorLeft>, however, and other permitted values (720K, 1.44MB, 1.2MB) appear. Special note: If you've installed the 386 Mother-

Since the 386 Motherboard lacks BASIC in ROM, your IBM BASIC disks are useless. (However, GW BASIC for the Compaq line, among others, will run without a hitch.) If you're working mostly with numbers or graphics, you'll probably want to spring for an 80387. But chances are you'll hunger for a speedy, high-capacity hard disk drive that can keep up with its new master. With 28ms 40MB drives running at least \$800 a crack, you may want to catch your breath before tackling this upgrade.

386 Motherboard XT  
Hauppauge Computer Works  
358 Veterans Memorial Hwy.,  
Ste. MSI  
Commack, NY 11725  
800/443-6284, 516/360-3827  
List price: \$1495, with 80387  
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RAM board \$895

## Slotless Compaq RAM

By 1981 standards, the Compaq Portable was a generous machine. A padded handle, a monochrome graphics screen, and the ability to hold an incredible 256K of RAM on its Lilliputian motherboard were enough to guarantee a warm reception from on-the-go computerists.

Unfortunately, most programs no longer meekly ask for 128K—they demand 512K and often more. If your Portable is facing a RAM crunch and an empty slot is but a fond memory, fear not. With a little \$12 memory decoder PROM chip from Microprocessors Unlimited, you can more than double the motherboard RAM in a Compaq Portable. The company also offers a similar decoder PROM for eight-slot PCs, the XT, the Portable PC, and the Zenith 150, 151, and 161.

The decoder PROM originally installed in Compaq Portables restricts the motherboard to 64K-bit

*(continues)*



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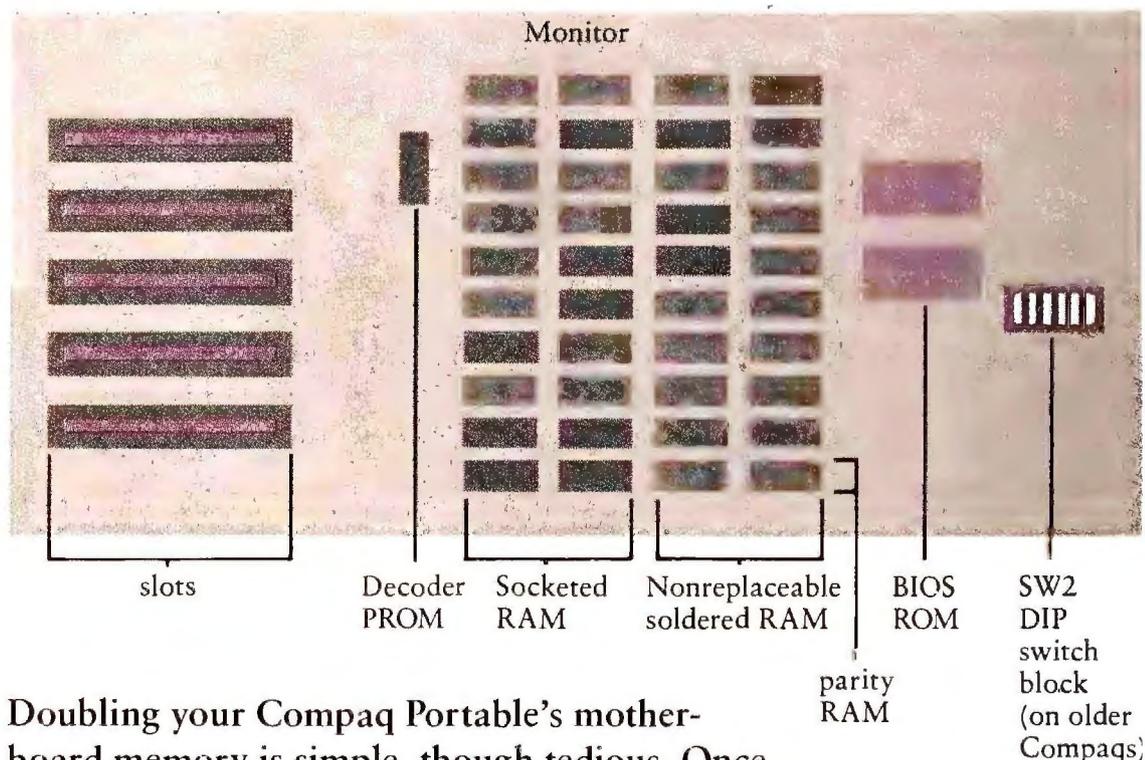
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RAM chips. Plug in a new decoder, however, and a Portable happily accepts 256K-by-1-bit RAM chips. Although you can't replace all the motherboard memory in the system (two of the four banks of RAM chips are soldered in), this quick little upgrade allows you to boost the system from 256K to as high as 640K.

Keep in mind that upgrading the Compaq Portable poses certain difficulties. For starters, there's not much room in the back, so you need a delicate touch when removing expansion boards and RAM chips. More important, the amount of memory the system will be able to access is determined by the BIOS ROM socketed into the motherboard. If the system dates from 1982, it probably contains a Revision B BIOS ROM and is restricted to 544K. Portables made since 1983 rely on a Revision C BIOS ROM and can take advantage of all 640K. You can display the ROM's age by loading BASIC on the Portable, typing `DEF SEG = &HFE00:FOR I = 0 TO 72:PRINT CHR$(PEEK(I));:NEXT,` and pressing <Enter>.

Since you'll be replacing two banks of RAM—18 chips in all—you'll need a fresh set of 256K-bit RAM chips (which Microprocessors Unlimited sells for \$59.40), a chip puller, and a small flat-blade screwdriver, plus a small Phillips screwdriver for removing expansion boards. Turn off the Portable, remove the power cord, and snap the keyboard over the monitor. With the front of the system facing you, lean over and pry off the

## The Compaq Portable's Motherboard—An Aerial View



**Doubling your Compaq Portable's motherboard memory is simple, though tedious. Once expansion boards are cleared out, you remove the aged decoder PROM chip and replace it with a new chip capable of recognizing 256K-bit RAM chips. Then you must replace the first two banks of old 64K-bit RAM and change the SW2 DIP switch settings.**

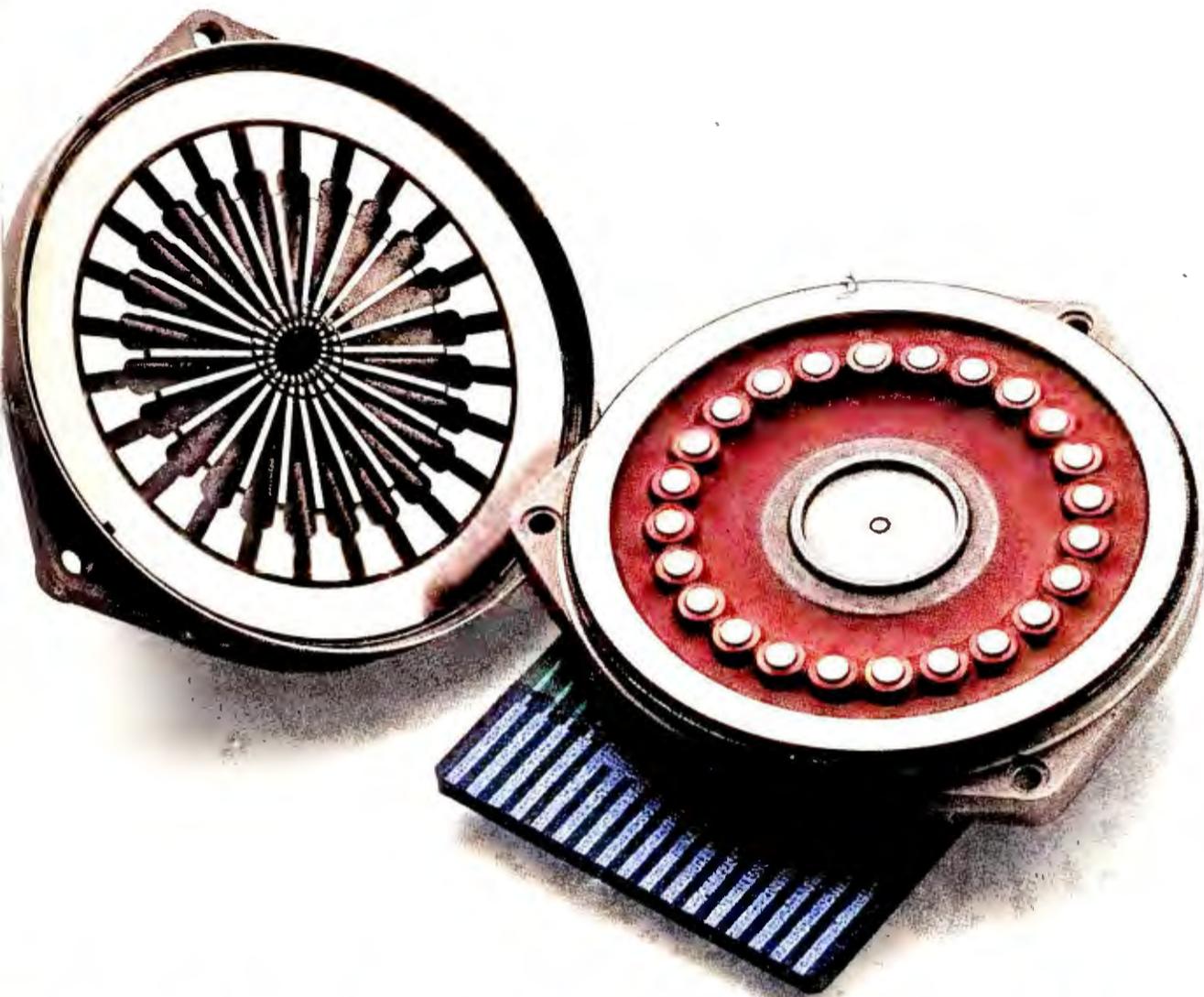
top panel. Rotate the unit so the front is facing to the left, loosen the screws holding down the system board's retaining cover, and slip it off. Don't remove these screws—they can easily fall into the system and be lost forever.

Getting at the RAM chips and the decoder PROM means removing all installed expansion boards. Ground yourself thoroughly and dig in. Note that the video controller and disk controller boards are connected to cables and secured to the chassis with screws that must be removed from the outside. When you unscrew the video board's mounting bracket, wiggle the board barely out of its slot and gently pull out the gray video cable by its black connector. Then remove the board. Finally, locate the blue connector at the

top of the disk controller board, push the two levers on either side of the connector to release the disk drive ribbon cable, and extract the board.

If you gaze upon the Compaq's motherboard at this point, you should see, from front to back, five empty slots, a raised black chip at a right angle to the slots (this is the system's decoder PROM in socket U35), then four rows of nine RAM chips each. The first two rows will be replaced; the back two are effectively wedged to the motherboard for life.

*(continues)*



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## The Upgrade Path

To shed some needed light on this upgrade, remove any remaining slot covers and shine a lamp or flashlight through the openings. Ground yourself again, locate the decoder PROM, and hook the chip puller between the chip and the socket. To remove the chip, gently rock the puller right and left as you pull up. Take the new decoder PROM out of its case and set it in the socket. Double-check the alignment of the pins and the socket holes and make sure the notch on top of the chip faces toward the Compaq's monitor. If the pins are straight, push the chip into the socket with your thumb.

Chances are, the pins on most of the replacement RAM chips will be slightly bent away from the chip block. To speed up the installation process, follow the steps discussed in "CPU Sidekick" (*The Upgrade Path*, June 1987) and straighten all the chips in one session. Then remove the old RAM chips. If a capacitor on the motherboard prevents you from slipping the puller around a chip, push it ever so slightly to the side and proceed. Probably the toughest chip to get to is the one at the end of the second RAM bank just under the video housing. Take a small flat-blade screwdriver and slip the blade between the chip and the socket. Twist the blade a tad, and the chip slowly but surely climbs out of its socket.

When you install the new 256K-bit RAM chips, make sure the notches on the chips and the sockets match. (Both should be aimed at the Compaq's slots.) If your Compaq Portable has a red SW2 DIP switch block, set all the

switches in the off (down) position. Don't alter any of the settings on the SW1 block.

Reassemble the system, slip a DOS disk in drive A:, and turn the machine on. If a memory error code appears instead of a DOS prompt, pinpoint the errant chip with the table supplied in the user manual, and make sure the chip is oriented properly and the pins aren't bent. If a cursor simply fails to appear, turn off the system and check the video connections and orientation of the decoder PROM. If the chips are properly installed, the system will load DOS. Run CHKDSK. On an older Compaq, the message '544656 bytes total memory' appears; newer Portables, of course, have a full 640K available.

Decoder PROM  
Microprocessors Unlimited  
24000 South Peoria Ave.  
Beggs, OK 74421  
918/267-4961

List price: \$12 for PROM,  
\$59.40 for set of 18 256K-bit  
RAM chips

Please forward submissions and queries to The Upgrade Path, PC World, 501 Second St., San Francisco, CA 94107 or electronically to MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908. Articles submitted by mail should be accompanied by a self-addressed, stamped envelope and an ASCII file of the item. ●

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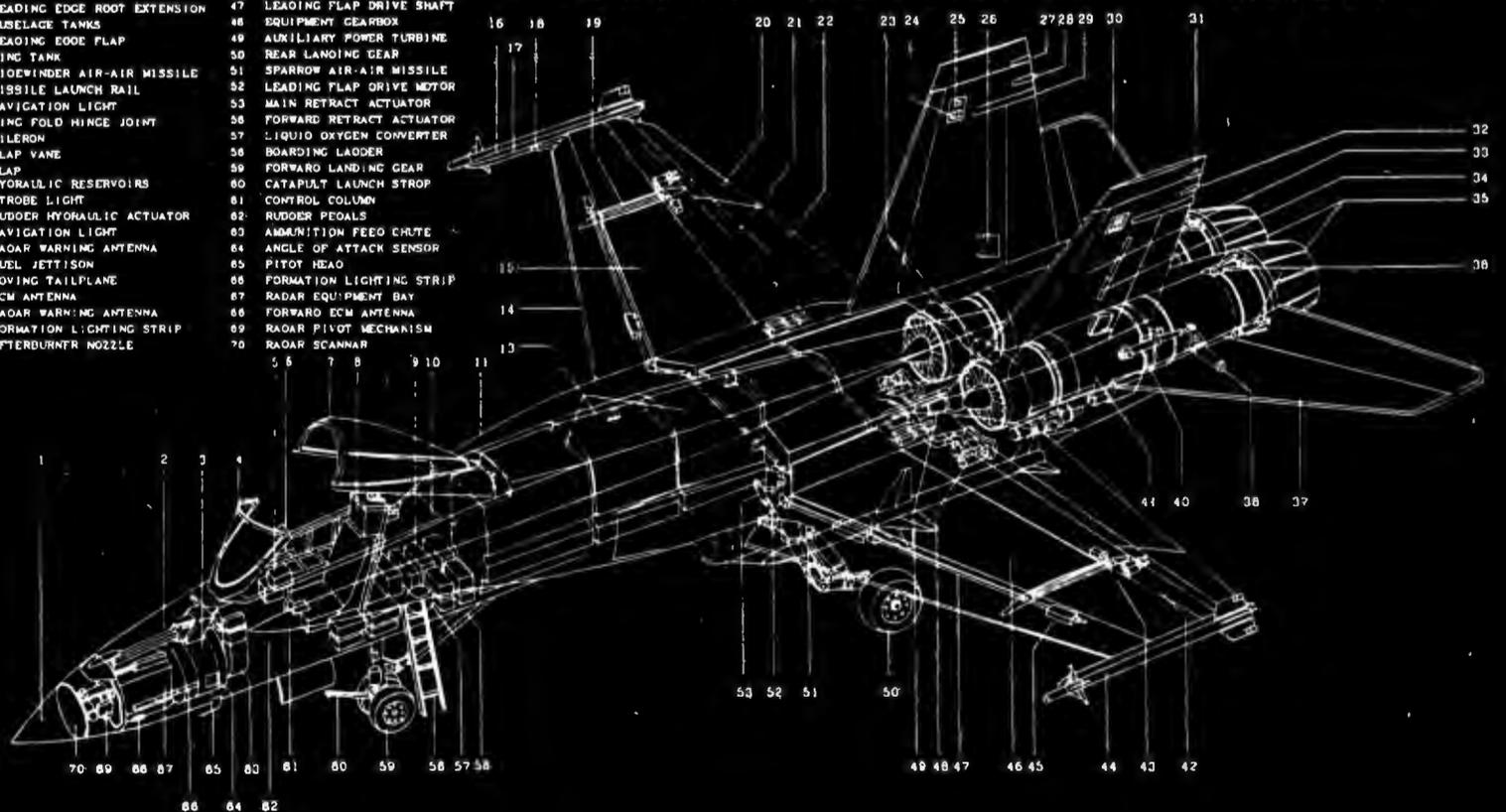
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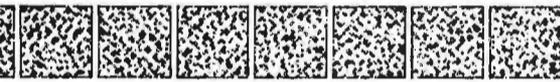


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# Consumer Watch

*Advice and information for the computer consumer*



This month: A hardware resource list and a report on an organization that helps resolve consumer complaints; plus "Second Look," a new section that provides updates on product bugs and fixes

Anita Amirrezvani

## A Matter of Gentle Prodding

If information is power, so is knowing how and where to lodge a complaint. When you're stuck with a problem product, you want solutions—not a song and dance. And there's nothing worse than having a complaint get lost in the corporate shuffle. ▶

Although knowing where to turn isn't always simple, there are some good rules of thumb. If you've purchased the product from a retailer, start there. A retailer—particularly a dealer authorized by the manufacturer—should be able to provide all the product support and service you need. Still, if contacting the retailer does not help or if the retailer is the problem, try the manufacturer.

First, call the technical support or customer service number listed in the product manual. If you can't get satisfaction, take your case to someone higher on the totem pole. Call the company for the name of the director of marketing, the head of public relations, or the product manager. (The sidebar, "Where to Turn for Help," lists contacts at 50 popular hardware manufacturers.) These employees oversee departments that handle customer complaints and are often directly responsible for resolving problems. Once you've got the right name, write that person a letter detailing the problem and your attempts to resolve it. If you don't get a quick response, follow up with a phone call.

You can always take your complaint elsewhere if you're not satisfied with a business's response. Along with sending letters to local consumer protection agencies, the attorney general's office, and the Better Business Bureau, you can turn to Sally Browne, executive director of consumer affairs in the consumer electronics group of the Electronic Industries Association (EIA). The EIA is a trade association supported through the dues of its 1000 members, but Browne's department is funded separately. "In 15 years of resolving complaints, I've never had a manufacturer go over my head and say, 'Hey, I'm an EIA member,'" says Browne. "Members and nonmembers get treated alike when we handle complaints."

PC World reader Alfred Woelk should know. In November 1986 Woelk bought a monitor from Goldstar Electronics (an EIA member) that failed within a few

*(continues)*



Anthony Russo

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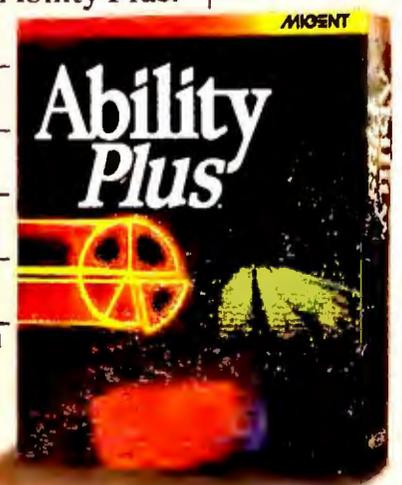
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weeks of purchase. He took the monitor to an authorized service location in White Plains, New York, in January, expecting it to be repaired under warranty. After six weeks and numerous phone calls, Woelk realized the monitor wasn't likely to be fixed anytime soon. He went to the store to pick it up. "It was on the floor, full of dust, piled up with other equipment," he writes.

But Woelk is no quitter. He sent three letters (one by registered mail) to Goldstar in Lyndhurst, New Jersey, asking that the monitor be fixed, but he never received a response. Finally, in May, Woelk contacted the EIA, which inter-

vened on his behalf. By the end of June, Goldstar had replaced the defective monitor. And according to Goldstar customer relations representative Mike Janos, the company has beefed up and reorganized its service division so that complaints can be processed more efficiently.

No organization can work miracles, but if you have a hardware complaint you've been unable to resolve, try the EIA. "Send us a letter detailing the name of the product, the model number, the serial number, the date purchased, the location of purchase, the service history, the problem, and

your attempts to get the problem resolved," says Browne. "We'll try to act as a catalyst." The address is 2001 Eye St. NW, Washington, DC 20006.

## Second Look

Reviewing products is a tricky business. Sometimes a product displays an unexpected quirk or even fails soon after a review sees print. Following *PC World's* review of internal hard drives in August 1985, for example, several of the products simply petered out.

In "Second Look," we'll keep you informed about such developments—incompatibilities, poorly

*(continues)*

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implemented functions, or product failures—that come to light only after a review appears. But “Second Look” won’t be limited to problems—it will also include reports on bug fixes and other notable improvements in hardware and software. To share your discoveries about products we’ve reviewed, write to “Second Look,” *c/o Consumer Watch*, at the address listed at the end of this column.

### Mannesmann Tally MT910

In *PC World's* roundup of LaserJet Plus compatibles, Mannesmann Tally's MT910 laser printer held

its own with durable construction, high graphics quality, and a relatively low price; but it dropped the ball in the speed department. In fact, the unit shipped to us lagged well behind its competitors in several print tests (see “Would-Be LaserJets,” *PCW*, June 1987).

After our roundup review was penned, Mannesmann Tally released a ROM upgrade for the MT910 that enables the machine to push paper at several times the original speed. When retested, the MT910 downloaded and printed a bit-mapped image in 57 seconds, about three times as fast as the first unit's time of 2 minutes and 50 seconds.

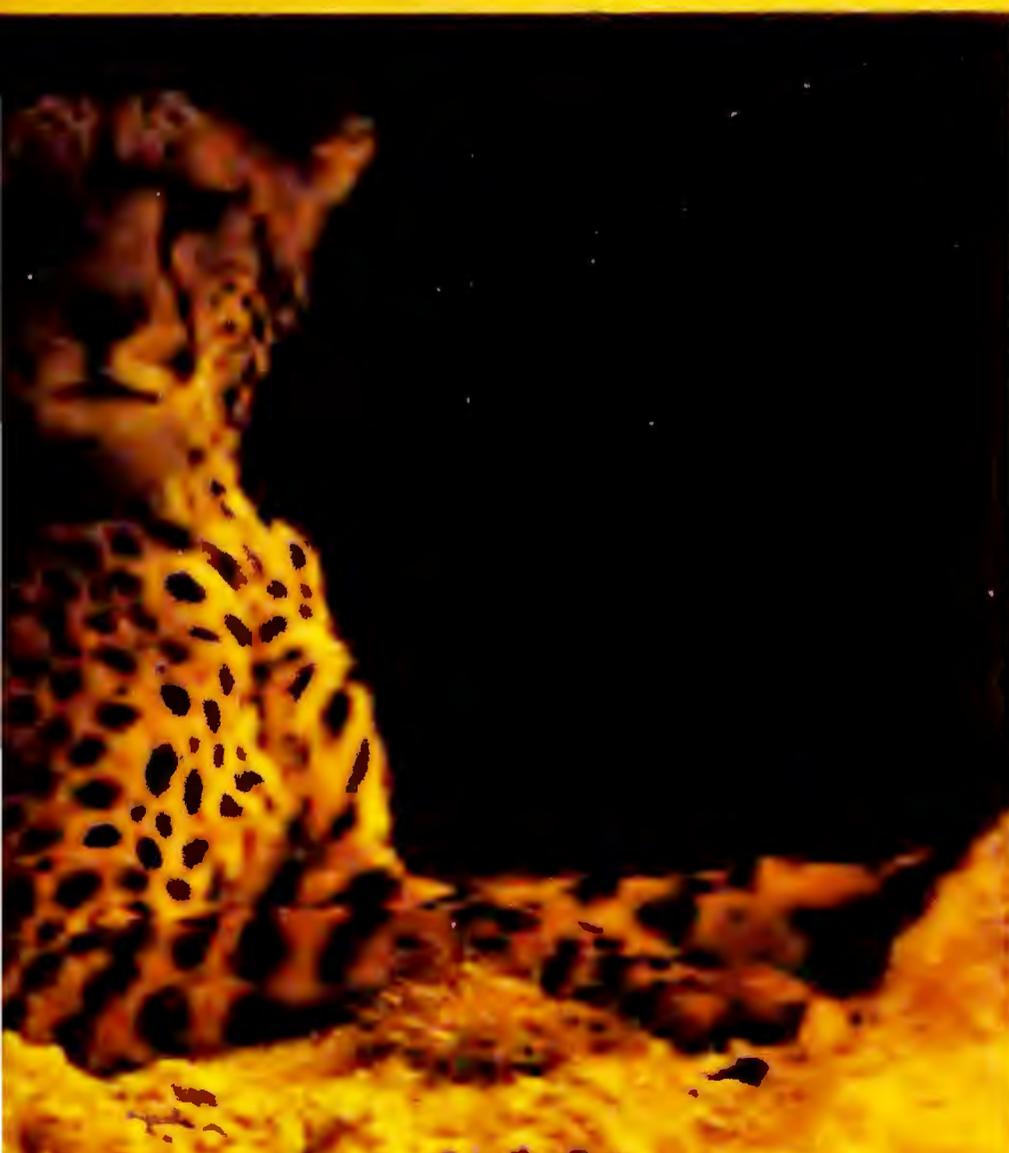
Mannesmann Tally has been shipping the unit with the speedy ROM (revision G) since our re-

view hit the newsstands in mid-May. If you have an MT910, you can check whether you have the new ROM chip by performing a print menu self-test; next to part number 700535 you'll find the revision letter. If you have an earlier revision, either an authorized Mannesmann Tally dealer or the company itself will supply you with a new ROM chip free of charge.

