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PC WORLD

March 1988 \$2.95

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*The Business Magazine
of PC Products and Solutions*

Invasion of the PS/2 Clones

Despite legal threats,
top computer makers are
cloning Big Blue's new PCs.
Who will be first—
and will IBM stop them?



With Quattro, S

Quattro," our 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.



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.

“Quattro has features that 1-2-3 users will want—better graphics, easier macros, no copy protection—plus compatibility with the files and keystrokes they already use.

Michael J. Miller, Infoworld ”

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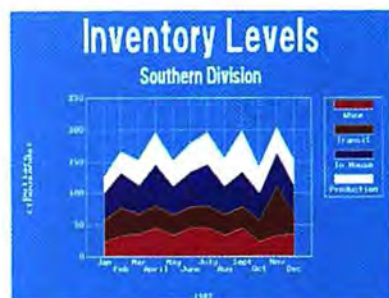
Quattro gives you presentation-quality graphics

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—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.

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.

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

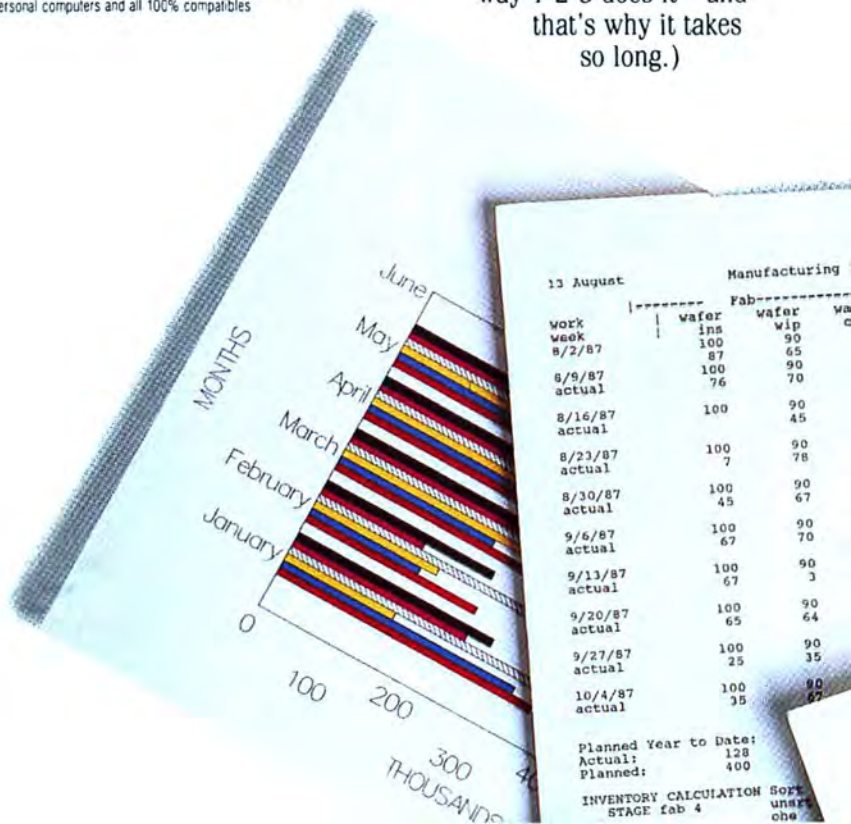


"What we show you"

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*. 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.)



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.

Quattro includes SQZ! Plus data compression

A special implementation of SQZ! Plus, the spreadsheet file compression utility, is built into

Quattro and comes to you absolutely free! SQZ! Plus for Quattro automatically compacts and expands Quattro spreadsheets by up to 95% during file saving and retrieving.