### PC Tools Version 3.2

Central Point Software reports that *PC Tools* (see *From the Software Shelf*, *PCW*, August 1986)

*(continues)*



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**Q.**

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**A.**

**ONE\***

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Micro processor	80C88	NEC V20	80C88	NEC V30	80286	80C86	NEC V30	80C88	80C86
Screen Type	supertwist LCD	supertwist LCD	supertwist LCD	supertwist LCD	Gas Plasma	supertwist LCD	LCD	backlit supertwist LCD	backlit supertwist LCD
Hard Drives	-	-	1 20M-byte	-	1 10M-byte	-	1 10M-byte	1 10M-byte	-
Internal Memory	512K	384K	640K	640K	640K	640K	512K	640K	640K
Battery Duration Time	6 to 8 hours	8 hours	8 hours	4 to 6 hours	Call for Avail	8 hours	4 hours	2 hours	3 hours
Clock Time (MHz)	4.77	4.77 or 9.54	4.77	4.77 or 9.54	4 or 8	4.77 or 7.16	8	4.77 or 8	4.77 or 8
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**NEC MULTISPEED**  
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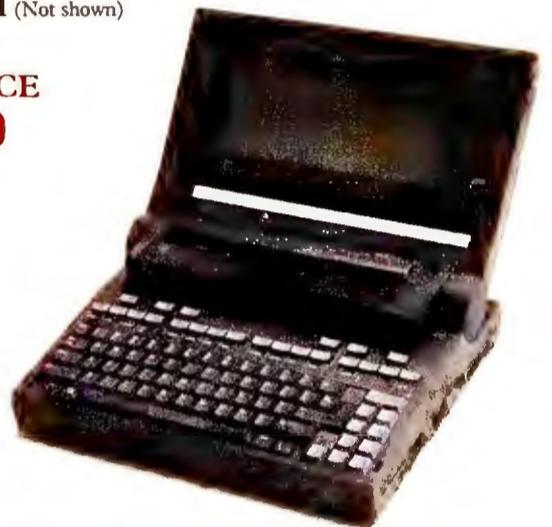
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**SNAP 1+ 1** (Not shown)  
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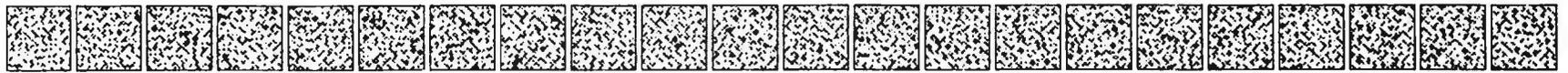
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version 3.2 may damage hard disk data if you try to optimize a hard disk without using the program's sort option. (Version 3.2 is the disk with the black dot.) Registered owners will receive a replacement disk that corrects the problem; until then, don't use the software.

## Shop Talk

### Protected and at a Loss

I recently transferred the contents of my IBM XT's hard drive, including my 1-2-3 program files, to a PS/2 Model 30. But now 1-2-3 won't work on the Model 30 because its hidden files (which were installed on my hard drive) didn't transfer. Nor can I use my 5 1/4-

inch backup system disk, because the Model 30 only accepts 3 1/2-inch disks. To make matters worse, I've already formatted the XT's hard drive and sent it out for use at a branch office.

When I called Lotus's user-support number and described my dilemma, I was informed that I'd have to pay \$30 to upgrade to the Model 30 version. I deeply resent having to pay when the problem with the copy I already own was caused by Lotus's copy protection files. Not to mention that this is interrupting work in my office.

Craig A. Koller  
Phillipsburg, New Jersey

**Lotus Development responds:** When IBM announced the PS/2 line in early April, both Lotus and IBM made it clear that copy-protected software would not be transferable to 3 1/2-inch disks. This was true because of the copy protection and because existing Lotus software obviously did not include certain device drivers required by the PS/2 line. In the same announcement, Lotus said it would develop PS/2 versions of all its products and make them available to existing users. I'm sorry Mr. Koller resents the cost of exchanging his software, but it brings Lotus no profit: It represents the cost of the disks them-

(continues)



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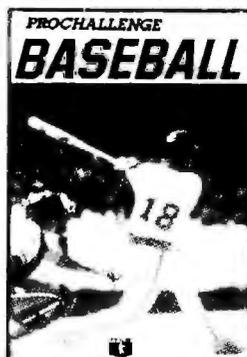
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selves, the documentation, and the new device drivers. Whether to protect our software against piracy is a question we have been studying very carefully. Many of our recent products are not copy protected (e.g., *Manuscript, Express, Freelance Plus*). In the case of 1-2-3, however, our market research shows that about one-third of our customers want us to keep copy protection, while about another third want us to remove it (the remaining third don't care either way). It's a difficult decision and one we cannot make lightly. You will probably hear more on this subject before long.

*Adine Deford*  
 Software Products Public  
 Relations Manager

**The High Cost of Memory**  
 Not long ago my company purchased a new Hewlett-Packard LaserJet Plus and began using *Freelance* to create graphs. We soon discovered that the on-board memory was insufficient to print the graphs at the maximum 300-dots-per-inch resolution. Through inquiry we learned that an additional 2MB memory board was available that would allow us to print at 300 dpi. However, the board's list price is \$2495, or \$1747 with our corporate discount! In other words, about the original cost of the printer itself,

and certainly more than the subsequently introduced LaserJet series II.

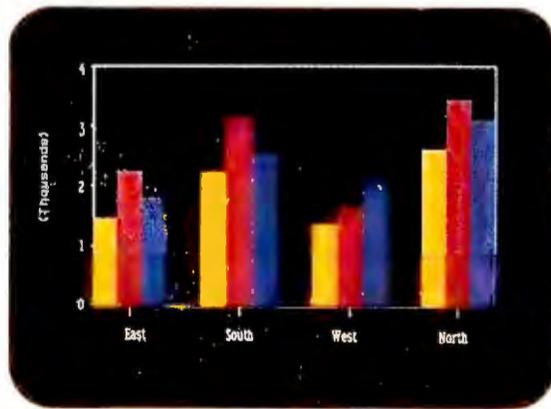
I cannot believe that such a high price for add-on memory can have any justification other than price gouging to force obsolescence.

*Oscar Fricke*  
 Irvine, California

**Hewlett-Packard responds:** Three years ago, during the development phase of the LaserJet Plus printer, we determined that 512K of internal memory was sufficient for most of our target market. Since this decision was made, desktop

(continues)

# To get Lotus 1-2-3 to do all this more quickly and easily, we didn't make it more powerful.



To graph sales by district from January to March just request "graph Jan to Mar."

```

REQUEST...
January February March Quarter 1
Detroit 1977 32,254 34,509 37,741
Tampa 1723 11,740 13,493 15,962
Boston 1057 32,015 34,030 36,902
Chicago 3509 11,478 12,955 15,022
-----
1767 11,873 13,741 16,407

[ F2 ] to increase the forecast and total it
delete and then down 1
increase jan by 10%
total all rows
avg all cols
then point up the model and do a graph
enter Quarter 1 on F1
insert row
underline row 1
graph jan to mar
29-Apr-87 10:01 AM
    
```

These macros are made of Lotus HAL requests. Easy to write. Easy to understand. Easy to test.

```

A21 [W:18] Vos Name, jobs
REQUEST...
REP NAME DIST QUOTA SALES PERCENT LINE
0
REP NAME DIST QUOTA SALES PERCENT LINE
Macy, Edna M East 10,000 10,500 106% Hospital
Thayer, Albert North 10,000 13,750 138% Hospital
DeCamero, John South 15,000 14,900 99% Packaging
Hassom, Bart South 11,000 12,500 114% Packaging
Cutler, Lois West 11,500 13,000 113% Packaging
    
```

Say you want to extract specific information from a database. In this case, simply request "who has sales >= 8000."

```

F4 (O) VTR1
REQUEST...
FIRST QUARTER SALES
JAN FEB MAR
-----
Detroit 1,444 1,568 2,065 5,077
New Orleans 2,234 2,457 3,195 7,886
Boston 1,345 1,480 1,923 4,748
Chicago 4,123 4,535 5,896 14,554
Denver 1,267 1,394 1,612 4,473
Montreal 1,942 2,136 2,777 6,855
Tulsa 3,842 4,226 5,494 13,562
St Louis 1,178 1,296 1,685 4,159
Dallas 5,268 5,795 7,533 18,596
Atlanta 2,143 2,357 3,064 7,565
Miami 1,277 1,405 1,826 4,508
Tucson 5,844 6,428 8,357 20,629
Seattle 1,739 1,913 2,467 6,119
    
```

You can sum up sales figures with Lotus HAL, by requesting "total all rows!" 1-2-3 and Lotus HAL will create the formulas.



publishing and high-resolution graphics have placed greater demands on printers.

Because the original LaserJet products weren't designed to include memory upgrade paths, our only recourse was to redesign and replace a printed circuit assembly, which includes the majority of the electronics in the printer (not just memory) and is the single most expensive component.

While \$2495 may seem high, it is the lowest price we could offer our customers and is a viable alternative to purchasing a new LaserJet series II printer. When you add the cost of the additional memory (\$495) to the list price

of the LaserJet series II printer (\$2595), the total is actually \$600 more than the 2MB memory upgrade kit.

*Walt Sledzieski,  
LaserJet Applications  
Support Manager*

*Editor's note: Mr. Fricke has another option—the J Laser Plus memory expansion board from Tall Tree Systems in Palo Alto, California. The board, which takes up a slot inside the computer, costs \$699; the switching cable is \$120; and 2MB of RAM costs \$480, for a grand total of \$1299—cheaper than Hewlett-Packard's 2MB memory upgrade. Tall Tree Systems can be reached at 415/493-1980.*

### Slowly but Surely

I purchased *Peachtree Complete Accounting* version 3.30, an inexpensive package, after a great deal of research. Reviews convinced me it was the best choice, but my experience in setting it up confirms that you get what you pay for. The manuals were obviously written by programmers, not accountants. To find any of the options, you have to thumb through the entire book.

To make matters worse, Peachtree's support line is obviously understaffed. Supposedly you call the toll-free number and pay \$1 per minute for help, but

*(continues)*

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As the screens to the left demonstrate, Lotus HAL gives you the ability to perform 1-2-3 tasks using simple English phrases—called, logically enough, “requests.” So you can focus on *what* you want to do, not *how* to do it. And it does all this without changing 1-2-3 or your worksheet.

In addition to this powerful capability, Lotus HAL also allows you to test assumptions, correct mistakes or simply change your mind with ease. Because through a special capability called “undo,” Lotus HAL lets you reverse your last command—even if you retrieve a file



before saving your current work.

Besides all this, Lotus HAL allows 1-2-3 to audit spreadsheets for possible errors, and link cells or ranges between worksheets.

One obvious benefit of all this is that you save time. Which means you're more powerful, more productive, more effective than ever before.

Make yourself more powerful and buy yourself Lotus HAL. You'll find it at your Authorized Lotus Dealer, for just \$150.\* Or, you can purchase it directly by calling us at 1-800-345-1043 and asking for Product PN-1377. Or ask for PN-1385

to receive more information about Lotus HAL.

You see? Everything with Lotus HAL begins with a simple request.

\*Suggested Retail Price (Plus Sales Tax)

## Lotus HAL

Requirements: Lotus HAL is a memory-resident program that requires 1-2-3 Release 1A, Release 2, or Release 2.01 (5.25 or 3.5 inch disk version) for personal computers from IBM, COMPAQ and AT&T, plus 1-2-3 certified compatibles; two disk drives; DOS 2.0 to 3.3; 512K RAM. Please refer to your 1-2-3 package or 1-2-3 documentation for appropriate hardware configurations and DOS requirements or consult your dealer. \*Lotus HAL does not operate with Release 1A for the IBM PCjr., or for the IBM 3270PC. When you purchase Lotus HAL directly from Lotus, take your first 30 days to try it. If after 30 days, Lotus HAL does not perform as described and you've purchased it directly from Lotus, we'll gladly give you a full refund. © 1987 Lotus Development Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Lotus HAL is a trademark of Lotus Development Corporation. Lotus HAL is distinguished from HAL which is a trademark of Qantel for its Hotel And Leisure software.

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Plus our Scanning Gallery software makes scanning easy. Our exclusive PreviewScan lets you see your image on screen before cropping it. Then you can size the cropped image to fit your dimensions — even if it means enlarging your original 200% or reducing it 50%. HP's ScanJet scanner is compatible with the most popular desktop publishing and optical character recognition software, too.

What's most important, though, is the end result. ScanJet scanner produces professional quality output by letting you input both black and white and color photos, line art and text.

What more could you ask for? How about a price tag of only \$1,990\* for ScanJet scanner, Scanning Gallery software and the interface kit.

For a ScanJet brochure and name of your HP dealer, call 1-800-367-4772, Ext. 902-A.

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Like structured data bases, MemoryMate is free-form and easy to use intuitively. Once you enter a record (up to 60 lines long), every single word, phrase, and date is automatically indexed. And cross-indexed.

Which means that MemoryMate can find that record later using any word, date, or phrase in it. And MemoryMate does it fast. You can search 180K on a PC XT in three seconds!

And since MemoryMate is memory-resident, it's always available. You can access it while other programs are running. You can even cut and paste between MemoryMate and other programs. And vice versa.

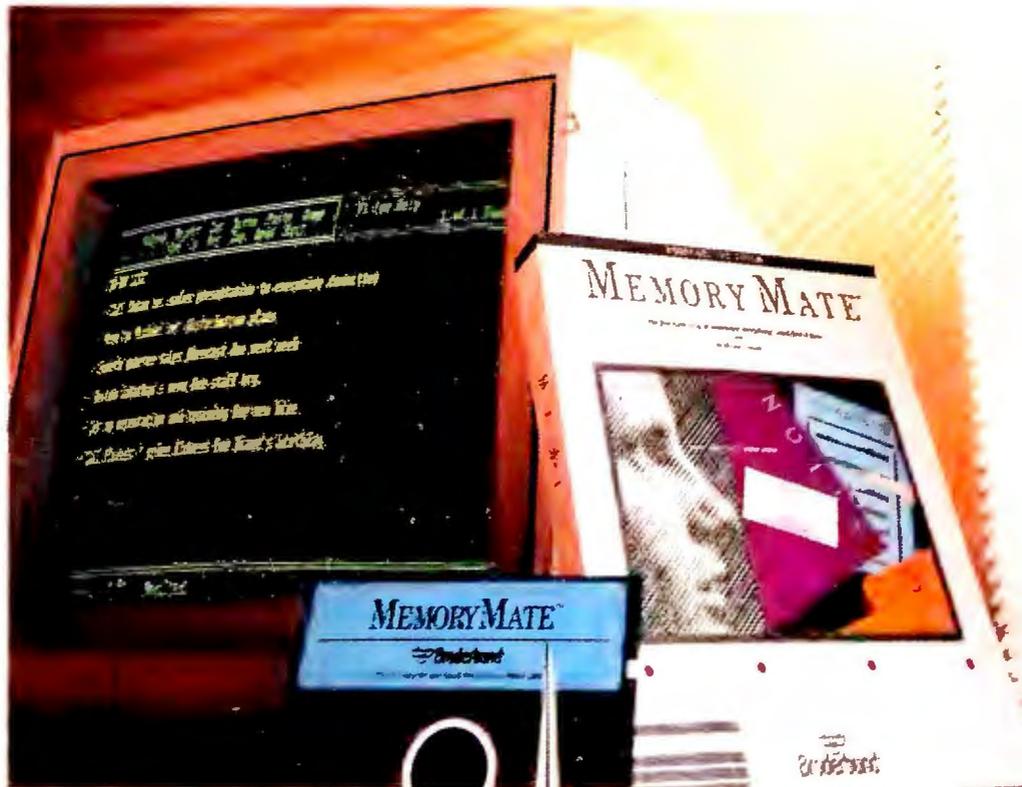
Just enter your memos, notes, tables — anything — using your favorite word processor. You can forget designating "keywords." Just like you can forget where you stashed that important scrap of paper or yellow Post-it®.

You can even forget all your to-do lists and deadlines. Because MemoryMate reminds you. Tickler messages pop-up on your screen automatically on the days you select.

How complex is all this to operate? MemoryMate has only 15 simple commands and they're always on screen. So you can access all that power easily — without having to remember a thing.

## Find what you need using a single word. Or a sentence.

Let's say you want to call an attorney you met playing tennis last May. But you can't remember his name. All you remember is that you put a note about him in MemoryMate. So you type in the word "tennis" and hit the search key. In three seconds, all records containing "tennis" begin to appear. But you also manage a tennis league. You've got tons of "tennis" entries. To narrow your search, you type "tennis May and attorney". Bingo! You've got his name and phone number.



## Is a better memory worth \$69.95?

Much more, according to *PC Week*: "(MemoryMate)\* is already worth far more to a professional who works with unstructured data than any \$700 database management package."

*Lotus* magazine agrees: "Once in a while a program comes along that makes you wonder how you ever lived without it."

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With all this praise and all these incredible features, you'd expect MemoryMate to cost a lot more than \$69.95. But it doesn't.

And, right now you can get a demo disk for less than six bucks — which can be rebated when you buy MemoryMate. So fill in the coupon below and send it in. And be sure to do it now, before you forget.

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**YES.** Send me the MemoryMate demo disk for just \$5.95, tax and shipping included.

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\*MemoryMate was previously self-published by Precept Software, and called Instant Recall. Post-it is a registered trademark of 3M. MemoryMate is a trademark of Broderbund Software, Inc. © Broderbund Software, Inc., 1997



the line is always busy. Am I supposed to tell my employees to wait to get paid until Peachtree calls back?

Having taken two weeks to install the payroll and having paid a consultant \$65 per hour for support, I'm going to end up paying almost as much for *Peachtree* as for top-of-the-line software. However, if I survive learning the program, I think it will satisfy my accounting needs.

Judith E. Hobbs  
Key West, Florida

**Peachtree Software responds:**  
I agree with your comments on the format of our documentation. We're making changes—the running heads have been revised to make it easier to flip through the book and find a particular subject, and the indexes are being rewritten by a noncomputer person for a new release [due out by press time].

As for our support department, the work load varies; it's at its peak at the beginning and the end of the month because new customers are installing the system and others are closing out months for the first time. We normally are not more than 4 hours behind in answering questions, and I am no-

tified automatically when we get that far behind. If you find that it takes more than 4 hours for us to get back to you, contact me and I will make sure you get a satisfactory response.

Bill Goodhew  
President

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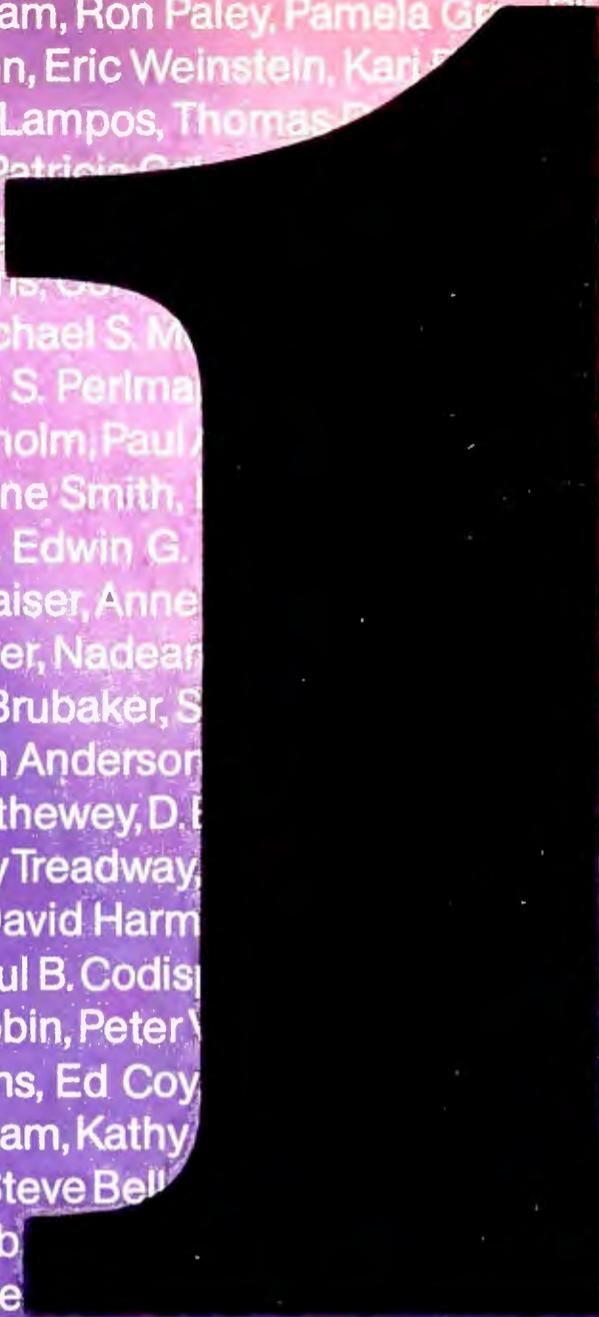
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*your name, city, state, and day-time telephone number with all correspondence. Letters may be edited for length and style. Due to volume, we cannot acknowledge every letter.*

## Where to Turn for Help

Here's a list of 50 hardware manufacturers and the names of company representatives who handle complaints that don't get resolved through typical channels—dealers, technical support lines, and customer service staff. In most cases you should write first, then call if necessary.

But note this exception: Some large companies, like IBM, sell consumer products primarily through dealers who are expected to provide support and service; you're probably better off getting in touch with an IBM dealer (800/447-4700) than trying to get a response from someone in IBM's monster bureaucracy.

Several companies declined to provide a contact name for this resource list, fearing a bombardment of calls. In such cases, the company's address and technical support numbers are listed. But remember, if technical support doesn't help, you can always do your own sleuthing: Call the company and get the name of someone who can help solve your dilemma.

James Wong  
Marketing Manager  
Acer Technologies (formerly Multitech)  
401 Charcot Ave.  
San Jose, CA 95131  
408/922-0333

Lorna Lyons-Egan  
Customer Service  
ALPS Electric  
3553 N. First St.  
San Jose, CA 95134  
800/828-ALPS, 800/257-7872  
California

Jim Schraith  
Director of Customer Support  
AST Research

*(continues)*



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End users are "sold on Brooklyn Bridge... Dvorak is certainly correct in describing White Crane Systems' Brooklyn Bridge as 'Fabulous'... and I love it." — G. Schochet, Letter to the Editor, *PC Magazine*, May 12, 1987\*

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Fort Worth, Texas 76102

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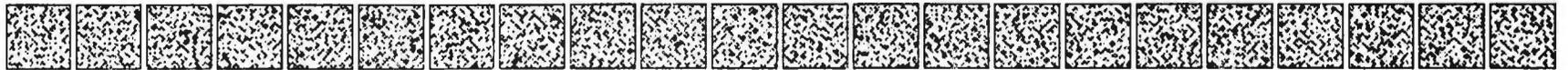
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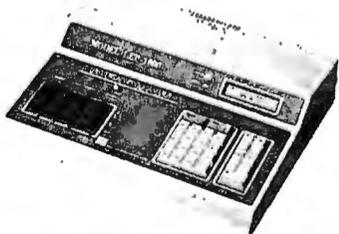
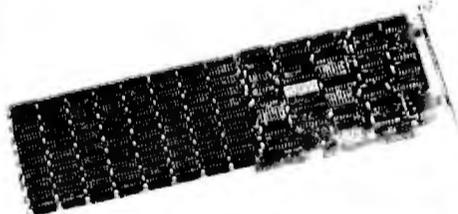
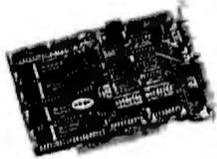
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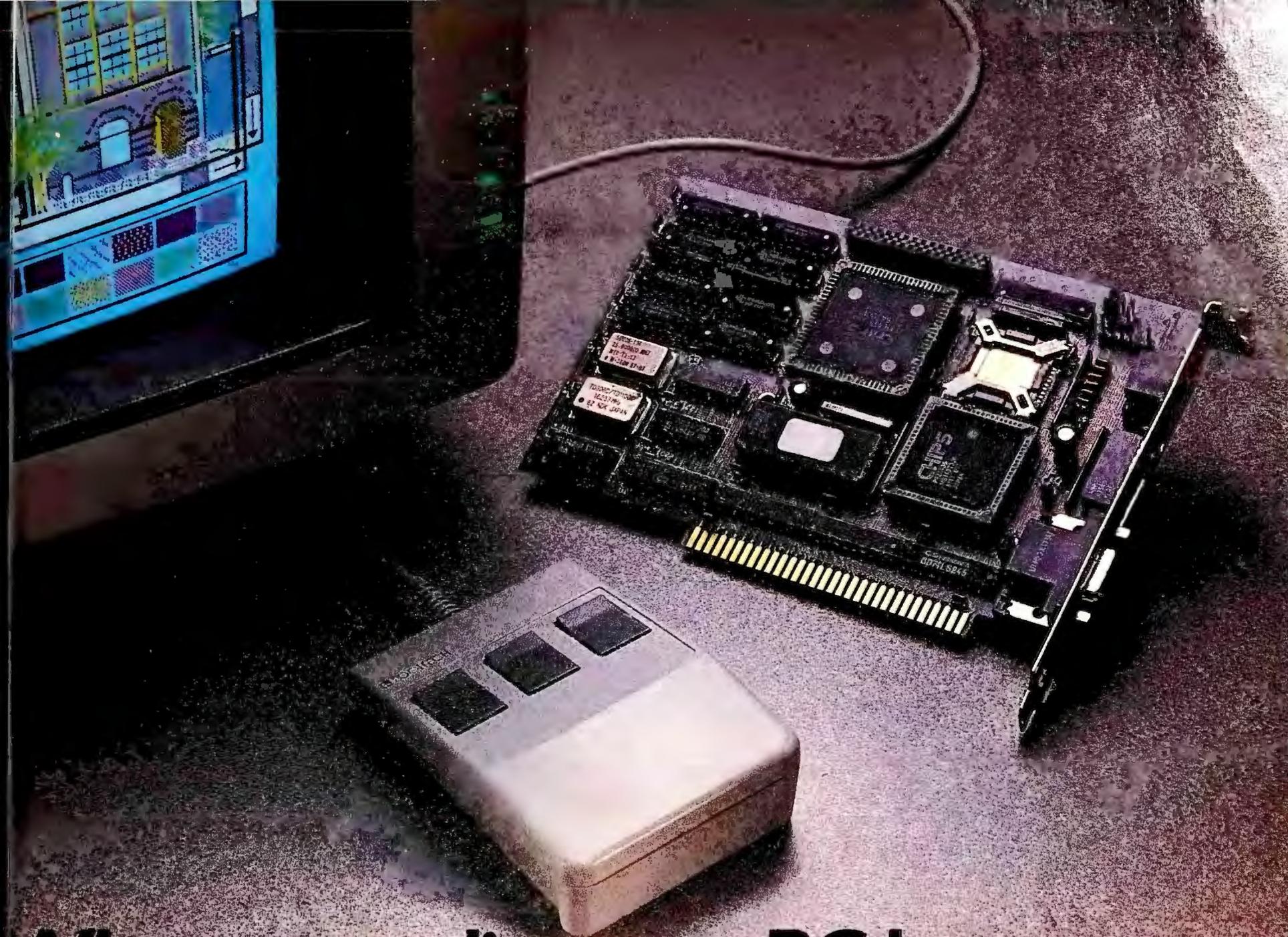
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Yes  No

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### 1. Industry (check one only)

#### Non-computer related businesses

- 1. Aerospace
- 2. Agriculture, mining, construction, oil
- 3. Business consulting (non-computer related)
- 4. College/university
- 5. Elementary/high school
- 6. Engineering/architecture
- 7. Finance, banking, accounting, insurance, real estate
- 8. Government
- 9. Health/medical services
- 10. Legal services
- 11. Manufacturing
- 12. Military
- 13. Other business services
- 14. Publishing/advertising/public relations
- 15. Research & development
- 16. Retail/wholesale
- 17. Transportation, communications, utilities
- 99. Other (please specify) \_\_\_\_\_

#### Computer-related businesses

- 18. Computer consultants
- 19. Computer retail
- 20. Distributor/wholesalers
- 21. Manufacturer (computers, software, peripherals)
- 22. Service bureau
- 23. VAR/systems house/integrator
- 99. Other (please specify) \_\_\_\_\_

### 2. Title (check only one)

- 1. Chairman/president/owner/partner
- 2. Vice president
- 3. Controller/treasurer/accountant
- 4. Director/supervisor/manager
- 5. Project manager/chief/group leader
- 6. Art director/writer/creative head/technical writer
- 7. Engineer/scientist
- 8. Administrator
- 9. Consultant/advisor
- 10. Microcomputer specialist/manager/analyst
- 11. Programmer
- 12. Educator
- 13. Professional (lawyer, doctor, etc.)
- 99. Other (please specify) \_\_\_\_\_

### 3. Department or function (check only one)

- 1. Accounting/finance
- 2. Administration/management/personnel
- 3. Consulting
- 4. Education/training
- 5. Engineering/R&D
- 6. Manufacturing/production
- 7. Microcomputer center/office automation
- 8. MIS/DP
- 9. Purchasing
- 10. Sales/marketing/distribution
- 99. Other (please specify) \_\_\_\_\_

### 4a. Does your company own or lease any mainframe computers at this location?

Yes  No

Existing (quantity)

Plan to buy (quantity)

- 1. IBM
- 99. Other (specify) \_\_\_\_\_

### 4b. Does your company own or lease any minicomputers at this location?

Yes  No

Existing (quantity)

Plan to buy (quantity)

- 1. IBM
- 2. DEC
- 3. Sun/Apollo
- 99. Other (specify) \_\_\_\_\_

### 5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

Yes (indicate quantity below)  No

#### Manufacturer

Currently own (quantity)

Plan to buy within 1-12mos 13-24mos

- 1. Macintosh 128/512
- 2. Macintosh Plus
- 3. Macintosh SE
- 4. Macintosh II
- 5. Apple IIe/IIc/IIgs
- 6. IBM Compatible (Compaq, Tandy, etc.)
- 7. IBM PC/XT/AT/RT
- 8. IBM Personal System/2
- 9. Sun/Apollo workstation
- 99. Other scientific or engineering workstations (non-mini)

### 6a. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply):

	Macintosh	Micros	Software	Peripherals	Networks &
<input type="checkbox"/> 1. Approve purchase	_____	_____	_____	_____	_____
<input type="checkbox"/> 2. Develop/manufacture	_____	_____	_____	_____	_____
<input type="checkbox"/> 3. Evaluate/select vendor	_____	_____	_____	_____	_____
<input type="checkbox"/> 4. Own (at least one)	_____	_____	_____	_____	_____
<input type="checkbox"/> 5. Own (two or more)	_____	_____	_____	_____	_____
<input type="checkbox"/> 6. Purchase or acquire	_____	_____	_____	_____	_____
<input type="checkbox"/> 7. Establish specifications	_____	_____	_____	_____	_____
<input type="checkbox"/> 8. Recommend to others	_____	_____	_____	_____	_____
<input type="checkbox"/> 9. Sell	_____	_____	_____	_____	_____
<input type="checkbox"/> 10. Train people to use/ or provide support	_____	_____	_____	_____	_____
<input type="checkbox"/> 11. Use	_____	_____	_____	_____	_____
<input type="checkbox"/> 12. No involvement	_____	_____	_____	_____	_____
<input type="checkbox"/> 99. Other (please describe by name and quantity)	_____	_____	_____	_____	_____

If you have no involvement with any of the above, skip to question 8.

### 6b. For approximately how many total personal computers or microcomputer systems do you have the above involvement? (check only one)

- A. 1-3  B. 4-9  C. 10-19  D. 20-49
- E. 50-99  F. 100-499  G. 500 +

### 7. For approximately how many Macintosh personal computers do you have involvement described in question 6 above? (check only one)

- A. 1-3  B. 4-9  C. 10-19  D. 20-49
- E. 50-99  F. 100-499  G. 500 +

(Over please, additional questions on reverse side)

Please fold, tape and mail.  
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8a. How many people work at your location? (check only one)

- A. 1-9
- B. 10-24
- C. 25-99
- D. 100-499
- E. 500-999
- F. 1000-2499
- G. 2500-4999
- H. 5000-9999
- I. 10,000 or more

8b. How many people are employed by your entire company? (check only one)

- A. 1-9
- B. 10-24
- C. 25-99
- D. 100-499
- E. 500-999
- F. 1000-2499
- G. 2500-4999
- H. 5000-9999
- I. 10,000 or more

9. What percentage of people who work at your location actually use a personal computer (check only one)

- A. 1-24%
- B. 25%-49%
- C. 50%-74%
- D. 75%-100%
- E. None

10. The personal computer purchased for this location would be: (check all that apply):

- 1. for internal use
- 2. for resale
- 99. other (please specify)

11. How are personal computers normally obtained for this location? (check all that apply)

- 1. direct from manufacturer
- 2. manufacturer's representative
- 3. distributor or wholesaler
- 4. retail computer store
- 5. mail order
- 6. VAR/systems house
- 7. in-house (company or university store)
- 99. other (please specify)

12. Personal computers or microcomputer systems at your location are or soon will be used for the following communications activities: (check all that apply)

- 1. Communicate with internal company mainframe or mini
- 2. Communicate with other micros via modem
- 3. Communicate with outside mainframe or mini through service bureau, database or time-sharing service
- 4. Local area network
- 5. Voice/data
- 6. None of the above
- 99. Other (please describe)

13. Are you involved in any of the areas shown below?  Yes (check all that apply)  No

A. Recommend  B. Influence  C. Specify  D. Buy (check all that define your involvement)

**Software**

- 1. spreadsheets
- 2. word processors/outline processors
- 3. database management
- 4. accounting
- 5. statistics
- 6. communications/networking
- 7. graphics
- 8. presentation
- 9. project management
- 10. desktop publishing
- 11. CAD/CAM
- 12. programming language
- 13. back-up systems
- 14. utilities
- 15. other \_\_\_\_\_

**Peripherals**

- 23. dot matrix printers
- 24. letter quality printers
- 25. plotter
- 26. laser printer
- 27. local area network
- 28. file server
- 29. optical disk
- 30. monochrome monitor
- 31. color monitor (standard)
- 32. hi-res color monitor
- 33. add-on board
- 34. external hard disk
- 35. internal hard disk
- 36. back-up systems
- 37. modem
- 38. other \_\_\_\_\_

**Computers**

- 16. personal computers
- 17. multiuser microcomputers
- 18. laptop microcomputers
- 19. portable microcomputers
- 20. engineering workstation
- 21. minicomputers
- 22. mainframe computers
- 23. others \_\_\_\_\_

**Outside services**

- 39. on-line services
- 40. education/training
- 41. maintenance
- 42. custom application
- 43. service bureau
- 44. other \_\_\_\_\_

14. Over the course of one year, how would you quantify your level of involvement in total microcomputer systems products?

A. Recommend  B. Influence  C. Specify  D. Buy (please check all that define your involvement)

- 1. less than \$10,000
  - 2. \$10,000-\$24,999
  - 3. \$25,000-\$49,999
  - 4. \$50,000-\$99,999
  - 5. \$100,000-\$249,999
  - 6. \$250,000-\$499,999
  - 7. \$500,000 +
  - 8. None of the above
- (check only one)



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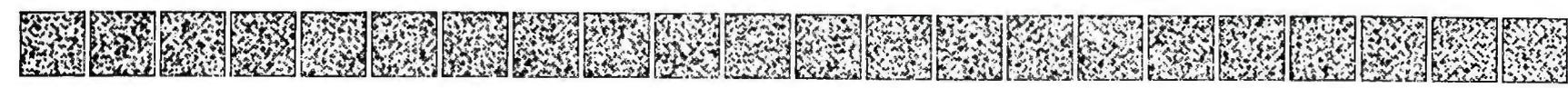
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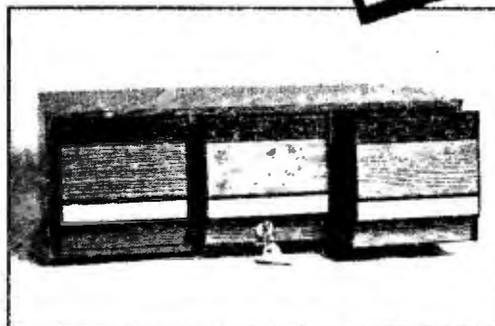
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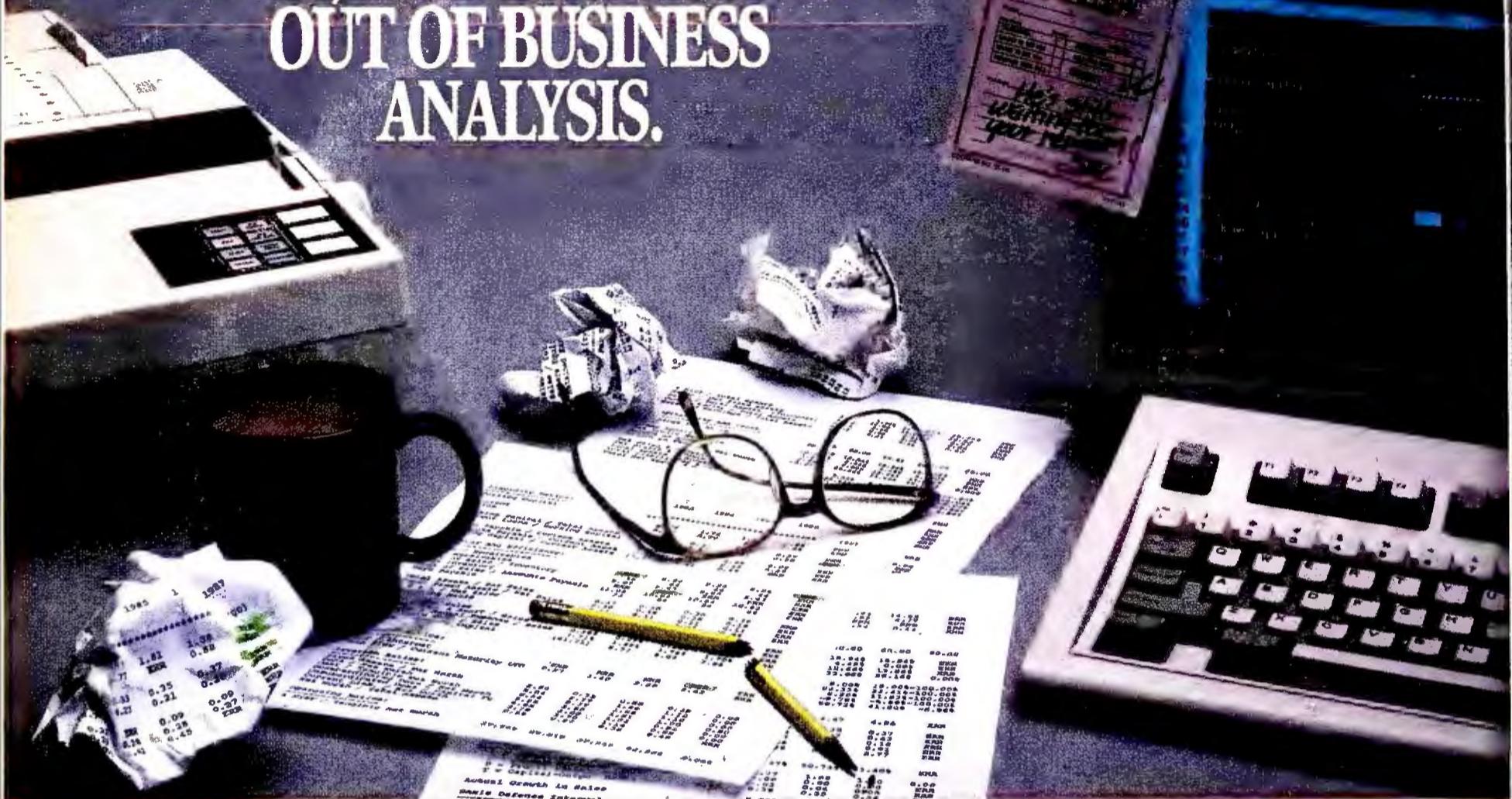
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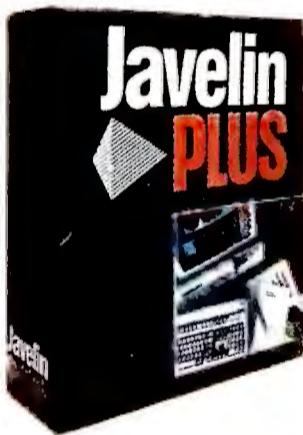
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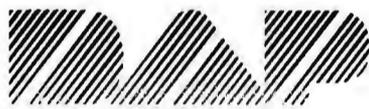
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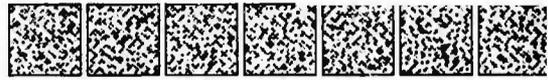
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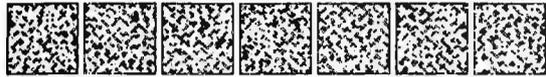
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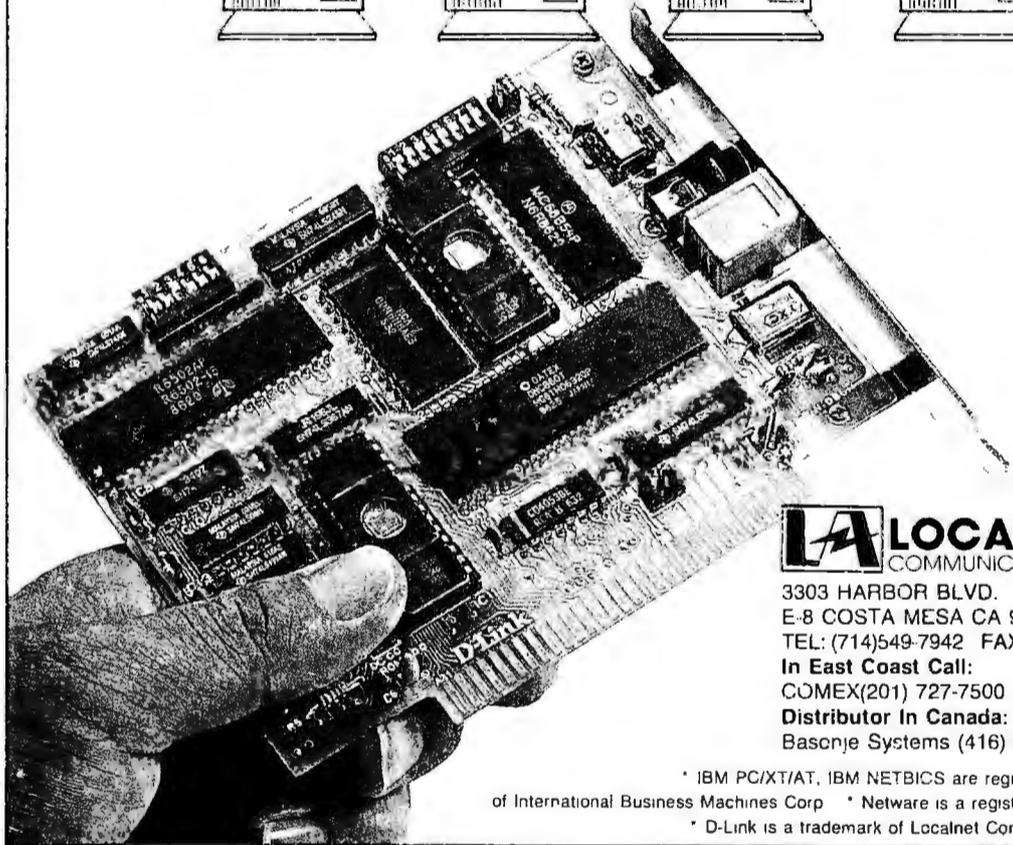
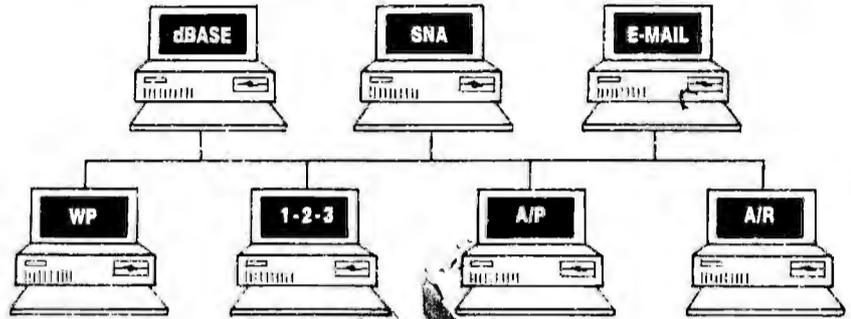
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*Russ Walter*

*Somerville, Massachusetts, 1987*

*287 pages*

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Russ Walter, personal computer sage and industry iconoclast, begins Volume 2 of his *Secret Guide* series with a list of frustrations. "The problem with computers," he says, is that "they make the production of mediocrity even easier and more glitzy."

Walter makes it his mission to sift out the dross and highlight the gold in the fast flux of computer technology. His fascination with every aspect of computing, combined with his skeptical intelligence and wide-ranging hands-on experience, produces a book that makes both compulsive browsing and an excellent instructional tool.

While Volume 1 focused on basic business applications and tools (see *Sourcebooks, PCW*, May 1987), Volume 2 is a grab bag of computer possibilities—from art to AI to application development. The first 80 pages cover software that casts your horoscope; recommends a mate; generates music, poetry, or pornography—even evaluates your medical history and lifestyle to predict how long you'll live.

Between this catalog of the exotic and a meaty 150-page examination of programming languages, a short chapter on artificial intelligence shines like a half-hidden jewel. Relying on language and logic problems to illustrate the evolution of AI research, Walter also includes brief, cogent bios of many important AI contributors. Lest you worry that the author has lost his soul to the AI siren, he smartly raps the grandiose claims of many AI proponents and advises readers to buy only products—not promises—from AI companies.

Walter's advanced tutorial on major programming languages will likely be the most useful section for many readers, although his language choices may seem eccentric at first glance. For 60 pages he focuses on BASIC routines—both for playful pursuits such as producing poems and songs on screen and for serious pursuits such as calculating exponents and building random-access data files. Walter says BASIC is his language of choice to be stranded with on a desert island because it's both powerful and easy.

The surprise in Walter's language section is Logo, which kids love as a charming shape-maker (via Terrapin's *Turtle Graphics* implementation). Walter criticizes Logo's awkward notation system but says it offers three functions missing from BASIC: the ability to create graphics easily, build "lists of lists," and add words to its lexicon.

*(continues)*

If Logo is appropriate for elementary school and BASIC for high school, then Pascal is the programming language for college students. It's more difficult to learn than either Logo or BASIC, Walter says, but more efficient because it forces you to clarify your thinking with outlines. His Pascal chapter includes fun routines, loop logic, and programs for working with array and string variables.

Famous for his uncompromising evaluations, Walter is also a born teacher, and teaching is really what *Secret Thrills* is all about. The lessons in *dBASE* that conclude the book, for instance, anticipate the goofs a beginner is likely to make, such as forgetting to remind the computer to look at the index file after appending or deleting records. He doesn't make you feel stupid for having made such mistakes, and he tells you in a straightforward and practical way how to fix them.

Furthermore, like many of the best teachers, he's a fanatic who ignores business hours. Far from assuming his canned lessons—however well done—will cover all the possibilities, he includes his personal phone number in all his books and urges readers with questions or comments (or lonely hours hanging loose in their hands) to call him anytime, day or night. "I'm a light sleeper," he explains. Now why can't computer companies offer documentation and support like that?



## Get That Buick

*The Algorithmic Image: Graphic Visions of the Computer Age*  
Robert Rivlin, with a foreword by Tom DeFanti  
Microsoft Press, Redmond, Washington, 1986  
282 pages, illustrated  
\$24.95 softcover

As graphics visionary Tom DeFanti notes in his foreword to *The Algorithmic Image*, "You can buy a board with 16 million colors at a resolution of 512 by 512 pixels and put it in a fast PC with a mouse, a hard disk, and several megabytes of memory for the price of a 3-year-old Buick."

But what can you do with today's Buick-priced graphics equipment? Create solid-model leatherette seats and video-cruise the coastline with your imaginary main squeeze? Simulate Harrison Ford's joystick and program it to wrest victory in the next space war? Produce dazzling animation for your next business presentation? Perhaps not quite yet for only \$10,000, but for \$100,000...

Author Robert Rivlin shares DeFanti's obvious fascination with computer graphics. *The Algorithmic Image* is an intensely serious survey of the field, packed with clear, detailed explanations of the hardware and equations that produce images, but Rivlin's delight in the technology and its achievements (including the

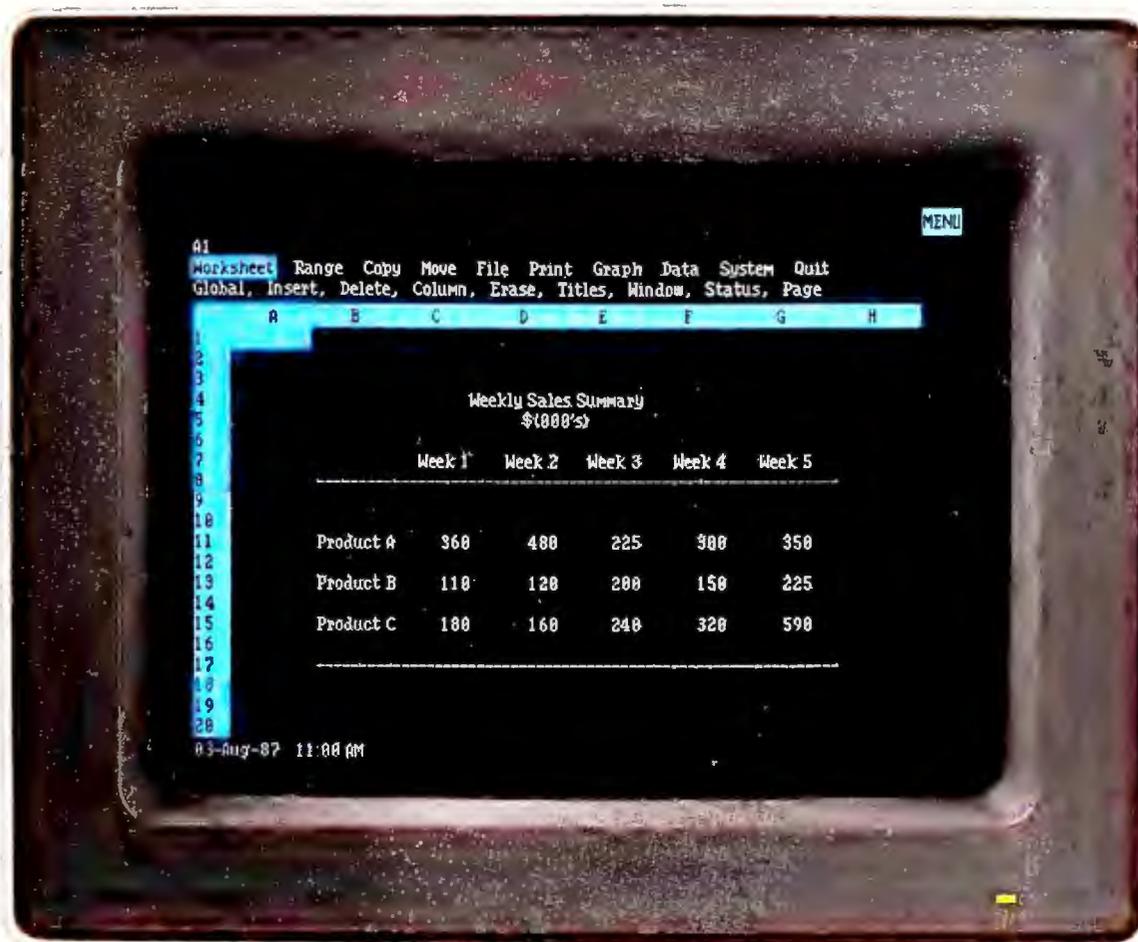
first close-ups of Mars) shines throughout his book. The reader who begins by glancing through the 31 pages of glossy photographs should quickly catch the author's excitement.