You know how to use Quattro

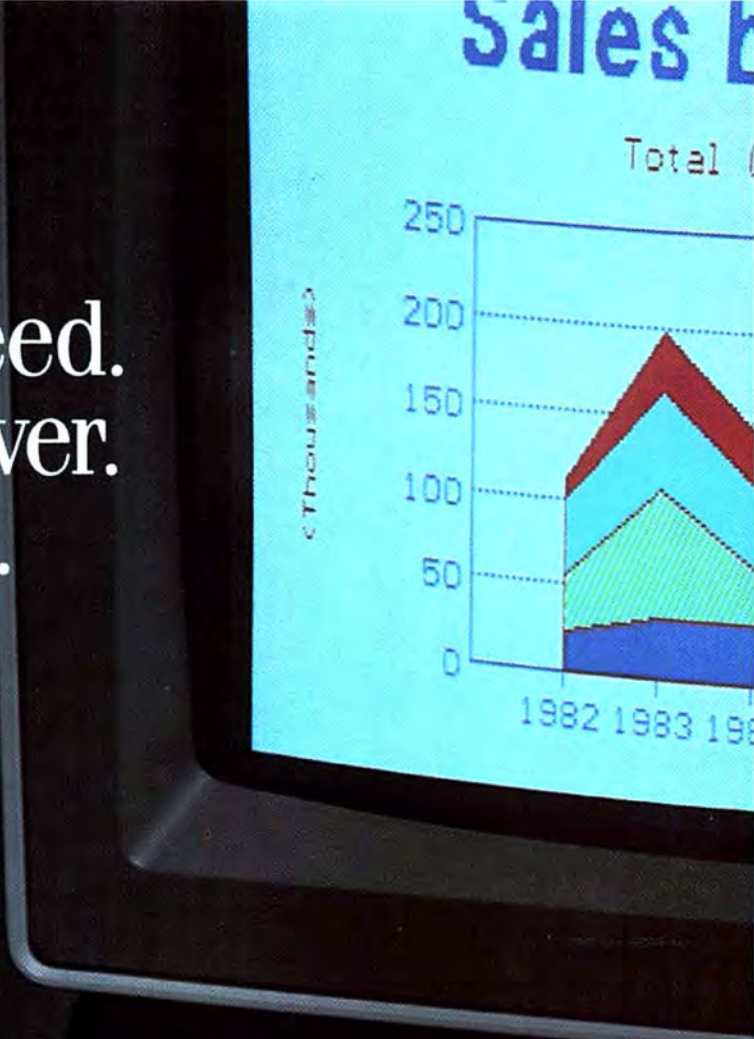
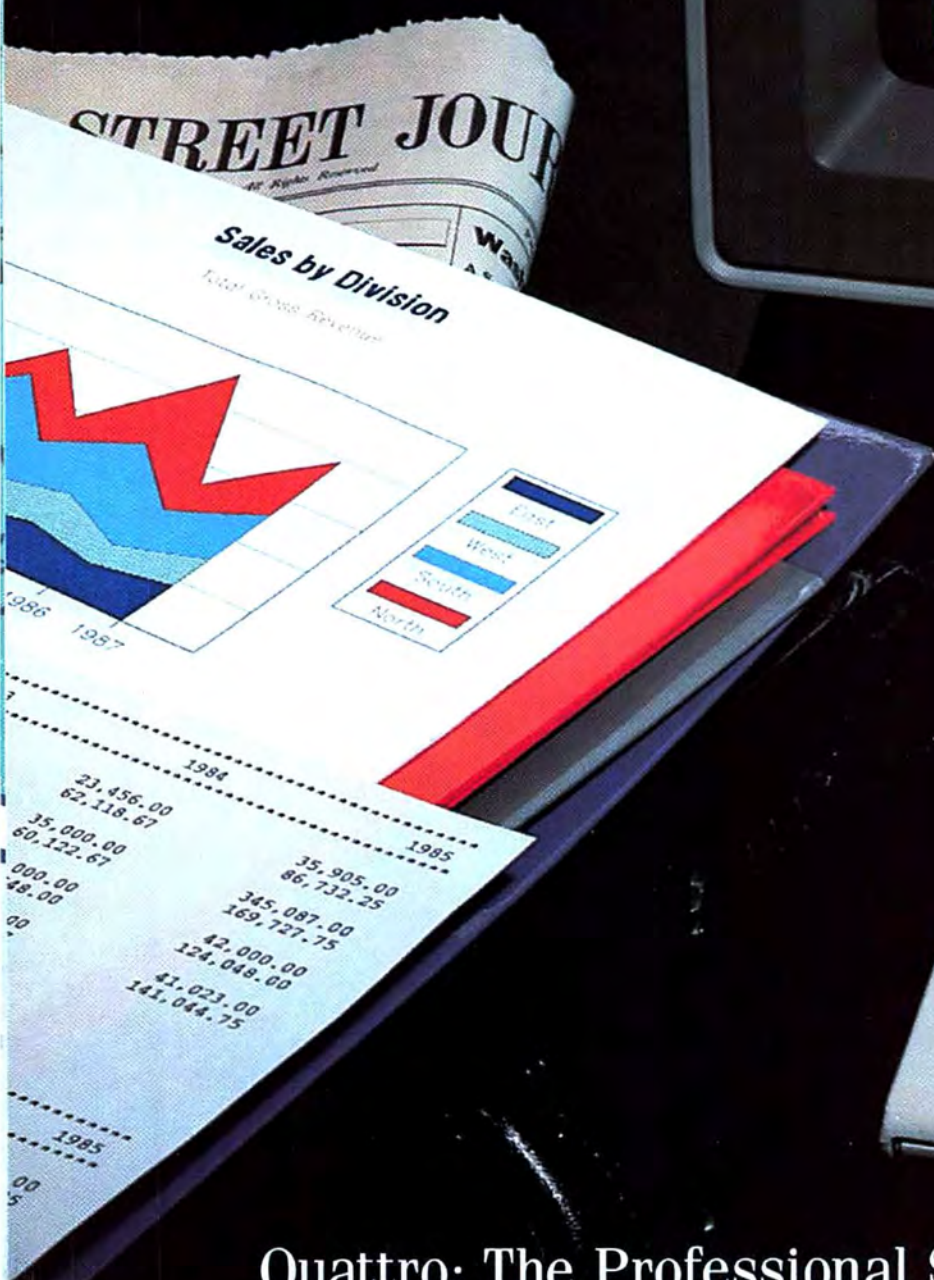
You can tell Quattro to respond to 1-2-3 commands. You don't have to learn a whole new program. Quattro works directly with all 1-2-3 file formats. No importing/exporting or macro translation is required.