Rivlin also explores the business side of graphics, citing predictions that the market for business graphics display systems will rise from its 1984 level of \$390 million to \$6.8 billion by 1994. In the same ten-year period the graphics software market should climb from \$177 million to \$682 million. Dataquest forecast that the CAD/CAM (computer-aided design/computer-aided manufacturing) industry alone should be worth \$9 billion by the end of 1987.

But graphics technology isn't just a business, argues Rivlin, it's an art—not only because filmmakers and other visual artists have been drawn to it, but for its mathematical elegance as well. Rivlin's final chapter, "Fractal Mountains, Graftal Trees," illustrates the fascinating and beautiful shape of research efforts at the high end of computer graphics.

In 1975 at IBM's Watson Research Center, Benoit Mandelbrot made a key contribution: His fractal geometry provided the basis for "landscape" algorithms that yield clouds, mist, fog, rain, waves, mountains, and rocks on screen. Graftals came along in 1984, an offshoot of fractals that employed a more efficient method for interacting with the computer. Graftal logic involves nodes and branches; a graftal procedure is

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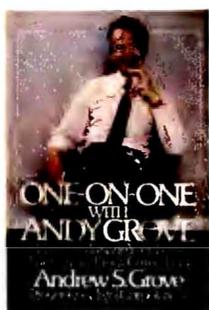


Quick-turn the page.

called a graftal tree. Graftals are ideal for simulating living plants waving in the breeze—especially trees. As Rivlin notes, “An image generated using laws that also appear to operate in the natural world provides a certain esthetic satisfaction.”

You may not be able to compose graftal masterpieces with \$10,000 worth of today’s PC hardware, but as software evolves to take advantage of 1-megabit RAM chips, 32-bit processors, and Targa boards, you’ll soon be able to produce and manipulate television-quality images (if not wind-tossed landscapes) with your PC.

In the meantime, you can prepare yourself by reading this well-written, thorough, and comprehensive celebration of a rapidly growing field. Open this book to the illustrations, put it on your coffee table, and watch guests drool.



## Dear Andy

*One-on-One with Andy Grove:  
How to Manage Your Boss,  
Yourself and Your Coworkers*  
Andrew S. Grove  
G.P. Putnam’s Sons, New York,  
1987  
235 pages  
\$18.95 hardcover

With insider trading scandals and the Iran-Contra hearings, there’s been a fair amount of talk lately about how decisions get made. A relatively new term has cropped up in these discussions: *micro-management*. What does it mean? Andy Grove, president of Intel Corporation, suggests what it should be: a manager’s close attention to interactions with subordinates, superiors, and co-workers.

*One-on-One with Andy Grove* springs from the regular column that this “Dear Abby of the workplace” wrote for a Silicon Valley newspaper. It consists of his replies—interwoven with commentary—to a huge selection of letters from frustrated readers. What should an employee do when his boss consistently makes him feel dumb or provides no guidance? How should a boss deal with staff conflict, with a defensive or bored employee? When do you decide that firing an employee is the only solution to a problem, and what is the right way of going about it?

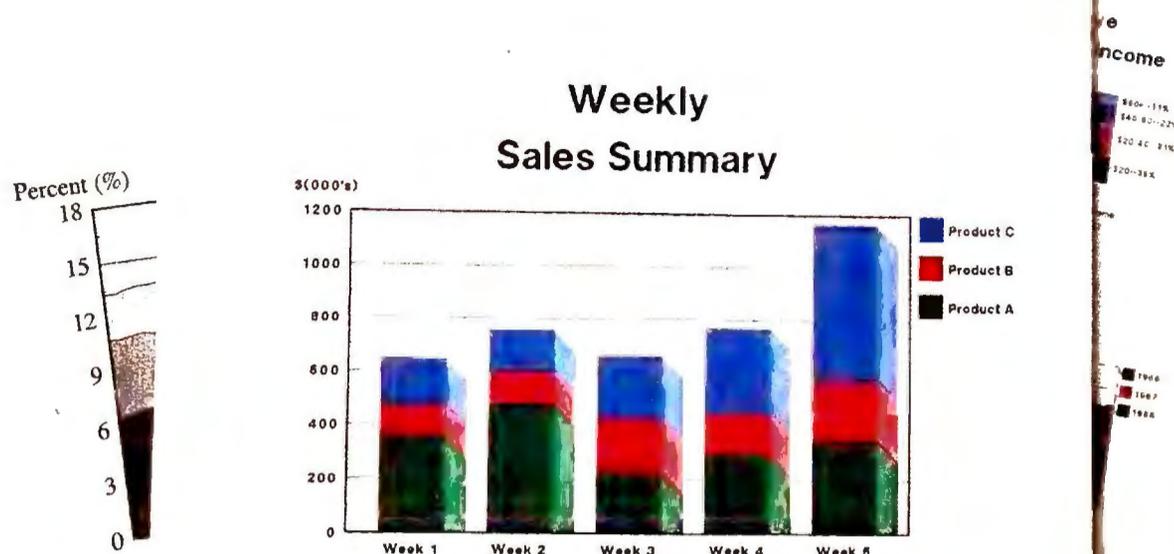
These are just a few of the problems that Grove confronts in the book, and his confident, straight-from-the-shoulder advice emphasizes the importance of honesty, tact, and fairness for all parties involved, including the firm and its clients. The question-and-answer, case-history format of the book makes compelling reading as it provides brief glimpses into the countless soap operas of the workplace. It’s also well suited to Grove’s managerial philosophy, for he’s happiest dealing with particulars—the micro-elements of management. Apart from a few guiding ethical princi-

ples (fairness, honesty, and so on), he doesn’t believe in an abstract science of management. “The best way anyone can prepare for a management career is by mastering a particular field,” he advises a business student bent on becoming an executive as quickly as possible.

“Know thy chosen field” is one of Grove’s commandments; he firmly believes a good manager is first of all someone completely conversant with the work of the group he or she supervises. As for other qualities, “There isn’t a single set of individual characteristics that one can associate with effective managers...extroverted and introverted, dynamic and cautious, patient and impatient, colorful and boring....I’ve seen all types both *make* the grade and *not* make it.”

Good management consists of good judgment, which draws on “intuition honed by experience.” Managers will be around for quite a while, Grove asserts, because those skills and qualities can’t be reduced to algorithms and embodied in a silicon chip. Whatever their potential, expert systems can’t stimulate “the communication that *must* take place among employees at the workplace. Even flesh-and-blood managers have a hard time coping with the complex needs, aspirations, insecurities, and conflicts of their coworkers.” Computers have yet to master this micromanagement juggling act.

(continues)



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## Micromanagement: Another Theory

*Micromanaging: Transforming Business Leaders with Personal Computers*

George T. Geis and Robert L. Kuhn

Prentice Hall Press, Englewood Cliffs, New Jersey, 1987

231 pages

\$13.67 softcover; \$18 with optional disk

George Geis and Robert Kuhn, business professors at the University of California, Los Angeles, and New York University, respectively, see micromanagement not as a matter of managing the details of interpersonal communication but of literally managing the power of the microcomputer.

According to their book, *Micromanaging: Transforming Business Leaders with Personal Computers*, micros have awesome power indeed. "Personal computers break down organizational hierarchies, change norms, cut across boundaries, bust up bureaucracies," they claim.

As the PC makes raw information widely accessible, decision making becomes decentralized, and the pyramidal structure of organizations begins to crumble. According to Geis and Kuhn, "Personal computers are spawning

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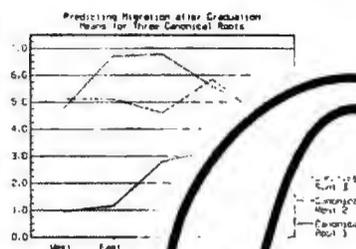
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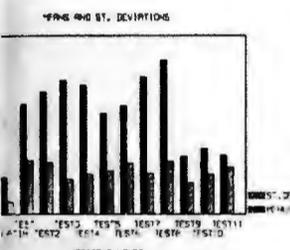
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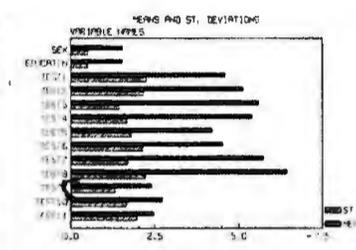
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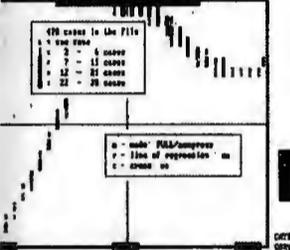
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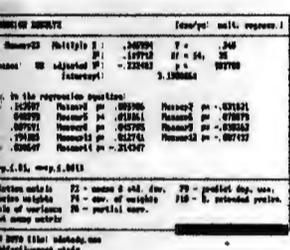


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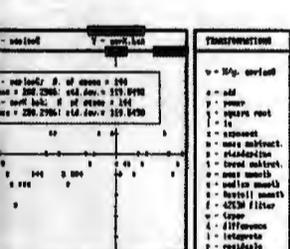
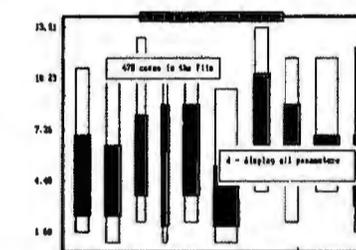
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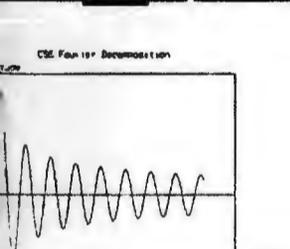
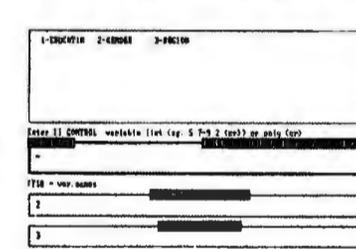
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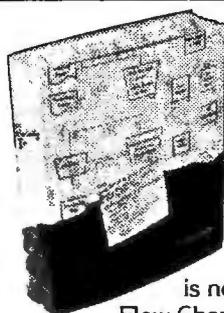
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a new generation of natural leaders—those who emerge by merit and wit, irrespective of whether they've been appointed by superiors.”

Whether you become one of those natural leaders depends on how you use your PC, and most of *Micromanaging's* ten chapters are devoted to pointing you in the right direction. PCs won't turn bad managers into good ones, they warn, but you can use technology to learn new methods and avoid pitfalls.

Toward that end, *Micromanaging* presents the reader with a disk of 1-2-3 templates that simulate various business scenarios. Each chapter offers advice and arguments, then points you toward a disk exercise designed to illustrate a particular capability of the micro—for planning, organizing, leading, brainstorming, or controlling. Chapter 5 (on company creativity), for instance, presents raw data on suit sales for an apparel store and invites you to look for the “creative flash” that will suggest why overall sales of suits have been declining. In another exercise, you decide which graphs of financial and market-related information will convince an investor group to fork over badly needed capital. Although the authors have an eye on the MBA textbook market, their writing is clear, free of jargon, vigorous, and entertaining. For greenhorn managers or those with little computer experience, this text/disk combo is

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## Books in Brief



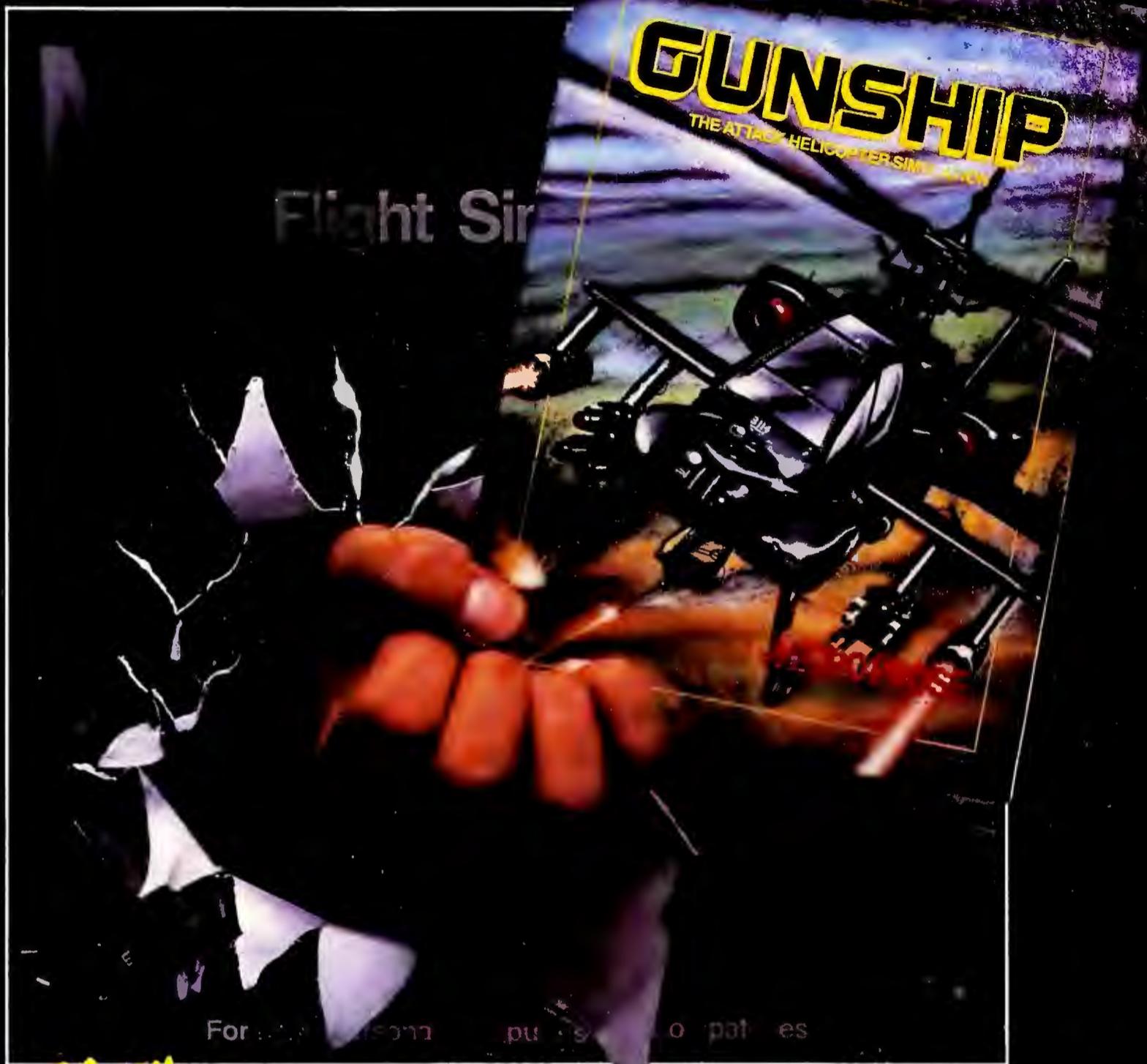
In the ecology of software, shareware may be the fittest specimen, but it isn't necessarily the best documented—hence *The Shareware Book: Using PC-Write, PC-File, PC-Talk*, shareware manual *extraordinaire*. Focusing on the most widely used shareware programs, authors Emil and Miriam Flock and Howard Schulman cover the programs individually—offering a quick-start, tutorial, and reference section for each one—and then move on to discuss integrating the three programs into one smooth DOS system. A wonderful adjunct to your shareware for a fair \$14.95. Osborne/McGraw-Hill, Berkeley, California, 1987; 652 pages, softcover.



A good teacher presents new material by comparing it with what a student already knows. Perhaps that's why computer product developers (who like to think their products are incomparable) usually do such a bad job of teaching users. But solid pedagogical principle is at work in *A WordStar Survivor's Guide to WordPerfect*.

(continues)

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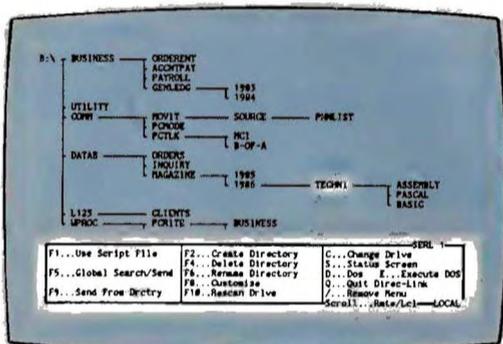
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Sourcebooks

Commissioned by WordPerfect Corporation and written pseudonymously by “W. S. Farewell & W. P. Forever,” the book builds an explicit bridge between what is known (*WordStar*) and what is unknown (*WordPerfect*). The chapters are organized into broad function areas such as formatting, printing, and macros; every step of the way, the authors remind you of how *WordStar* does it and then introduce *WordPerfect*’s technique. Readers crossing over will probably want to remove and post the two appendixes, which provide quick reference lists of *WordStar-WordPerfect* command and macro equivalents. At \$12.95, the book provides a valuable teaching solution to a specific learning problem. WordPerfect Publications, Orem, Utah, 1987; 161 pages, softcover.

Since many expert system toolkits now provide an interface to languages other than the traditional LISP, C language guru Herbert Schildt’s new book may find a ready market: *Artificial Intelligence Using C: The C Programmer’s Guide to AI Techniques* asserts that there is nothing a declarative language like LISP or Prolog can do in real-world applications that a C procedure can’t also do—and much faster. Schildt runs through traditional AI problem-solving tactics and terminology and offers equivalent C routines. He includes chapters on expert systems, natural language processing, robotics, machine learning, and pattern recognition.

(continues)

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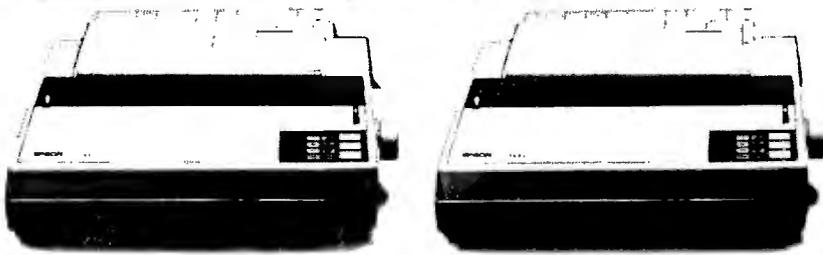
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Circle 54 on reader service card

A review of C with 32 keywords and appropriate syntax rounds out this timely compendium. At \$21.95 it's a good investment—especially for those contemplating expensive AI development projects. Osborne/McGraw-Hill, Berkeley, California, 1987; 412 pages, softcover.

At the other end of the AI language spectrum is a relative newcomer and hot development prospect—Prolog. *Prolog: A Relational Language and its Applications* was written by academician John Malpas for programmers who already know other “tongues.” Malpas prefers the descriptor *relational* (rather than *declarative*) for Prolog because the program classifies types of relations in a data set. He includes chapters on logic and arithmetic (both at an advanced level) as well as sections devoted to Prolog techniques for handling application areas such as text processing, knowledge representation, and expert consultation. Case studies, a glossary of terms and major Prolog versions, and program listings complete this \$28.67 text. Prentice Hall Press, Englewood Cliffs, New Jersey, 1987; 465 pages, softcover. —M. N.

*Michael Harper teaches English at Scripps College in Claremont, California. Marlene Nesary is an Assistant Editor for PC World.*



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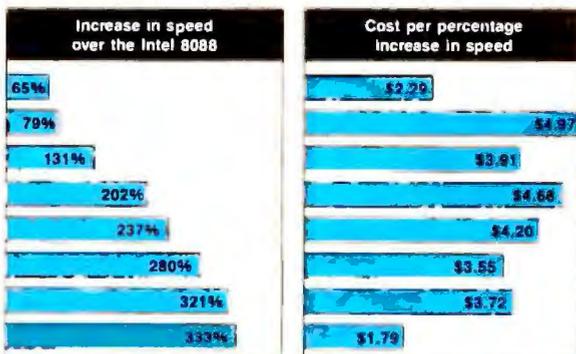
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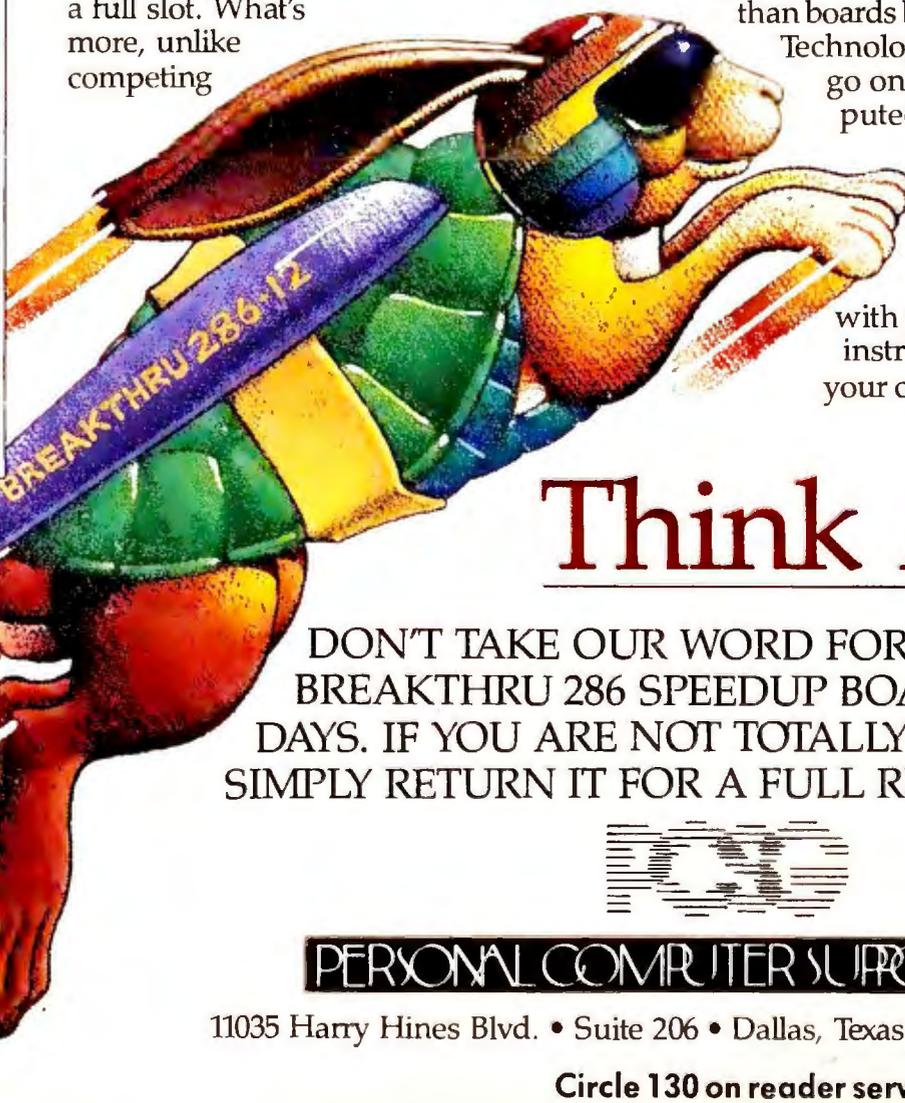
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*Karl Koessel*

**AUTOEXEC SideKick**  
*Q. I may just be lazy, but I'd like to be able to turn on my computer and have SideKick's calendar and its appointment list pop up automatically on the screen. Notes for the current day, jotted down months ago, could appear without effort and not be forgotten. As it is, I don't even use the appointment list anymore because I never remember to check it. How can I get my AUTOEXEC.BAT file to pop up SideKick's calendar and open its appointment list?*

*Peter John Garratt  
Onalaska, Wisconsin*

**A.** Borland touts SideKick as SuperKey's perfect companion. For the task of automatically opening SideKick, the reverse may also be true. In addition to SuperKey's keyboard macro processing, cutting and pasting, file encryption, screen blanking, 128-character keyboard buffer, and DOS command stack capabilities, Borland's productivity booster includes a SideKick command. Borland included that command for bringing up SideKick because, like most macro processors, SuperKey cannot record <Ctrl>-<Alt> or <Shift>-<Shift>, the keys that call up SideKick.

Let's assume that you keep your SuperKey files on drive C: in a directory called \SUPERKEY and your SideKick files on the same drive in a directory called \SIDEKICK. Change to the \SUPERKEY directory (**CD \SUPERKEY** <Enter>) and load SuperKey (**KEY** <Enter>). Next, change to the \SIDEKICK directory (**CD \SIDEKICK** <Enter>) and load SideKick (**SK** <Enter>). Now that both programs are loaded, let's build a

macro that will automatically bring up the SideKick calendar's appointment list.

Press <Alt> -/ (that is, hold down the <Alt> key, press the slash, and release both keys) to invoke SuperKey's menu. Issue Macro Begin and enter <Alt> -L as the key to define. Then press <Alt> -/ and issue Macro auto-start so the <Alt>-L macro will run automatically when the macro file it's saved in is loaded. Press <Alt> -/ again, issue Commands SideKick, and type L <Enter> to pop up the SideKick calendar's appointment list. Press <Alt> -/ again and issue Macro End. Finally, press <Alt> -/ one last time and issue Macro Save. In response to the file name prompt, type \SUPERKEY\AUTOSK-L and press <Enter>. The macro file will be saved in the \SUPERKEY directory. Press <Esc> twice to remove the appointment list and the calendar, and enter the DOS command **TYPE \SUPERKEY\AUTOSK-L.MAC**. If the <Alt>-L macro definition that appears differs from that shown in Figure 1, start over. Otherwise, you're ready to modify AUTOEXEC.BAT.

Bring up SideKick's notepad (<Ctrl> - <Alt> N), press <F3> for a new file, and enter C:\AUTOEXEC.BAT. Use <CursorDown> to move the cursor below all commands that install memory-resident programs and insert the commands shown in Listing 1a. The first two lines log on to the SuperKey directory and load the program. The next two lines do the same for SideKick. The last

*(continues)*



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## The Help Screen

```
<BEGDEF><AltL><AUTO><SIDEKICK>L<ENTER>
<ENDDF>
```

Figure 1: AUTOSK-L.MAC contains this definition for <Alt>-L, which, when loaded, automatically pops up the SideKick calendar’s appointment list.

```
for DOS 2.xx:  cd \superkey
                key
                cd \sidekick
                sk
                cd \superkey
                key autosk-l.mac/ML
```

```
for DOS 3.00  C:\SUPERKEY\KEY
or later:     C:\SIDEKICK\SK
              C:\SUPERKEY\KEY C:\SUPERKEY\AUTOSK-L.MAC/ML
```

Listings 1a and 1b: Add these lines to AUTOEXEC.BAT, and every time you start your PC, they’ll load SuperKey and SideKick and then load the macro file AUTOSK-L.MAC (see Figure 1).

two log on to the *SuperKey* directory and load the macro file AUTOSK-L.MAC, which automatically invokes *SideKick* and displays the calendar’s appointment list. (Users of DOS 3.00 or later can use the commands shown in Listing 1b.)

### Perverted Palette

*Q. I have a utility that blanks out the screen if I don’t type for 10 minutes. This is supposed to prevent etching an image in the screen’s phosphors and thereby lengthen the life of the monitor (it’s an Enhanced Color Display driven by an EGA clone, Video Seven’s Vega). To bring the display back, I simply press the <Shift>*

*key. (Any key would do, but the keystroke is passed through to DOS or to the currently running program.)*

*When I am using Microsoft Word and have to bring back the display (for example, after it blanks out while I’ve been on the phone), the blue background that I use turns to an awful reddish brown.*

*Even worse, after using SideKick while in Word, the top portion of the display is littered with purple dots, and the characters underneath the dots are cyan—a result, I’m told, of changing back to Word’s graphics mode display.*

(continues)



Then if I use one of the cursor keys, both the background and the character colors turn brown—I can't read anything! Pressing <Esc> displays Word's menu in barely legible brown on black, but I can't reset the colors with the Window Options command because the palette of choices has been altered, and blue is no longer available. What once was blue has rusted to that awful reddish brown.

In either case, to restore my preferred colors, I have to save the document, quit Word, restart Word, reload the document, and find where the cursor was before the screen went blank. Can you figure out an easier way to bring back my word processor's colors?

Susan Parker  
Athens, Georgia

A. EGA boards can change the colors that programs use. This feature enables appropriately written programs to let you choose which 16 of 64 colors the screen will display. Unfortunately, every new feature a system offers also means there's one more way things can go wrong.

To restore the background and character colors, issue the command <Esc> Library Run. Press <Enter> in response to the 'Enter DOS command' prompt, then press <Enter> again to return to your Word document. You'll find the cursor right where you left it.

### 1A Days

In response to Gary Anderson's formula for producing the days of the week ("Readers Respond," *The Help Screen*, PCW, June 1987), reader Tim Ault of Mesa, Arizona, has sent me a clever

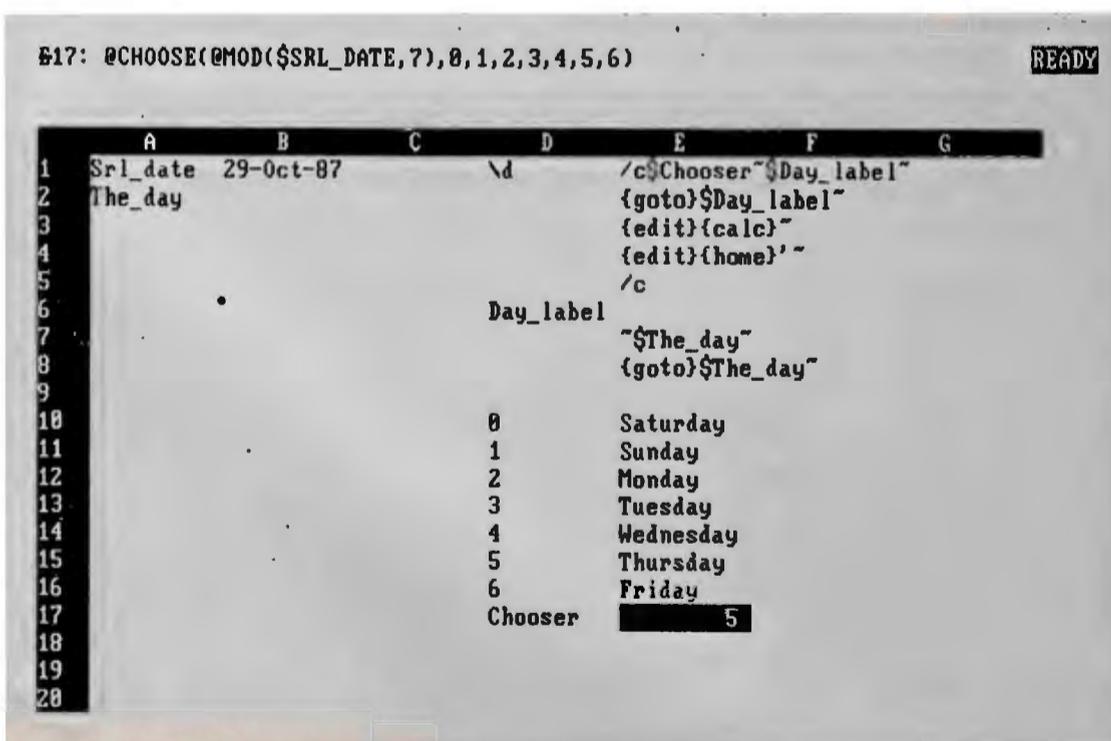
1-2-3 release 1A macro (see Screen 1) that calculates the day of the week from a serial date value. A macro is not as elegant as a formula because it must be reissued whenever the cells that it uses in its calculations change. A formula's calculations, on the other hand, are automatic. (For example, the day of the week that a macro derives from an @TODAY serial date value will not change on the following day until the macro is reissued.) However, this macro does give the release 1A user the means to find the day of the week.

To build the macro, open a new worksheet, issue /Worksheet Column-Width Set, type 10, and press <Enter>. Now enter the labels (which all begin with an apostrophe) for the cells specified in Table 1. Be careful: There are several tildes (~), and an apostrophe is buried within E4's label.

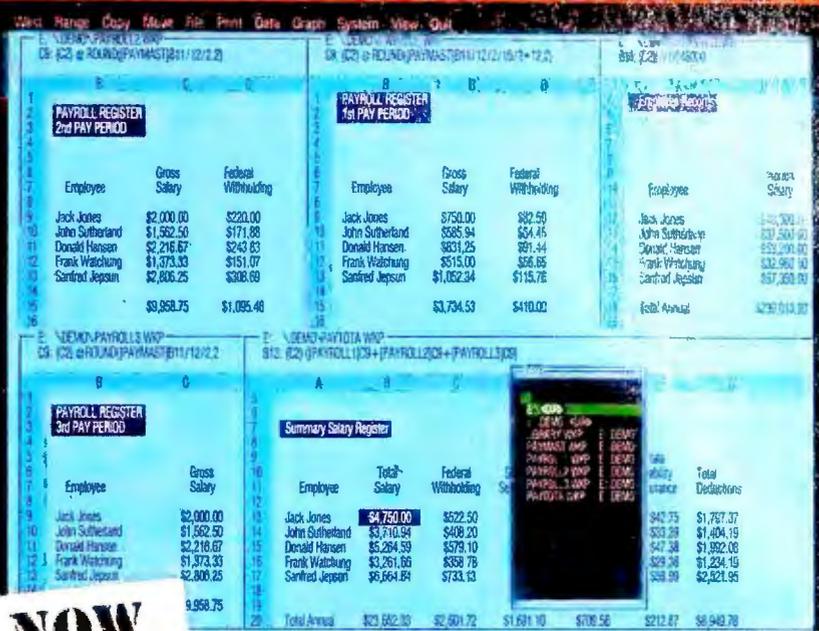
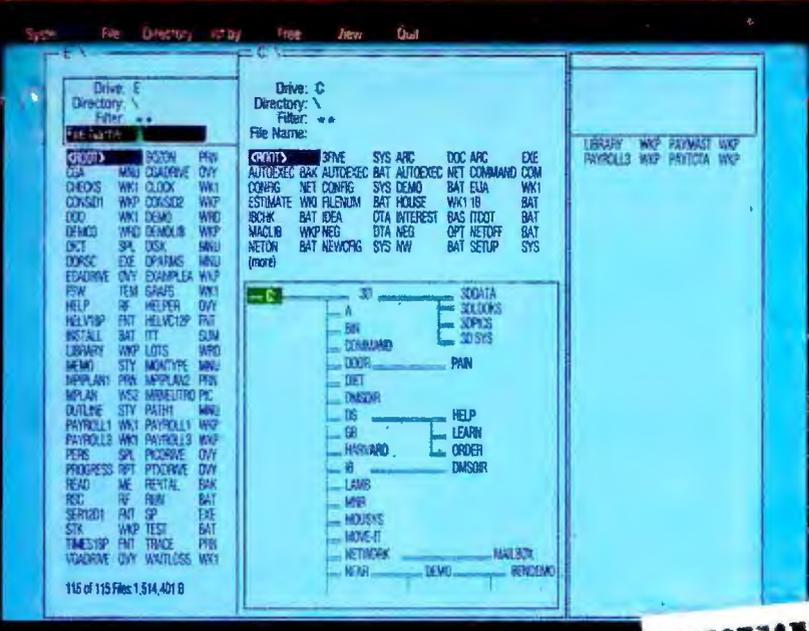
The two formulas, in cells B1 and E17, are next. Note that for cell B1, you do not type (D1). Those characters indicate cell B1's format—1-2-3's first date format. Therefore, go to cell B1, type @TODAY, press <Enter>, then issue /Range Format Date 1-(DD-  
MMM-YY), and press <Enter>.

Because the formula in cell E17 references a range name, it cannot be entered until that range name is defined. Press <Home>, and issue /Range Name Labels Right. Press <CursorDown> and then <Enter>. Now go to cell E17 and enter its formula as shown in Table 1. (The formula contains a

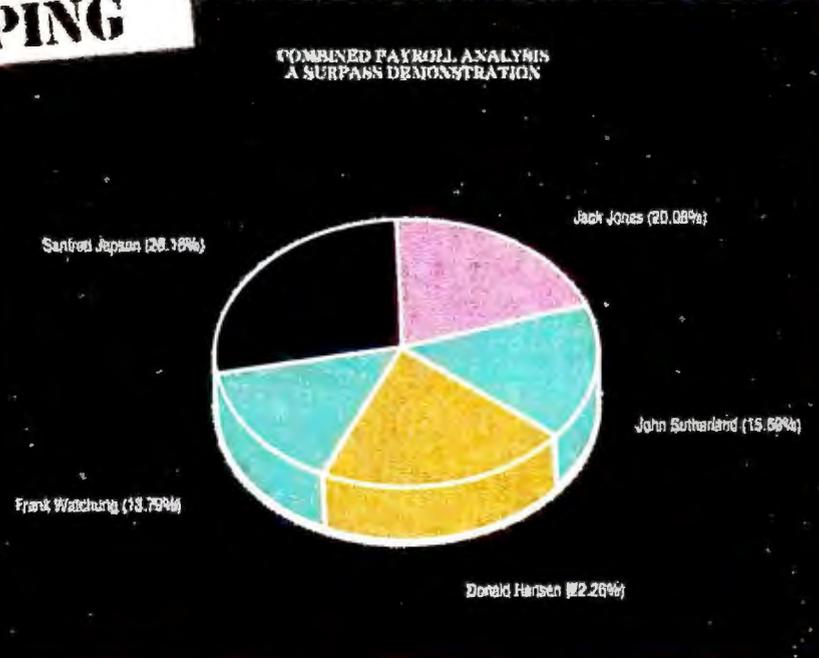
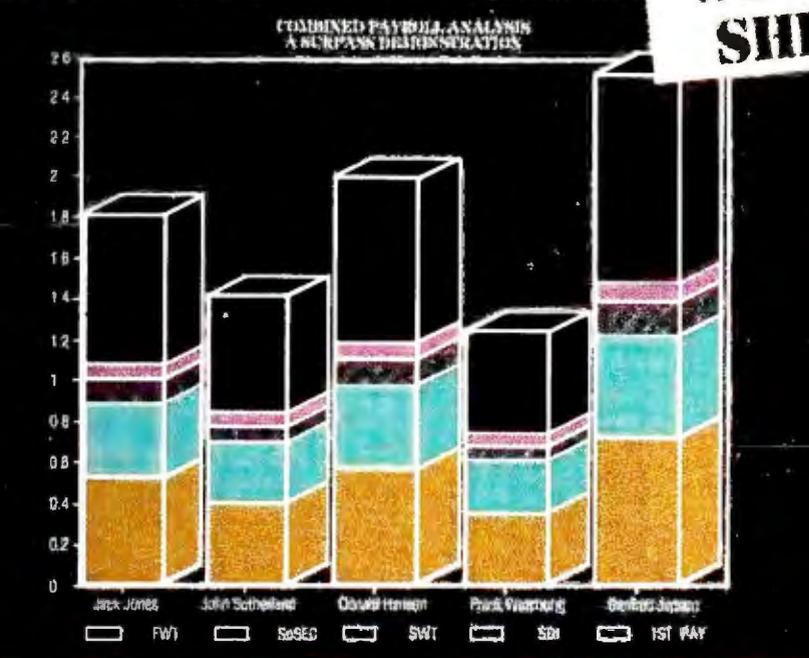
(continues)



Screen 1: The 1-2-3 release 1A macro <Alt>-D calculates the day of the week for a given serial date value. It works in part by cleverly turning a calculated value into a label.



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## The Help Screen

Table 1: Use these formulas and labels to build the 1-2-3 release 1A worksheet shown in Screen 1.

Cell	Contents	Cell	Contents
A1	'Srl_date	E1	'/c\$Chooser~\$Day_label~
A2	'The_day	E2	'{goto}\$Day_label~
B1	(D1) @TODAY	E3	'{edit}{calc}~
D1	'\d	E4	'{edit}{home}'~
D6	'Day_label	E5	'/c
D10	'0	E7	'~\$The_day~
D11	'1	E8	'{goto}\$The_day~
D12	'2	E10	'Saturday
D13	'3	E11	'Sunday
D14	'4	E12	'Monday
D15	'5	E13	'Tuesday
D16	'6	E14	'Wednesday
D17	'Chooser	E15	'Thursday
E16		E16	'Friday
E17	@CHOOSE(@MOD(\$SRL_DATE,7),0,1,2,3,4,5,6)		

dollar sign followed by an S. Be sure that you don't accidentally omit one of them.)

Now for the last step. Go to cell D17 and issue /Range Name Labels Right. Press <PgUp> and then <Enter>. That's it. Save the worksheet and give it a try by pressing <Alt>-D. If you'd like to watch the macro run one step at a time, press <Alt>-<F1> and then execute <Alt>-D. Just press the <Space> bar to move along to the next step.

### Modifying NORMAL.STY

Reader Laura J. Sanborn of Albany, California, also has a tip for Help Screen readers. Hers regards "A Matter of Style" from July's Help Screen. Ms. Sanborn points out that readers would be better advised to put nothing in the 'key code' field when modifying Word's

NORMAL.STY style sheet.

Here's her explanation:

*By leaving out the key code, you can modify the default settings without the penalty of more cumbersome speed formatting commands (the additional X in all the <Alt>-key commands). The key code is only a shortcut for applying a style. It is not necessary for setting defaults [which is what NORMAL.STY does]. In fact, it's not necessary at all.*

*You can also change other default Format Division settings (for example, page numbering or page size) in this manner by modifying the Standard Division in NORMAL.STY. In addition, you can modify the default character and/or paragraph settings with the*

(continues)

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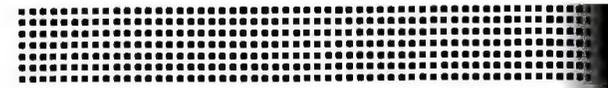
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*Standard Paragraph style. When the Paragraph Heading styles are defined, the outliner applies styles automatically (up to seven levels). The same holds true for the table of contents and index generator (up to four levels each) and for footnotes. In all cases, leave the key code fields blank, or the speed formatting won't be so speedy. Since these are all automatic [default] styles, they need not be named with a key code.*

*As far as I can tell, you can also use this approach to add any number of new styles to NORMAL.STY. So long as no key codes are defined in the attached style sheet, the speed formatting operates as though the style sheet has not been modified. This is a useful trick for anyone who uses speed formatting much more frequently than defined styles. You access the additional new styles through the Format Style menu; make sure they are given a name in the remark field so that the list of available styles makes sense.*

**BASIC Date File**

Another reader, James H. Huckabey of Bellingham, Washington, feels that the method for obtaining the day of the week offered in "A Day in the Life" (*The Help Screen*, PCW, August 1987) was unnecessarily long and complex. He offers a simpler method for obtaining the day of the week with BASIC, one that uses file redirection instead of in-line assembly language. His technique, modified slightly to support users

*(continues)*

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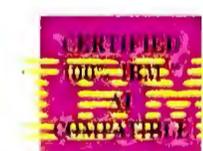
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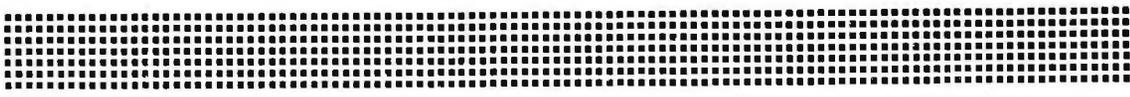
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```
'DAY.BAS finds the day of the week for dates 1-1-1980 to 12-31-2099
20 DEFINT A-Z           'Define integer variables
30 WIDTH 80 :CLS       'Set up screen
40 SYSDATES=DATES$     'Save system date

50 OPEN "CR" FOR OUTPUT AS #1       'Make a file containing
60 PRINT #1, CHR$(13);             ' the <Enter> key
70 CLOSE

80 SHELL "DATE"                   'Use DOS to get the date in question
90 SHELL "DATE > \DATE.DAT < CR" 'Redirect DOS DATE output to a file
100 KILL "CR"                      'Remove <Enter> key file

110 OPEN "\DATE.DAT" FOR INPUT AS #1 'Look inside date file
120 INPUT #1, FIRSTLINES$          'Get first line of file
130 CLOSE

140 DAYS=MID$(FIRSTLINES$,17,3)    'Excerpt the three day characters
150 IF DAYS="Mon" THEN DAYS="Monday" :GOTO 220 'Find match and complete
160 IF DAYS="Tue" THEN DAYS="Tuesday" :GOTO 220 ' name of day
170 IF DAYS="Wed" THEN DAYS="Wednesday" :GOTO 220
180 IF DAYS="Thu" THEN DAYS="Thursday" :GOTO 220
190 IF DAYS="Fri" THEN DAYS="Friday" :GOTO 220
200 IF DAYS="Sat" THEN DAYS="Saturday" :GOTO 220
210 IF DAYS="Sun" THEN DAYS="Sunday" :GOTO 220

220 CLS                            'Clear the screen
230 PRINT DATES;" is "DAYS"."      'Display result
240 INPUT "Do another (y or n)"; ENTRY$ 'Prompt for more
250 IF ENTRY$="" THEN ENTRY$="N"    'Fix null entry
260 IF (ASC(LEFT$(ENTRY$,1)) AND &HDF)=89 THEN CLS :GOTO 50

270 DATES=SYSDATES$                'Reset system date
280 END
```

Listing 2: DAY.BAS redirects the output of DOS's DATE function to a file so BASIC can determine the day of the week.

who don't shut off their PCs, consists of sending the output of DOS's DATE command to a file, which is then manipulated in BASIC (see Listing 2, DAY.BAS).

DAY.BAS makes a temporary file called CR that contains only <Enter> (lines 50 to 70). It then uses BASIC's SHELL statement to run DOS's DATE command (line 80). The user enters a date, and the program uses SHELL again to run DOS's DATE command (line 90). This time, however, input (the <Enter> key) is supplied by redirection from the file CR. The output of the DATE command, Current date is Thu 10-29-1987

Enter new date (mm-dd-yy);, is redirected into the file DATE.DAT in the root directory. Because both input and output are redirected, nothing appears on the screen. The temporary file, CR, is erased (line 100), and the first line of DATE.DAT is read into the variable FIRSTLINES\$ (lines 110 to 130). The three characters indicating the day of the week (beginning at position 17) are excerpted and placed into the variable DAYS\$ (line 140). The three-character DAYS\$ is then expanded to the

(continues)

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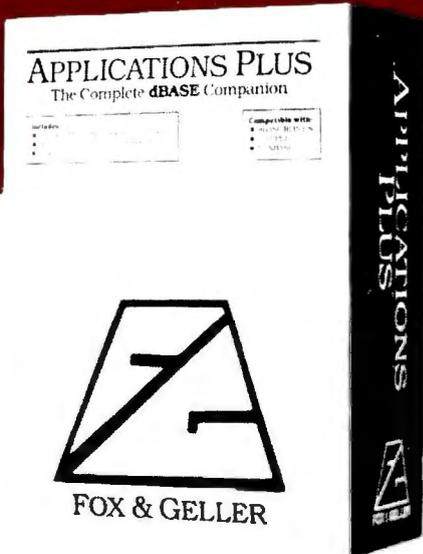
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## The Help Screen

day's full name (lines 150 to 210). The screen is cleared (line 220), the result is displayed (line 230), and the user is asked if there are more dates to be converted (line 240). Because line 260 generates an error if ENTRY\$ has no value, ENTRY\$ is set to N by line 250 if the user simply presses <Enter> in response to line 240's prompt. Otherwise, if the user enters a y or a Y, the program loops back to line 50 to start again. Any other entry causes the system date to be reset to the value it had when DAY.BAS began, and the program ends. If you intend to use DAY.BAS to set the system date, delete lines 40 and 270.

### Error in Automatic Partition Changer

"Pick a Partition" (*The Help Screen, PCW, August 1987*) contains a typographical error. Each 02 in the first DEBUG command, printed as 'F 100 L6 02 0D 02 0D 1B 1B <Enter>', should be "2" (without the zero and with the quotes) or 32, since the ASCII value of the character "2" is 32 hexadecimal.

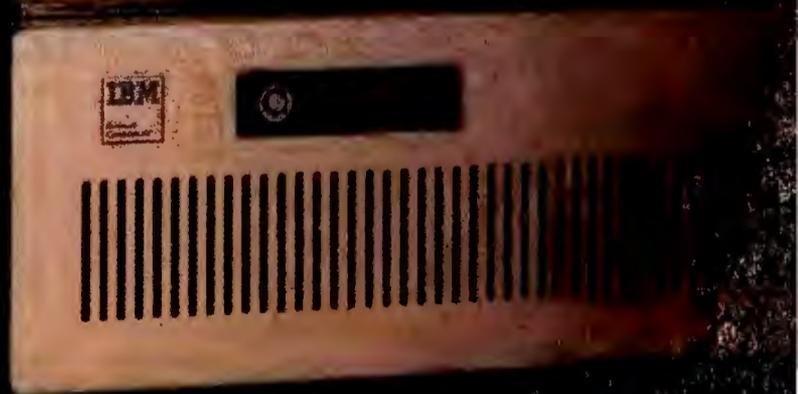
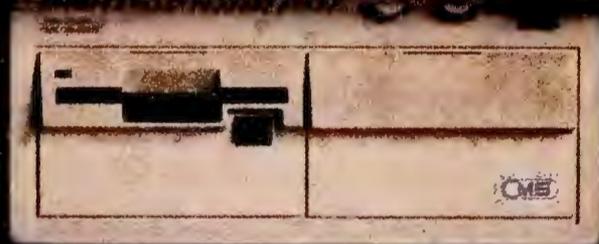
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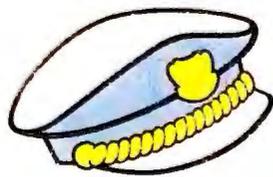
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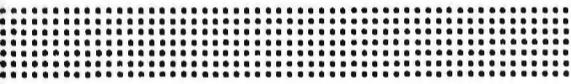
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*Edited by Mike Cushman*

### Swapping <Ctrl> and <CapsLock>

Many years ago when Bell Telephone introduced push-button phones, it logically arranged the digits 1 through 9 in sequence from top to bottom in rows of three. This arrangement was upside down from that found on ten-key adding machines already in use. What's more, Bell insisted that 0 came after 9, not before 1, and it was big enough to have its way. Persons using both kinds of office machines cried for a while.

Now IBM introduces a new keyboard, moving the <Ctrl> and <CapsLock> keys in the process. IBM is big and insists that the new keyboard is better. Users switching to these new office machines are going to cry for a while.

Although there is no easy way to invert the telephone keypad, software can come to the rescue of misplaced PC keys. To that end I wrote KEYSWAP.ASM [Listing 1], which, after it's assembled and linked, can be converted by DOS's EXE2BIN.EXE utility into a terminate-and-stay-resident (TSR) program. Because fussy programs such as *SideKick* must be loaded after any other TSR that uses the keyboard interrupt (interrupt 9), KEYSWAP is written as a dummy device driver and is installed by placing the line `DEVICE = -KEYSWAP.SYS` in the CONFIG.SYS file. You must restart your PC to actually load the program.

Some other TSR programs may ignore KEYSWAP for some or all operations. If this happens, you have two choices: Learn what works, or reverse the swap by pressing the <Ctrl> and the <CapsLock> keys at the same time. That same hot-key combination will swap them again.

The ability to swap the key functions is also useful if your office has both kinds of keyboards. KEYSWAP can be installed on all of the computers, and anyone can quickly adjust the <Ctrl> and <CapsLock> keys of any keyboard to match either the old keyboard layout or the new.

The program intercepts interrupt 9, which occurs anytime there is a scan code ready at port 60H—that is, whenever a key is pressed or released. This is a hardware interrupt normally processed by the ROM BIOS. Because the two keys involved are status keys—that is, they change the status of the keyboard and don't produce an ASCII character—the keyboard status flags (at memory locations 0040:0017 and 0018) must be updated and the keystroke thrown away. All other scan codes are passed through to the ROM BIOS, but they may be intercepted both before and after this program by other TSR programs.

*Clifford Vander Yacht  
Jackson, Michigan*

*Editor's note: Although the MASM, LINK, and EXE2BIN commands to create KEYSWAP.SYS are at the beginning of KEYSWAP.ASM, it's probably easier to create the dummy device driver with X-MAKER2.BAS (Listing 2). Load BASIC and enter the lines for X-MAKER2.BAS. Type **SAVE "X-MAKER2"** <Enter>, then type **NEW** <Enter>. Enter the lines shown in KEYSWAP.DAT (Listing 3), followed by **SAVE "KEYSWAP.DAT",A** <Enter>. Issue the commands **LOAD "X-MAKER2"** <Enter>, **MERGE "KEYSWAP.DAT"** <Enter>, and **RUN** <Enter>.*

*(continues)*

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```

PAGE      ,132
TITLE     KEYSWAP - Exchanges Ctrl and CapsLock keys
SUBTTL    Clifford J. Vander Yacht - Jackson, MI 7/6/87

COMMENT $
    Assemble, link, and convert as follows:
    MASM KEYSWAP;
    LINK KEYSWAP;
    EXE2BIN KEYSWAP KEYSWAP.SYS

    Install by adding the following line to CONFIG.SYS
    DEVICE=KEYSWAP.SYS

    Program interchanges the Ctrl and CapsLock keys
    by performing the operations on the key status
    bits directly, bypassing ROM BIOS. All other keys
    are unaffected.

    To toggle the key swap on and off, press both
    the Ctrl and the CapsLock keys at the same time.
    $

IOPacket      STRUC
IO_CMDLEN     DB      ?
IO_UNIT       DB      ?
IO_CMD        DB      ?
IO_STATUS     DW      ?
              DB      8 DUP(?)
IO_MEDIA      DB      ?
IO_ADDRESS    DW      ?
              DW      ?
IO_COUNT      DW      ?
IO_START      DW      ?
IOPacket      ENDS

CSEG          SEGMENT
              ASSUME CS:CSEG, DS:NOTHING, ES:NOTHING
              ORG      00H                ; Origin for Device Drivers

Prefix        DD      -1
              DW      8000H
Old_Int9      DW      Strat
              DW      Intr
              DB      'Keyswap '
Toggle        DB      0                ; Initially on

;            Interrupt 9H intercept.
;            -----

New_Int9:
    PUSH      AX                ; Save needed registers
    PUSH      BX
    PUSH      DS
    MOV       AX,0040H          ; Set DS = Data area
    MOV       DS,AX
    MOV       BX,DS:17H        ; Get keyboard flags
    IN        AL,60H           ; Get scan code
    MOV       AH,AL            ; Copy for later
    AND       AX,807FH         ; Extract bits
    CMP       AL,10H           ; Test old Ctrl
    JE        NewCapsLock     ; Yes, convert
    CMP       AL,3AH           ; Test old CapsLock
    JE        NewCtrl         ; Yes, convert
    
```

(continues)

Listing 1: Use KEYSWAP.ASM to create KEYSWAP.SYS, a memory-resident program that swaps the functions of the <Ctrl> and <CapsLock> keys.

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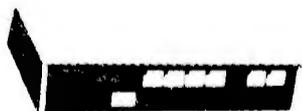
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```

POP    DS                ; Exit all others
POP    BX                ; Restore registers
POP    AX
JMP    DWORD PTR Old_Int9 ; Go to old vector

;
; Conversion by direct change to keyboard flags.
;
-----

NewCapsLock:
CMP    Toggle,00H        ; Check swap active
JNE    OldCtrl           ; No, do regular key

OldCapsLock:
CMP    AH,80H            ; Test key released
JE     ReleaseCapsLock   ; Yes, reflect change
XOR    BX,0040H          ; Toggle CapsLock state
OR     BX,4000H          ; Show CapsLock depressed
JMP    SHORT Set         ; Exit with new state

ReleaseCapsLock:
AND    BX,NOT 4000H      ; Show CapsLock released
JMP    SHORT Set         ; Exit with new state

NewCtrl:
CMP    Toggle,00H        ; Check swap active
JNE    OldCapsLock       ; No, do regular key

OldCtrl:
CMP    AH,80H            ; Test key released
JE     ReleaseCtrl       ; Yes, reflect change
OR     BX,0004H          ; Show Ctrl depressed
JMP    SHORT Set         ; Exit with new state

ReleaseCtrl:
AND    BX,NOT 0004H      ; Show Ctrl released

Set:
MOV    DS:17H,BX         ; Update keyboard flags
AND    BX,4004H          ; Are both the Ctrl and
CMP    BX,4004H          ; CapsLock keys down?
JNE    Reset             ; No, no toggle
XOR    Toggle,0FFH       ; Yes, toggle on/off

Reset:
IN     AL,61H            ; Reset keyboard
MOV    AH,AL
OR     AL,80H
OUT    61H,AL
MOV    AL,AH
OUT    61H,AL
CLI                                ; Clear interrupts
MOV    AL,20H
OUT    20H,AL
STI
POP    DS                ; Restore registers
POP    BX
POP    AX
IRET                            ; Resume interrupted program

;
; End of stay-resident portion of program.
;
-----

Packet DD    0                ; Request Packet address
Message DB    'KEYSWAP installed',0DH,0AH,24H

;
; Initialization or installation routines.
;
-----

Strat  PROC    FAR
MOV    WORD PTR Packet,BX    ; Save Packet info
MOV    WORD PTR Packet+2,ES
RET
    
```

(continues)

Listing 1 (continued)

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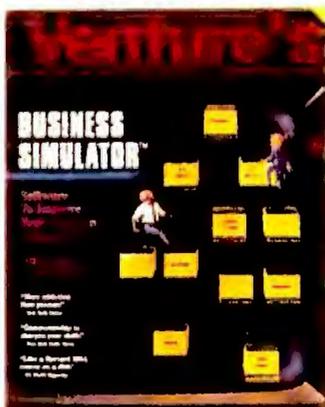
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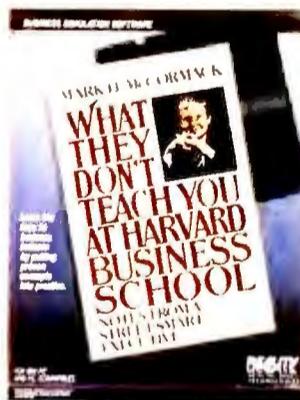
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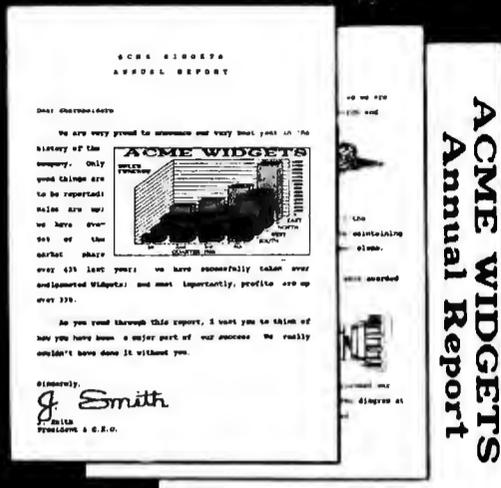
PC-11/7

System Requirements: Business Week's Business Advantage—(IBM) PC-DOS/MS-DOS 2.0 or higher, at least 384K RAM, 2 disk drives (Macintosh) Minimum 512K RAM, 2 800kb disk drives and/or hard disk. Venture's Business Simulator—(IBM) PC-DOS/MS-DOS 2.0 or higher, at least 256K RAM, 2 disk drives (pref a hard disk), any graphics card (Macintosh) 512K RAM, 2 disk drives (1 800kb). What They Don't Teach You at Harvard Business School—(IBM) PC-DOS/MS-DOS 2.0 or higher, at least 512K RAM, 2 disk drives (pref a hard disk). Business Week and Business Week's Business Advantage are trademarks of McGraw-Hill, Inc. What They Don't Teach You At Harvard Business School, written by Mark McCormack © 1984 Book View, Inc. Published by Bantam Books, Inc. What They Don't Teach You At Harvard Business School software and Venture Magazine's Business Simulator are registered trademarks of Reality Technologies. © 1987 Reality Technologies, Inc.

Circle 94 on reader service card

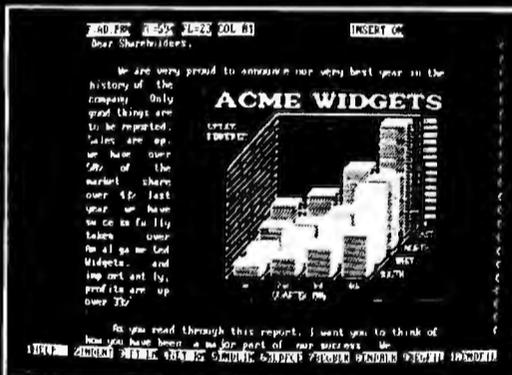
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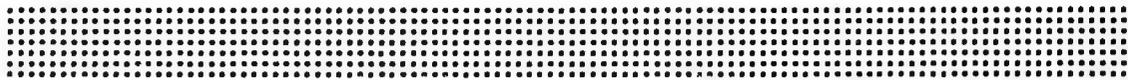
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```
Intr:
    PUSH    BX                ; Work area
    PUSH    DS
    PUSH    AX
    PUSH    DX
    PUSH    ES
    PUSH    CS                ; Make DS = CS for DOS
    POP     DS
    MOV     AX,3509H          ; Get interrupt 9 vector
    INT     21H
    MOV     Old_Int9,BX      ; Save for normal codes
    MOV     Old_Int9+2,ES
    MOV     AX,2509H          ; Put new interrupt 9 vector
    MOV     DX,OFFSET New_Int9
    INT     21H
    MOV     DX,OFFSET Message ; Show install message
    MOV     AH,9
    INT     21H
    LDS     BX,DWORD PTR Packet ; Set memory request
    MOV     [BX+IO_ADDRESS],OFFSET Packet
    MOV     [BX+IO_ADDRESS+2],CS
    MOV     [BX+IO_STATUS],0100H ; Set done bits
    POP     ES                ; Restore registers
    POP     DX
    POP     AX
    POP     DS
    POP     BX
    RET                                ; Exit installation

Strat  ENDP

CSEG  ENDS
      END
```

Listing 1 (continued)

```
10 DEFINT A-Z : KEY OFF : DEF FNHEX(X$)=VAL("&h"+X$)
20 MSG$="Now testing for data errors...please wait" : GOSUB 190
30 SUM=0 : READ LN : IF LN<0 THEN 80
40 READ H$ : IF VAL(H$)<0 THEN 70
50 IF LEFT$(H$,1)="*" THEN GOSUB 210 : GOTO 40
60 SUM=(SUM+FNHEX(H$))*2 : SUM=(SUM\256)+(SUM MOD 256) : GOTO 40
70 READ CKSUM$ : IF (SUM MOD 256)=FNHEX(CKSUM$) THEN 30 ELSE GOTO 170
80 MSG$="Press any key except ESC to create "+F$+" : "
90 GOSUB 190 : A$=INPUT$(1) : PRINT : IF A$=CHR$(27) THEN END
100 LOCATE 6,1 : PRINT "Working...";
110 OPEN F$ AS #1 LEN=1 : FIELD #1,1 AS BXS
120 READ LN : IF LN<0 THEN 160
130 READ H$ : IF VAL(H$)<0 THEN READ CKSUM$ : GOTO 120
140 IF LEFT$(H$,1)="*" THEN GOSUB 240 : GOTO 130
150 LSET BXS=CHR$(FNHEX(H$)) : PUT #1 : GOTO 130
160 CLOSE : PRINT : PRINT F$;" has now been created." : END
170 PRINT : PRINT "Error in DATA line";STR$(LN);" : "
180 PRINT "Check your work." : BEEP : END
190 CLS : LOCATE 3,1 : PRINT "X-Maker II" : RESTORE : READ F$
200 LOCATE 5,1,1 : PRINT MSG$; : RETURN
210 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
220 SUM=SUM*2 : SUM=(SUM\256)+(SUM MOD 256)
230 NEXT : RETURN
240 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
250 LSET BXS=CHR$(0) : PUT #1 : NEXT : RETURN
```

Listing 2: X-MAKER2.BAS, \*.\*'s program-making program.

(continues)

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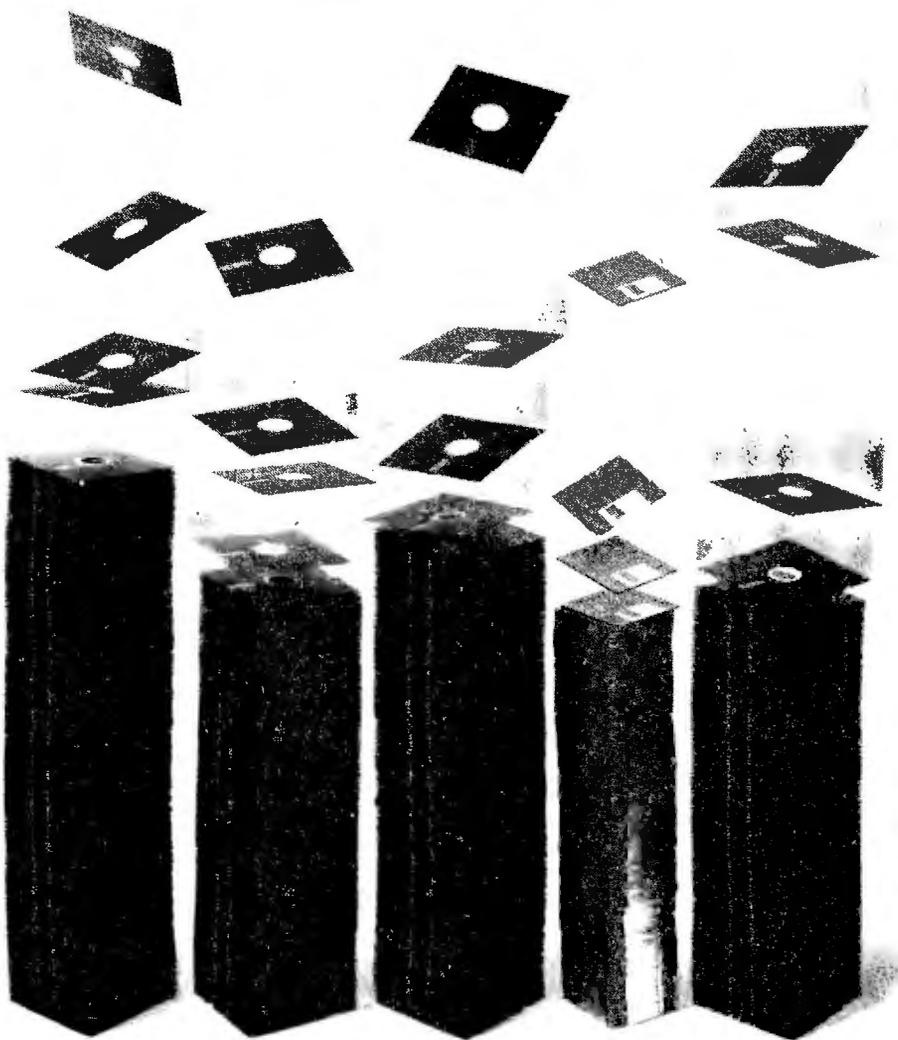
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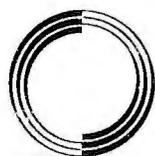
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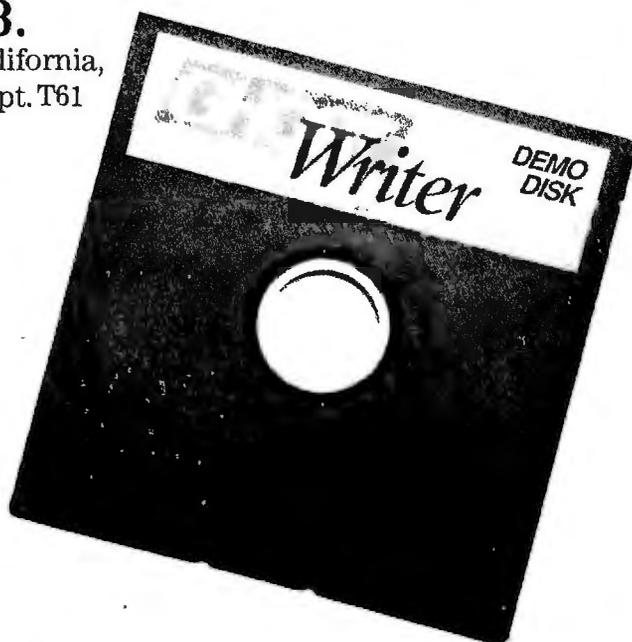
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\*.\*.\*

## dBASE Documenter

Developing dBASE applications is more fun than writing documentation, but documenting is a necessary evil. One day after struggling to document more than 40 data file structures, I resolved to find an easier way.

The dBASE program DOC.PRG [Listing 4] writes a .DBF file's structure to another file. With some simple reformatting, saving to an ASCII file, and a quick pass through a text editor, the new file is ready to be printed. Using WordStar, I merge a standard heading at the top. I then edit the file name and add any necessary comments.

I hope this helps ease someone else's documentation woes.

*George J. Salguero*

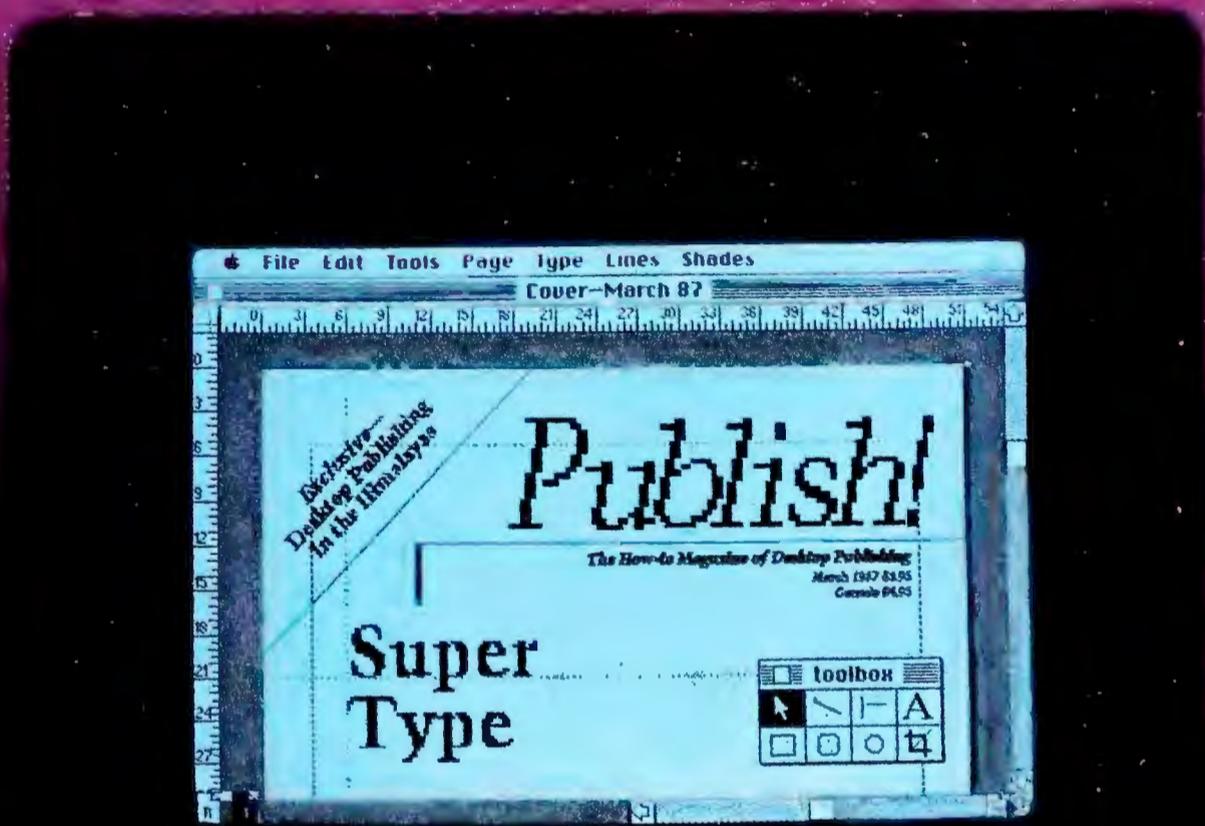
*High Point, North Carolina*

*Editor's note: DOC.PRG requires the presence of TEMP.DBF. To create this file, load dBASE and issue the command Use dbf\_file (any .DBF file will do). Then issue Copy Structure Extended To Temp, followed by Use Temp and Modify Structure. Change the width of the Field\_type field to 9, and change the type of the Field\_dec field to character.*

**Tighter Boxes for WordPerfect**  
WordPerfect's line drawing feature (<Ctrl>-<F3>2) is often used to draw boxes around text. Single line boxes, however, appear a bit

*(continues)*

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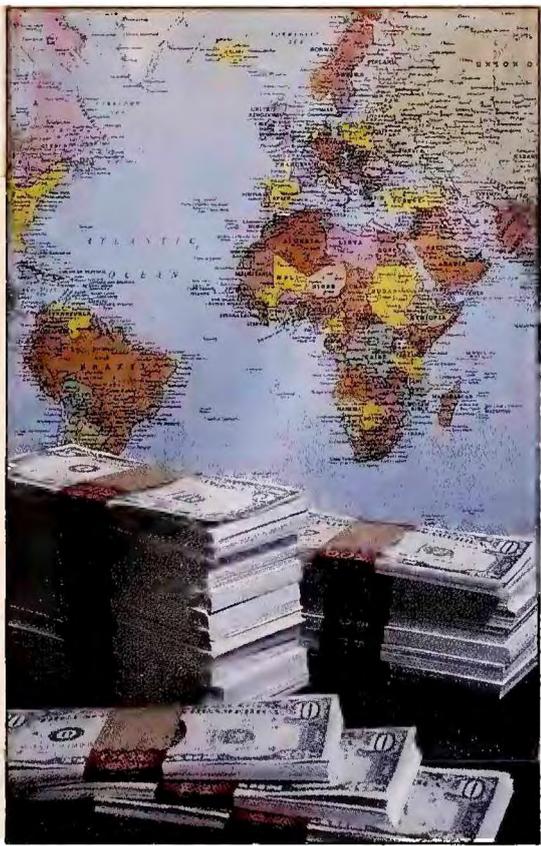
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```

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1010 DATA 1,FF,FF,FF,FF,FF,D0,80,AC,00,B7,00,4B,65,79,73,77,61,-1,C1
1020 DATA 2,70,20,00,50,53,1E,B8,40,00,8E,D8,8B,1E,17,00,E4,-1,67
1030 DATA 3,60,8A,E0,25,7F,80,3C,1D,74,0C,3C,3A,74,25,1F,5B,-1,1E
1040 DATA 4,58,2E,FF,2E,06,00,2E,80,3E,12,*2,75,1D,80,FC,-1,D2
1050 DATA 5,80,74,0A,81,F3,40,00,81,CB,00,40,EB,1D,81,E3,FF,-1,78
1060 DATA 6,BF,EB,17,2E,80,3E,12,*2,75,E3,80,FC,80,74,06,-1,F8
1070 DATA 7,81,CB,04,00,EB,04,81,E3,FB,FF,89,1E,17,00,81,E3,-1,76
1080 DATA 8,04,40,81,FB,04,40,75,06,2E,80,36,12,00,FF,E4,61,-1,BC
1090 DATA 9,8A,E0,0C,80,E6,61,8A,C4,E6,61,FA,B0,20,E6,20,FB,-1,59
1100 DATA 10,1F,5B,58,CF,*4,4B,45,59,53,57,41,50,20,-1,8C
1110 DATA 11,69,6E,73,74,61,6C,6C,65,64,0D,0A,24,2E,89,1E,94,-1,C4
1120 DATA 12,D0,2E,8C,06,96,00,CB,53,1E,50,52,06,0E,1F,88,09,-1,A4
1130 DATA 13,35,CD,21,2E,89,1E,06,00,2E,8C,06,08,00,B8,09,25,-1,F6
1140 DATA 14,BA,13,00,CD,21,BA,98,00,B4,09,CD,21,2E,C5,1E,94,-1,CB
1150 DATA 15,00,C7,47,0E,94,00,8C,4F,10,C7,47,03,00,01,07,5A,-1,90
1160 DATA 16,58,1F,5B,CB,-1,83,-1

```

Listing 3: KEYSWAP.DAT: Add these lines to X-MAKER2.BAS (Listing 2) to create KEYSWAP.SYS.

```

*****
Builds a .DEF file containing a .DBF file's structure
*****

CLEAR
usedbf = 'ZZZZZZZZ'
DD WHILE LEN(TRIM(usedbf)) > 0
  @ 10,10 SAY 'ENTER DBF ' GET usedbf PICTURE '!!!!!!!'
  READ
  IF LEN(TRIM(usedbf)) > 0
    USE &usedbf
    SET SAFETY OFF
    CDPY STRUCTURE EXTENDED TO test
  * test is a work file
  USE temp
  * see *.* , PC World, Nov 87, for instructions to create temp.dbf
  ZAP
  APPEND FRDM test
  * now replace codes with text and blank out zeros on nonnumerics
  REPLACE ALL field_dec WITH ' ' FOR field_type <> 'N'
  REPLACE ALL field_type WITH 'Character' FOR field_type = 'C'
  REPLACE ALL field_type WITH 'Numeric' FOR field_type = 'N'
  REPLACE ALL field_type WITH 'Date' FOR field_type = 'D'
  GD TOP
  * now update the field descriptions by looking at what you've got
  BROWSE FIELDS field_name, field_type, field_len, field_dec
  * freeze field descriptions
  COPY TO &usedbf..def SDF
  USE
  SET SAFETY ON
  * now use your word processor to bring in the headings, and to add
  * any additional info like file usage, indexed on, etc.
  MODIFY COMMAND &usedbf..def
  * now you've got a file with an extent of .DEF that you can print
  * from your word processor or from DDS since it is an ASCII file
  ENDIF
  CLEAR
ENDDO
CLDSE DATA
RETURN

```

Listing 4: DOC.PRG helps to automate the documenting of dBASE .DBF files.

(continues)

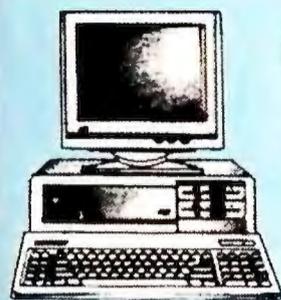
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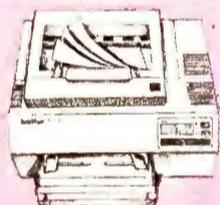
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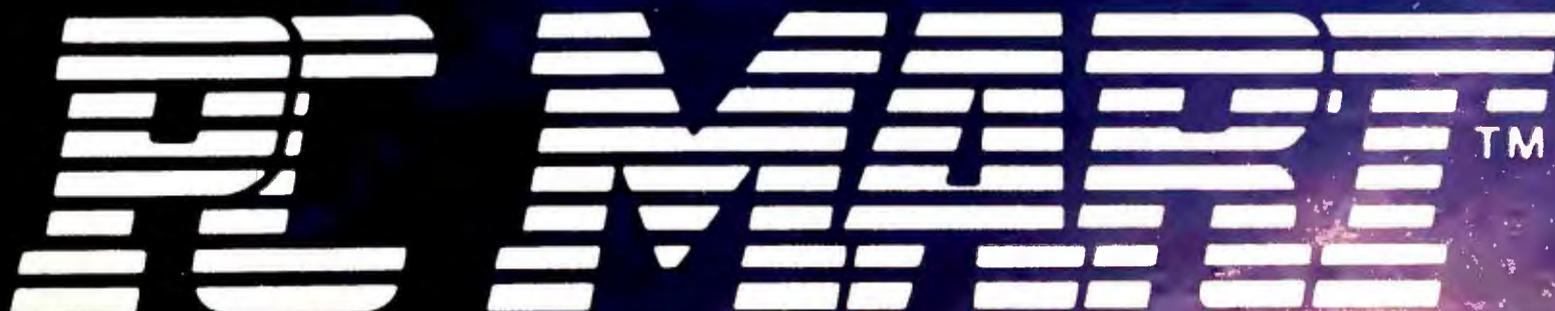
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loose because the lines of the box are centered within their character spaces:

Loosely-boxed text

More tightly boxed text can be achieved by making the box one text line shorter and advancing the box up half a line.

First, compose your page without boxes, noting the line numbers of the items to be boxed. Then at the bottom of the page (below all the text), issue the Advance to Line # command (<Shift>-<F1>6line number) to tell the printer to go to the first line of material to be boxed. Then draw the box, positioning it so it will be exactly superimposed over the text (just center the box if you're boxing centered text). Repeat this procedure for each box, advancing to the appropriate line each time.

Then insert an Advance Up (<Shift>-<F1>4) at the beginning of your first line of boxes, and put an Advance Down (<Shift>-<F1>5) after your last box. All the boxes will then properly surround their text:

Tightly-boxed text

With liberal use of the Reveal Codes key (<Alt>-<F3>), this procedure can become fairly easy.

Bob Frommer  
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(continues)

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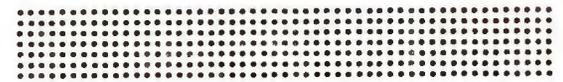


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Noticing that the Search command also selects text, I found that I could quickly select a block of text by placing the cursor at the beginning of the block, pressing <F6>, and searching for the last few characters of the desired block.

Steven T. Lawrence  
Denver, Colorado

### No Printer? No Problem

A friend at work had a problem with his favorite text editor because many of that program's functions are invoked by pressing <Ctrl> and a letter key. Every once in a while he mistakenly presses <Ctrl>-P, which, like <Ctrl>-<PrtSc>, echoes screen characters to the printer. Because he doesn't have a printer connected to his computer, he is forced to wait while DOS tries to communicate with the nonexistent device.

(continues)

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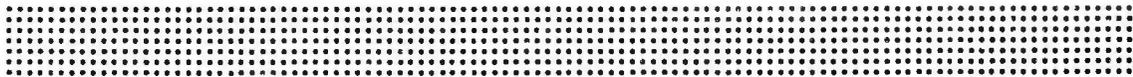
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```
1000 DATA "NO-PRINT.COM"
1010 DATA 1,E9,A5,00,07,0D,0A,0A,11,20,6E,6F,5F,70,72,69,6E,-1,45
1020 DATA 2,74,2E,63,6F,6D,20,30,34,2F,33,30,2F,38,37,20,10,-1,EB
1030 DATA 3,0D,0A,43,6F,70,79,72,69,67,68,74,20,31,39,38,37,-1,29
1040 DATA 4,20,62,79,20,54,69,6D,20,46,65,6C,64,6D,61,6E,20,-1,86
1050 DATA 5,2D,2D,20,61,6C,6C,20,72,69,67,68,74,73,20,72,65,-1,1A
1060 DATA 6,73,65,72,76,65,64,20,2D,2D,0D,0A,46,72,65,65,20,-1,0D
1070 DATA 7,64,69,73,74,72,69,62,75,74,69,6F,6E,20,67,72,61,-1,08
1080 DATA 8,6E,74,65,64,2E,0D,0A,0A,1A,0A,E4,75,27,53,51,8B,-1,E6
1090 DATA 9,50,0D,E4,61,50,24,FC,E6,61,89,0A,0D,E2,FE,0C,02,-1,8B
1100 DATA 10,E6,61,89,0A,0D,E2,FE,4B,75,EB,58,E6,61,89,EB,03,-1,DC
1110 DATA 11,E2,FE,59,5B,FB,B4,90,CF,1E,56,53,33,DB,8E,DB,8E,-1,0F
1120 DATA 12,5C,0D,8C,CB,89,5C,02,8B,79,0D,81,C3,0D,01,89,1C,-1,AC
1130 DATA 13,5B,5E,1F,BA,A8,0D,81,C2,0D,01,CD,27,-1,89,-1
```

Listing 5: NO-PRINT.DAT intercepts characters on the way to the printer and turns them into speaker clicks.

Then he has to type <Ctrl>-P again to turn off the printer echo. I wrote NO-PRINT.COM, a memory-resident program, to solve his problem. Anyone without a printer or who usually leaves the printer off will find NO-PRINT quite handy. (It could also help conserve paper for anyone with very young computer users who love to print out reams of their work.)

NO-PRINT solves the <Ctrl>-P and <PrtSc> problem by imitating a printer. Run it once to install it in memory, and the program intercepts every character that DOS or the BIOS tries to send to the printer, making a click sound instead of printing the character.

NO-PRINT works with any program that uses the documented DOS and BIOS printer routines to control the printer. Programs that bypass DOS and the BIOS by directly controlling the computer's printer interface hardware will ignore NO-PRINT.

To create NO-PRINT.COM, load BASIC and X-MAKER2.BAS

[Listing 2], then add the lines in NO-PRINT.DAT [Listing 5] and run the program.

*Tim Feldman  
Davis, California*

## Changing File Attributes

Every once in a while, the user of a Turbo Pascal program I am developing will need to be able to make files hidden or read only (for example, to protect a data file from unauthorized changes). This requirement entails changing the file's attribute. The short program ATT.PAS [Listing 6] demonstrates the method I use. After it's compiled, the program is invoked with the syntax *ATT attribute filename*, where *attribute* is either A (for archive), H (for hidden), or R (for read only), and *filename* is, of course, the name of the file whose attribute is to be changed. The program uses the command ParamStr, which was introduced in Turbo Pascal 3.0, and thus re-

*(continues)*

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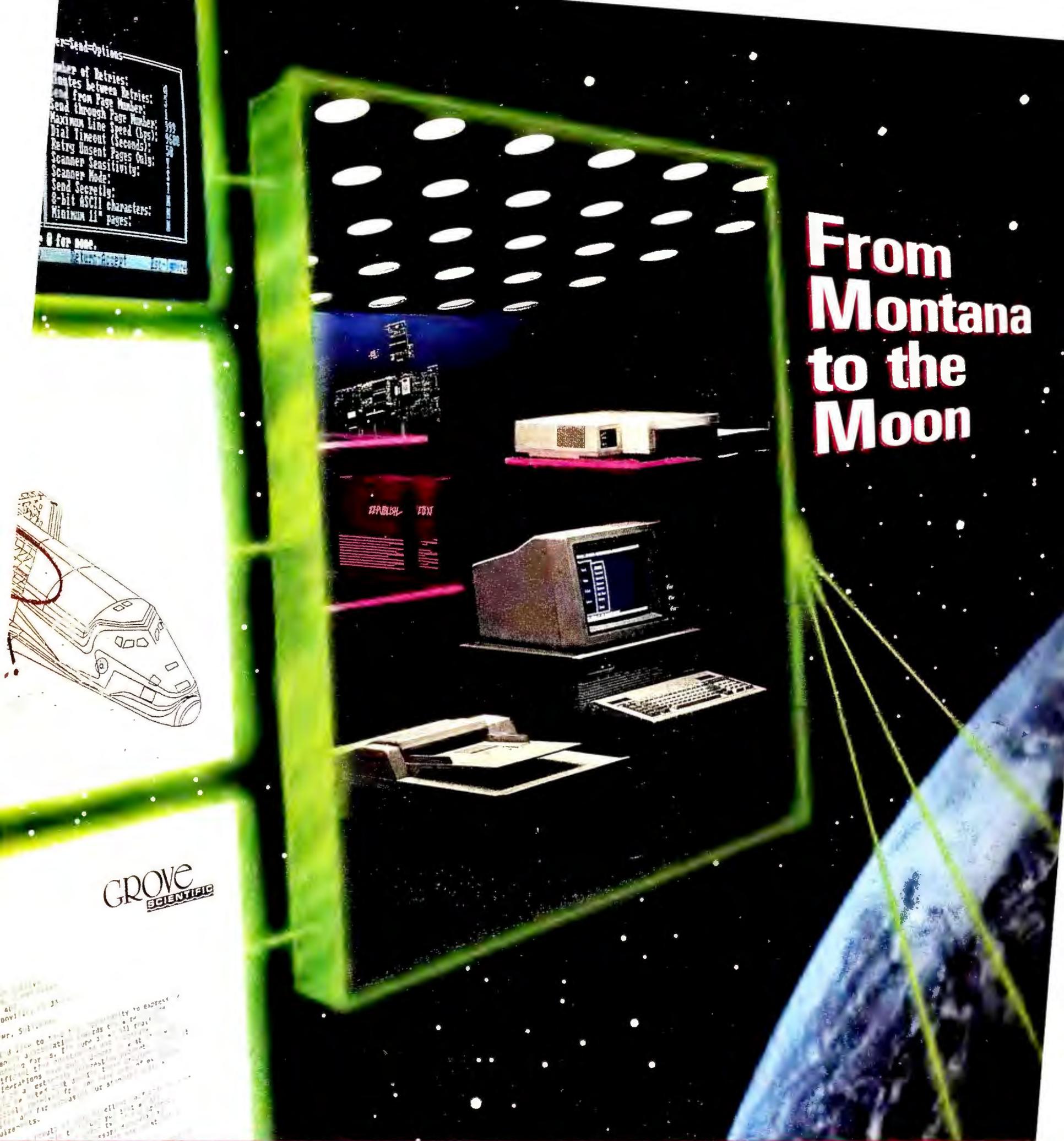
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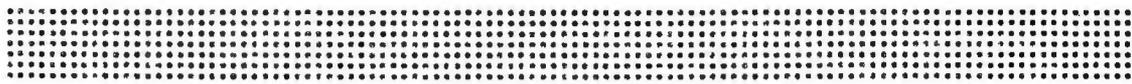
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```

program ChangeAtt;
type
  RegList =
    record
      ax, bx, cx, dx, bp, si, di, ds, es, flags : integer;
    end;
  Str80 = String[80];
var
  Reg : RegList;
  AttNum : byte;

procedure AttFile(FileSpec : Str80; Num : byte);
begin
  FileSpec := FileSpec + Chr(0);
  Reg.dx := ofs(FileSpec[1]);
  Reg.ds := seg(FileSpec[1]);
  Reg.cx := Num;
  Reg.ax := $4301;
  msdos(Reg);
end; (AttFile)

begin (Main)
  if Ucase(ParamStr(1)) = 'R' then AttNum := 1;
  if Ucase(ParamStr(1)) = 'H' then AttNum := 2;
  if Ucase(ParamStr(1)) = 'A' then AttNum := 32;
  AttFile(ParamStr(2), AttNum);
end. (Main)

```

**Listing 6: ATT.PAS shows how to change a file's attribute with Turbo Pascal 3.0.**

quires that version. Although ATT.PAS doesn't check for errors on the command line, it won't crash if you enter the wrong information or omit parameters.

*Earl J. White  
Philadelphia, Pennsylvania*

**BASIC Super Saver**

The tip from Douglas Kingsley in the July column [*\*, PCW, July 1987*] reminded me of a similar trick I used when programming in interpreted BASIC. I would always start BASIC with the command BASIC KEYS, which runs KEYS.-BAS, a short program that reassigns the function keys to my liking and then clears itself from memory with NEW.

In particular, KEYS.BAS changes function key <F4> with the command:

KEY 4, "LIST 1" + CHR\$(13) + CHR\$(30) + CHR\$(30) +

"SAVE" + CHR\$(34) + CHR\$(13)  
With this definition, pressing <F4> lists line 1 of the currently loaded BASIC program, then moves the cursor up, writes "SAVE" over the first five characters, and executes the line. To make this all work, I begin any program that I develop with the line:

1 ' filename

There must be exactly five character spaces before the file name— one space after the number 1 and two spaces after the apostrophe (the REM substitute). With this method, a single keystroke on a blank line quickly saves the current program.

*Derek Anderson  
Pointe Claire, Quebec,  
Canada*

(continues)

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```

argument      struc
save bp       dw    ?           ;Register BP pushed onto stack
ret_address   dd    ?           ;FORTRAN's return offset:segment on stack
dfree_arg     dd    ?           ;Drive number argument on stack
argument      ends

cseg          segment para public 'CODE'
assume cs:cseg, ds:cseg, es:nothing
public dfree
dfree         proc    far

                push    bp
                mov     bp,sp
                les     di,dfree_arg[bp];Load ES:DI with the address of the
                ;      drive argument on stack
                mov     ah,36h      ;Function 36h, get free disk space
                mov     dx,es:[di]  ;Set drive number from ES:DI to DL
                int     21h         ;Get free disk space via DOS
                cmp     ax,ffffh    ;If FFFFh returned, DOS error #15
                jne     DF10
                mov     ax,15       ;Return DOS error code #15,
                xor     dx,dx        ;Invalid drive was specified.
                jmp     short DF20
DF10:         xchg    bx,ax         ;DX:AX x BX x CX = Free disk space
                mul    bx           ;
                mul    cx           ;
DF20:         pop     bp
                ret     04h        ;DX:AX returned to FORTRAN

dfree         endp
cseg          ends
end

```

Listing 7: DSKSPACE.ASM is an assembly language routine for FORTRAN users. It returns the amount of disk space free.

```

PROGRAM FREE DISK SPACE
INTEGER DFREE

C

I = DFREE(0)
IF (I .EQ. 15) THEN
WRITE (*,*) ' Invalid drive specified'
ELSE
WRITE (*,10) I
10 FORMAT(I12,' bytes free disk space')
ENDIF
C
END

```

Listing 8: DSKSPACE.FOR, a simple FORTRAN program, demonstrates DSKSPACE.ASM (Listing 7).

(continues)

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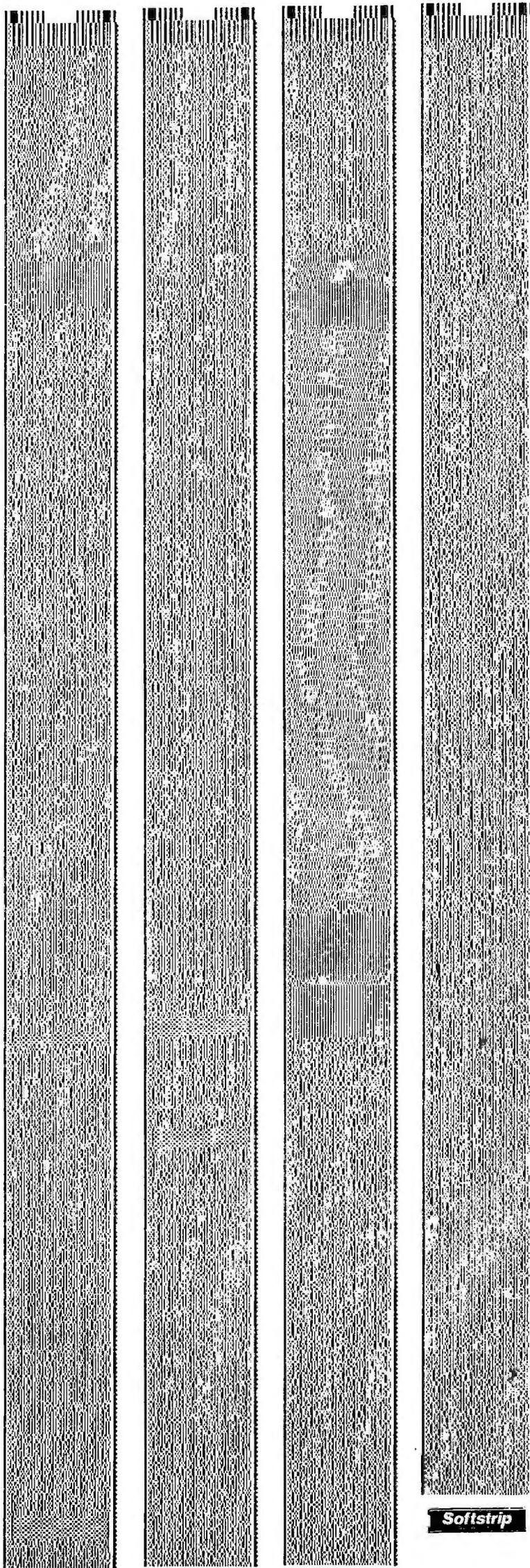
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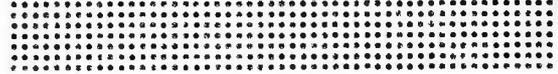
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Bytes Free in FORTRAN  
DSKSPACE.ASM [see Listing 7] is an assembly language listing that creates the procedure DFREE for use with FORTRAN. (Yes, some of us still use FORTRAN.) DFREE uses the "get disk free space" DOS function call (36h) to find the amount of free space on a drive.

DSKSPACE.FOR [see Listing 8] is a Microsoft FORTRAN program that demonstrates the use of DFREE. It simply contains the statement INTEGER DFREE and calls the procedure with I = DFREE(0). The 0 denotes the default drive. A 1 would specify drive A.; a 2, drive B.; a 3, drive C.; and so forth.

If the DOS function call returns an error, DSKSPACE.FOR displays the message 'Invalid drive specified' [although the error may be due to an invalid sector or cluster format on a valid drive].

Wayne Chesser  
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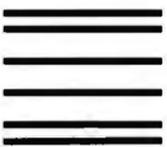
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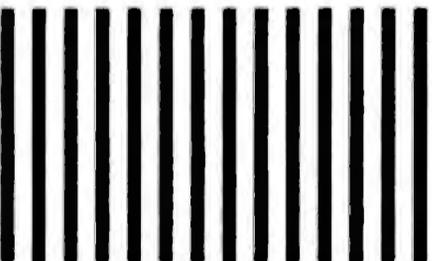
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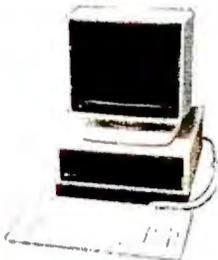


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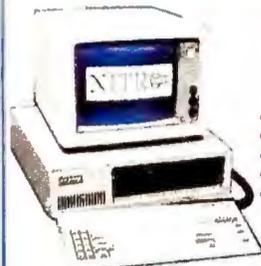
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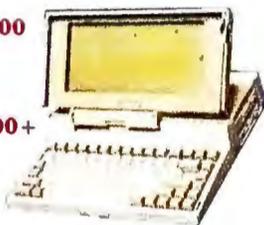
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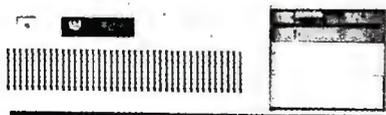
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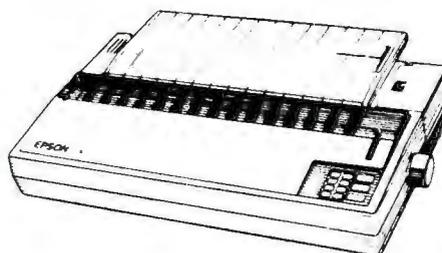
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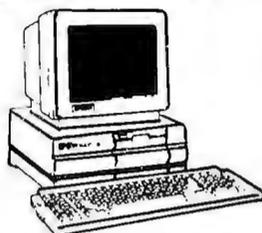
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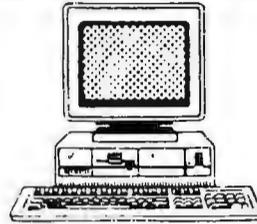


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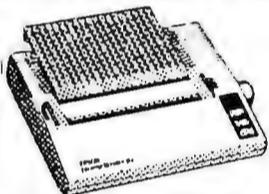
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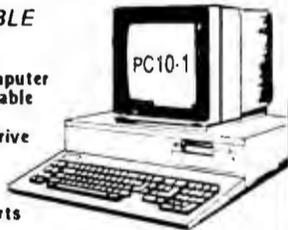
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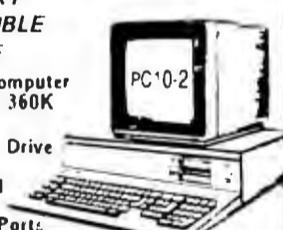
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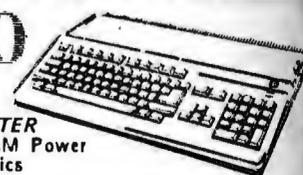
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- PC-TUTORIAL** #454 — A first course in computer usage covering various aspects of MS-DOS. Good!
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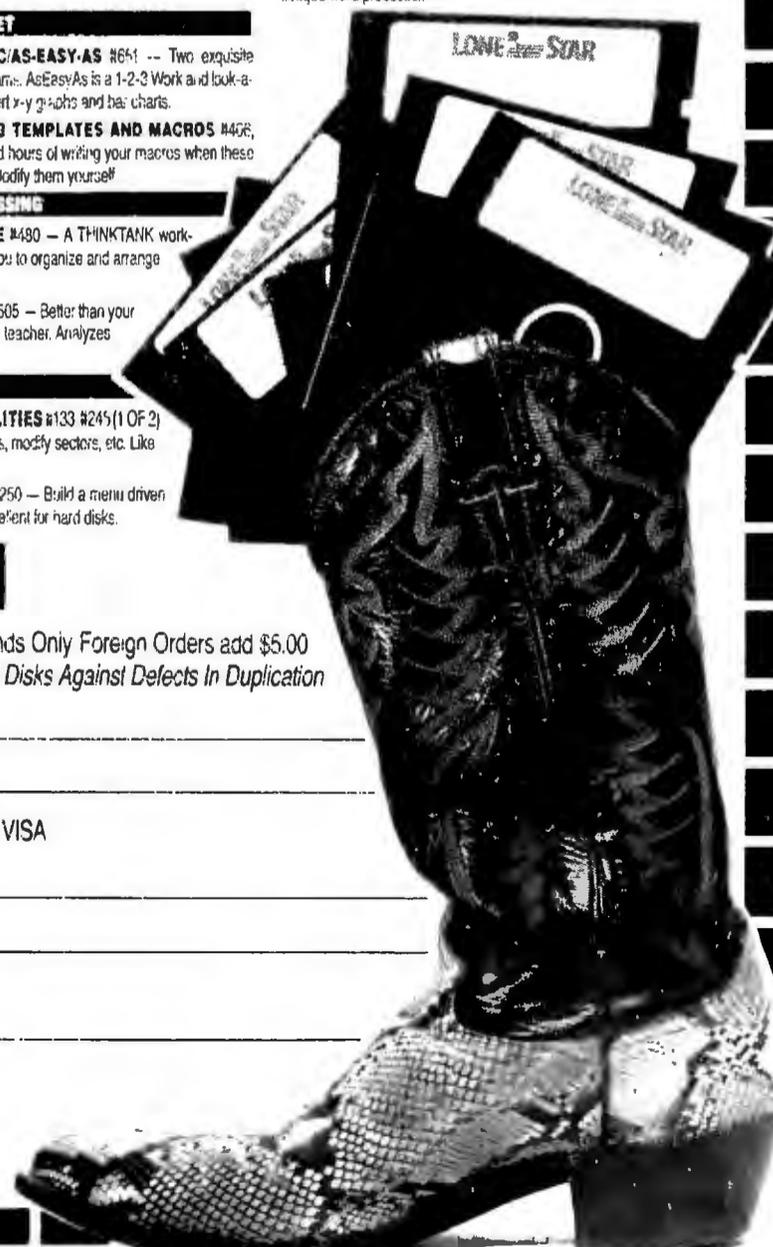
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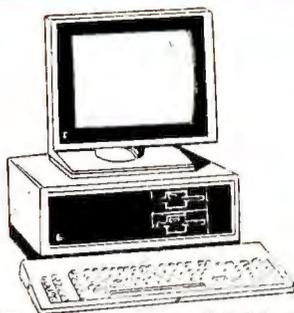
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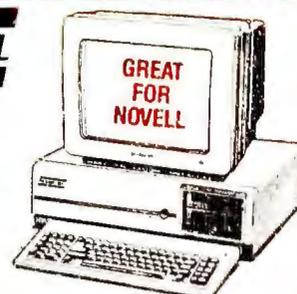
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- TOSHIBA 351 ..... 650.00

- TOSHIBA P341SL ..... 668.17
- TOSHIBA P351 S/P Model 2 ..... 979.99
- TOSHIBA P351 Color Model 2 ..... 1199.95

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- CORONA Laser Printer ..... \$1699.85
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- H-P Laser Jet Plus ..... Closeout 2999.50
- NEC LC 890 Postscript ..... 3358.60

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- SEAGATE 30 Meg 1/2 height w/RLL ..... 324.72
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- GENOA 20 Meg ext. tape ..... IS NOW ..... 636.02
- GENOA 60 Meg int. tape ..... NOVELL ..... 734.60
- GENOA 60 Meg ext. tape COMPATIBLE ..... 895.10
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- IOMEGA BERNOULLI 20+20 ..... 1699.99
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- IRWIN 20 M/ 40 M Internal Tape ..... 499.10/ 589.20

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- SANTA CLARA Diskless Workstation w/Ethernet ..... 640.40

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- ETHERNET Interface Connector ..... 349.80
- ETHERNET Plus Board (for 286) ..... 724.74
- G-NET Interface Card w/cable ..... 319.52

#### ACCESSORIES

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- SFT Netware Level I ..... 2148.66
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- HERCULES color card w/p ..... 144.16
- HERCULES monographics plus w/p ..... 179.84
- HERCULES Incolor Board ..... 324.00
- STB CHAUFFEUR HT w/p ..... 185.60
- TAXAN MONOGRAPHIC w/p ..... 99.00

### MONOCHROME MONITORS

- AT&T Monochrome Monitor ..... \$185.40
- AMDEK 310A/ 410A ..... 139.99/ 154.95
- AMDEK 1280 ..... 687.78
- COMPAQ monochrome monitor ..... 188.46
- IBM monochrome monitor ..... 219.84
- IBM PS2 Mono Monitor ..... IN STOCK
- PGS MAX 12E amber color ..... 144.40
- PACKARD BELL Green or Amber ..... 89.95
- TAXAN 123 Green/ 124 Amber ..... 119.50/ 124.05

### COLOR GRAPHIC MONITORS

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- AMDEK color 600S/ 722 ..... 349.24/ 444.49
- IBM PS2 Color Monitor ..... IN STOCK
- IBM PS2 Enhanced Color Monitor ..... SAVE
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- PGS HX-12 Plus ..... NEW MODEL
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- TAXAN 720 ..... NEW LOW PRICE

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- IBM enhanced graphics monitor ..... 679.41
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- NEC Multisync + ..... 968.10
- NEC Multisync XL 19 inch ..... 1996.46
- PGS HX-12E Hi-Resolution RGB ..... 469.32
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- TAXAN 770U ..... 539.40

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- GENOA Super EGA Hi-Res 800 x 600 ..... 299.40
- IBM Enhanced Graphics Adapter ..... 398.98
- NEC GB-1 640x480 ..... 299.43
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- PARADISE Auto Switch EGA 350 ..... 199.65
- PARADISE Auto Switch EGA 480 ..... 299.65
- QUADRAM EGA Card ..... 299.10
- QUADRAM Prosync ..... 349.40
- TAXAN Auto Switch EGA Card ..... 299.99
- VIDEO 7 Vega Deluxe ..... 298.74

### MODEMS, COMMUNICATIONS & EMULATIONS

- AST 5251-11 Plus/ 5251-12 ..... \$595.04/ 499.60
- EVEREX 1200B/ 2400B ..... 109.90/ 199.50
- HAYES 1200/ 1200B ..... 289.60/ 269.20
- HAYES 2400 ..... 424.68
- HAYES 2400B ..... 379.65
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- IRMA 3278/79 Courier ..... 695.17
- US ROBOTICS 1200E HAYES compat. .... 108.45
- US ROBOTICS 2400 External ..... 129.10
- US ROBOTICS 2400B ..... 199.70
- VEN-TEL 1200 Int. Half Card ..... 194.50
- VEN-TEL 1200 Plus ..... 228.88
- VEN-TEL 2400 Int. Half Card ..... 299.10
- VEN-TEL 2400 External ..... 389.44
- Smartcom/ Crosstalk ..... 58.95/ 96.85

### CHIPS

- 4164 (64K) 9 chip set ..... \$13.50
- 128K piggy backs 9 chip set ..... 34.85
- 41256K (256K) 9 chip set ..... 32.35
- 8087-2 (for COMPAQ DeskPro) ..... 154.33
- 8087-3 (for PC/XT/COMPAQ Portable) ..... 118.50
- 80287-6 (for AT and AT Compatible) ..... 168.30
- 80287-8/ 80287-10 ..... 297.55/ 336.25
- COMPAQ 386 1 Meg upgrade ..... SAVE

### MISC. & ACCESSORIES

- A-B Switching Box (par. or serial) ..... \$39.95
- BASF D/S, D/D ..... 12.50
- BASF Disks for AT (1.2 Meg) ..... 26.14
- DATASHIELD 6 Outlet Surge Suppressor ..... 27.85
- DATASHIELD 500 Watt Batt. Backup ..... 469.10
- KENSINGTON Masterpiece ..... 99.99
- KENSINGTON Masterpiece Plus ..... 118.40
- KEYTRONICS 5151 IBM or AT&T ..... 154.95
- KEYTRONICS 101 ..... 113.65
- PERMA POWER 6 Outlet Surge Suppressor 29.40
- QUADRAM Micro Fazers ..... 140.40
- Printer Cable (IBM to Centronics) 6 ft. .... 19.99
- XT Power Supply 150 Watt ..... 69.95

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- LOGITECH Logimouse Bus Version ..... \$109.06
- LOGITECH Logimouse C7 ..... 89.95
- LOGITECH Logimouse C7 w/publisher ..... 124.85
- MICROSOFT Mouse (Bus Version) ..... 119.34
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- MOUSE SYSTEMS (Serial Version) ..... 108.55
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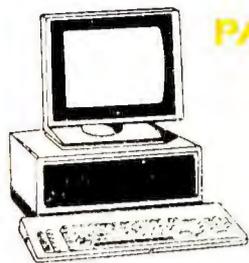
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286 Deskpro w/640K,  
40MB ..... \$2649  
386 Deskpro Model 40 .. \$4695  
386 Deskpro Model 70 .. \$5295  
386 Deskpro Model 130.. \$6295  
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Portable III, 20MB ..... \$3950  
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80MB for AT ST4096 ..... \$869  
Plus Hard Card 20MB ..... \$599  
Plus Hard Card 40MB ..... \$879  
Western Digital 20MB Card \$495

### SOFTWARE

D Base III Plus ..... \$389  
Framework ..... \$389  
IBM Displaywrite IV ..... \$359  
Lotus 123 ..... \$309  
Managing Your Money .... \$115  
Microsoft Word ..... \$259  
Multimate Adv. II ..... \$259  
R Base System V ..... \$409  
Symphony ..... \$429  
Ventura Desktop Publ. .... \$499  
Word Perfect 4.2 ..... \$205

### MONITORS

#### AMDEK

310A ..... \$139  
410 ..... \$159  
600 ..... \$349  
722 ..... \$445  
NEC Multisync ..... \$549  
Samsung Color ..... \$269  
Thomson Ultrascan ..... CALL

#### PRINCETON

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HX12 ..... \$415

HX12E ... \$499

SR12 ..... \$565

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256K Chips ..... each \$3.25  
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8087-2 ..... \$139  
80287 ..... \$159  
80287-8MHZ ..... \$249  
80287-10MHZ ..... \$299  
80387 ..... \$499

### GRAPHICS CARDS

Everex EGA Autoswitch .... \$139  
Everex Edge ..... \$199  
Hercules Color Card ..... \$145  
Hercules Graphics Plus ..... \$179  
NEC GB-1 ..... \$289  
Paradise Autoswitch 480 .. \$289  
Quadram EGA Plus ..... \$299  
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### MULTIFUNCTION CARDS

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AST 6 Pack Premium 512K \$229  
AST Advantage ..... \$299  
AST Advantage Premium  
512K ..... \$429  
AST Rampage PC w/256K. \$259  
AST Rampage AT w/512K. \$349  
AST Flashpack ..... \$289  
AST 5251-11 Plus ..... \$599  
Everex Maglcard II w/384K \$149  
Intel Above Board PC ..... \$239  
Intel Above Board PC P/S. \$279  
Intel Above Board AT .... \$329  
Intel Above Board AT P/S. \$349  
Irma Board ..... \$695  
Orchid Tiny Turbo 286 .... \$329

### PRINTERS

#### EPSON

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FX 86E .. \$299 LQ 1000 .. \$519  
FX 286E .. \$429 LQ 2500 .. \$849  
LQ 800 .. \$399 EX 800 .. \$365  
LQ 850 .. \$489 EX 1000 .. \$489

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193 Plus .. \$459 293 Plus .. \$599  
182 ..... \$219 294 Plus .. \$999

#### NEC

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P7 ..... \$619 3550 .... \$759  
PSXL .... \$879 8850 .... \$1095

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Hayes 1200B Alone ..... \$249  
Hayes 1200B w/Software .. \$279  
Hayes 2400 ..... \$419  
Hayes 2400B ..... \$389  
Hayes 2400B w/software .. \$419  
US Robotics 2400 ..... \$179  
2400 External ..... \$279



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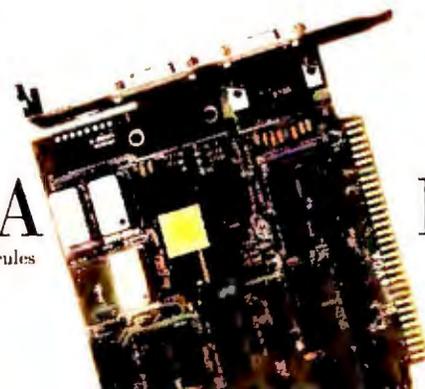
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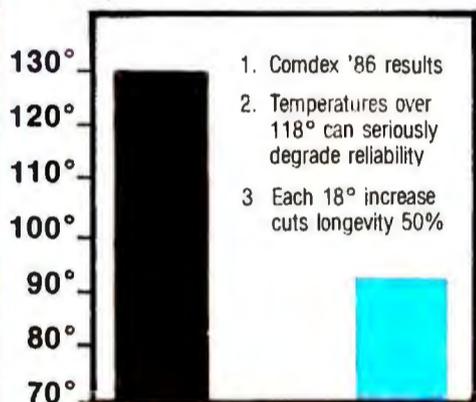


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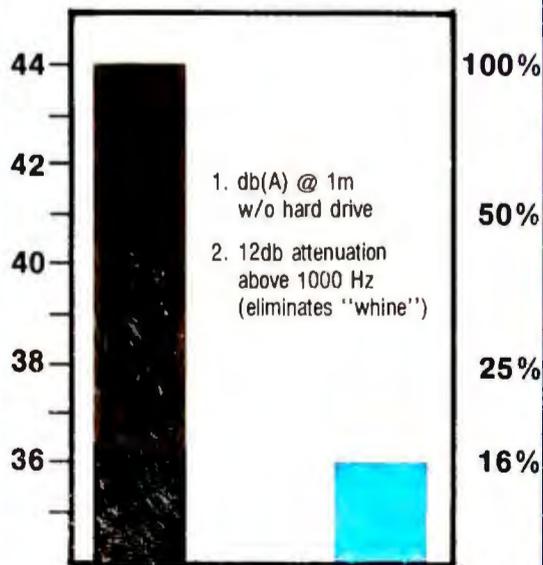


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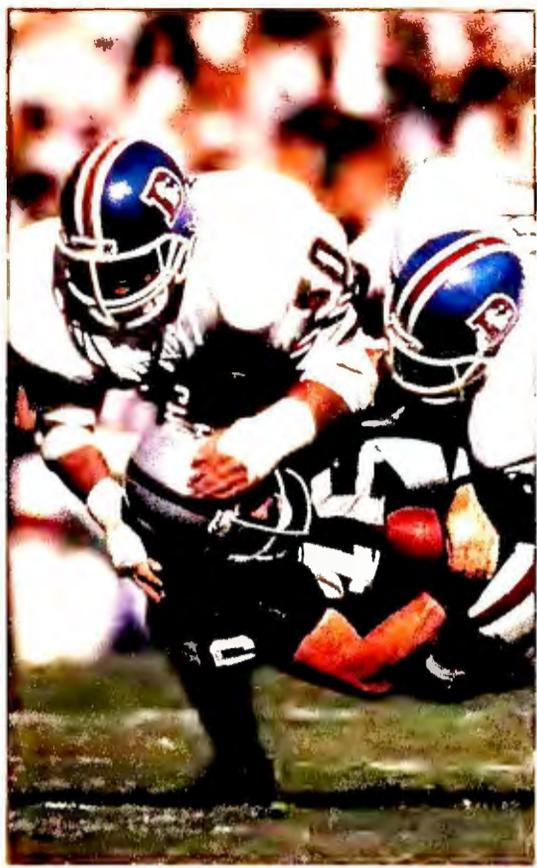
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# Next in PC World

## December

### WHAT'S SO GOOD ABOUT IT?

Industry analysts have variously touted and panned IBM's PS/2s, but few really understand what Big Blue's intentions were in building its new line. In their own words, IBM's chief PC scientists explain the how and why of the Personal Systems/2.

Also, an in-depth review of the top-of-the-line Model 80.

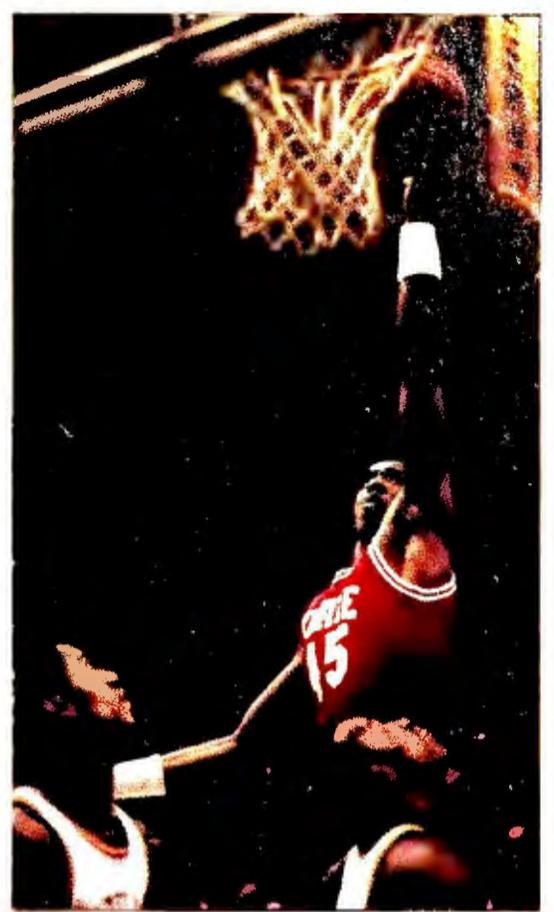
### LOW-COST MODEMS

It looks like a Hayes and it smells like a Hayes, but is it as good as a Hayes? *PC World* and National Software Testing Laboratories put eight me-too modems through their paces to separate the look-alikes from the work-alikes.

### SUPER HARD DISKS

These days, with hard disk storage only \$15 a megabyte, it makes sense to invest in a 100MB or larger disk for network servers or mammoth data bases. Yet most high-capacity hard disk drives are still designed with the computer reseller—not the end user—in mind. *PC World* examines not only the performance but also the ease of installation and setup of four mass-storage monsters.

Also, a roundup of alternatives in removable media, plus advice for setting up batch files from Peter Norton.



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Circle 127 on reader service card

# Products Featured in This Issue

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Service  
Number

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- 401 CGA and EGA color terminals, SunRiver Corp.
- 402 Compaq 386 Portable Computer, Compaq Computer Corp.
- 403 Cygna 386, SunRiver Corp.
- 404 Excel, Microsoft Corp.
- 405 HP Portable Vectra CS, Hewlett-Packard
- 406 MemoryMate, Brøderbund Software Direct
- 407 Microsoft Works, Microsoft Corp.
- 408 Model 1000 HX, Tandy Corp./Radio Shack
- 409 Model 1400 LT, Tandy Corp./Radio Shack
- 410 Model 4000, Tandy Corp./Radio Shack
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- 432 Lap-Link 2.05, Traveling Software
- 433 Paranet 1.3, Aldersparre & Associates
- 434 The Brooklyn Bridge, White Crane Systems

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- 449 Hotshot version 2.0, Symsoft
- 450 Inset version 2.0, APG Software

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- 452 PC Paintbrush +, ZSoft
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#### 2. Number of employees in your company:

- 25 or fewer
- 26-99
- 100-499
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- Now
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- 1
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- 5-9
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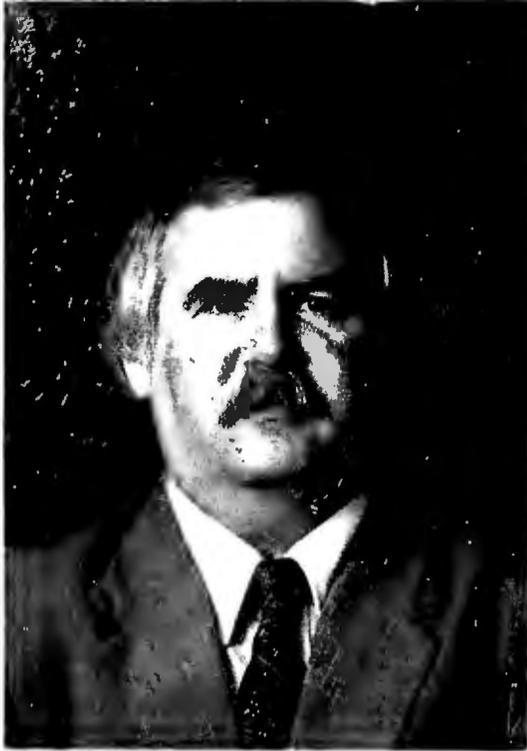
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Jerry Schneider

# Another Angle: Do Computer Users Have Rights?

**C**aveat emptor! has become the watchword of the computer marketplace. For years, computer product manufacturers have engaged in business practices that, although commonplace in our industry, are illegal in most others.

Picturing a full computer system in an ad when the price mentioned includes only the CPU is deceptive and misleading. False claims about software ease of use and functionality at the front end of a sale are exacerbated by inadequate customer warranty protection at the back. There is frequent interference with the consumer's right to use software freely after purchase. Even where legislation exists to protect consumers, the microcomputer industry has conspired to exempt itself from responsibility through creative lawyering, insisting that software is licensed, not sold.

It's time the industry responded to the continual flow of input from users concerning their needs and requirements. The Capital PC User Group has long espoused a "Users' Bill of Rights" that outlines consumers' most basic needs.

Although oriented primarily toward computer software sales, many of its tenets apply equally to hardware purchases. They can be summarized as follows:

- Users have the right to expect products to perform as advertised.
- A product should perform the basic functions common to its genre at a level of quality consistent with industry standards.
- Users have the right to make backup copies of software to ensure uninterrupted use of the program should the original copy fail.
- Manufacturers have an obligation to inform users of known errors, bug fixes, and temporary work-arounds and to provide periodic updates to correct errors.
- Users have the right to integrate software into their system environments without undue constraint by copy protection, authorization requirements, or extraneous functions added to the software.

The Users' Bill of Rights is not a radical statement of outrageous demands, but simply a reflection of what most people consider to

be good, commonsense business practices. It has been endorsed by computer publications, end-user organizations, and consumer groups but virtually ignored by the software publishing community.

If the industry wants to show its concern for customers, it should support the concepts outlined in the Users' Bill of Rights. Unless the industry takes action to redress these abuses, enactment of state or federal legislation to protect the user seems inevitable. ●

|| Jerry Schneider is president of  
|| the Capital PC User Group.

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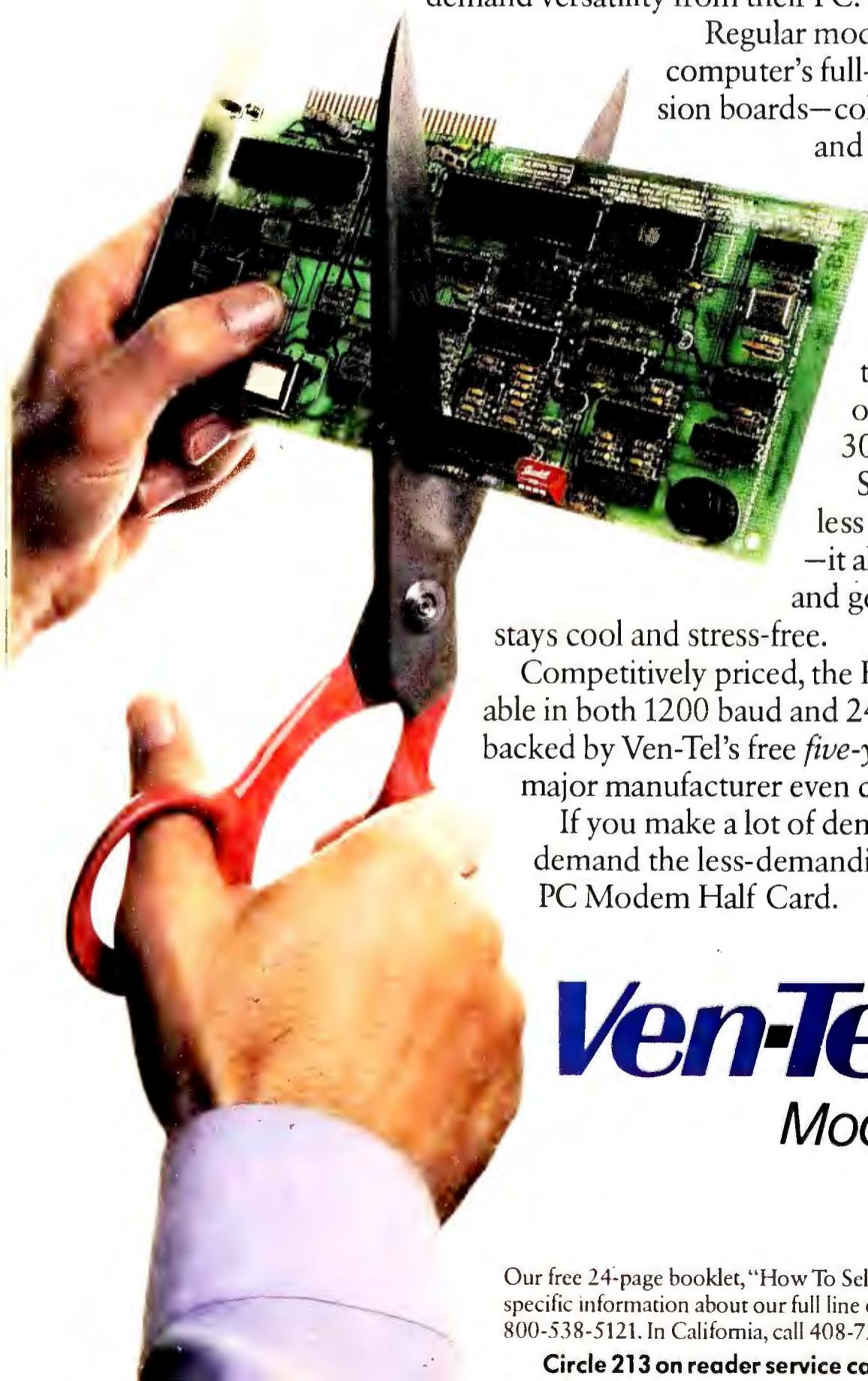
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