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

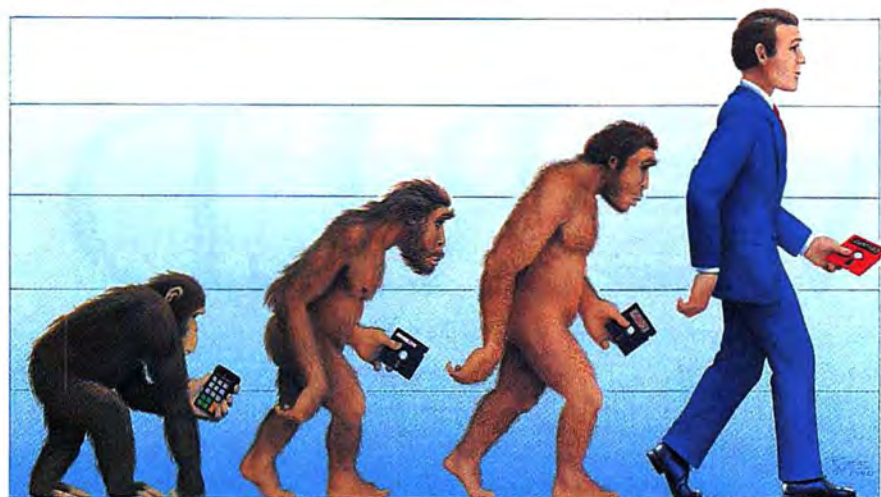
Compatible with 1-2-3? Yes.
Faster than 1-2-3? Yes.
Technically superior to 1-2-3? Yes.
Half the price of 1-2-3? Yes!



Quattro:
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Twice the power.
Half the price.



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1979
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1982
LOTUS 1-2-3™

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FEATURE		QUATTRO	LOTUS 2.01
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	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
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QUATTRO

PC WORLD

The Business Magazine of PC Products and Solutions
March 1988



108 Excel—Should You Switch?

Move over, 1-2-3! *Microsoft Excel* offers everything you're used to in a spreadsheet and more, including superior presentation capabilities and an intuitive interface. But power has its price.



116 Thoroughly Modern Modems

Offering automatic hardware-based data compression and error correction, Hayes's new V-series modems deliver at nearly double their 9600- and 2400-bps ratings, while the Modem Enhancer brings V-series features to vintage Smartmodems.



214 A License to Clone

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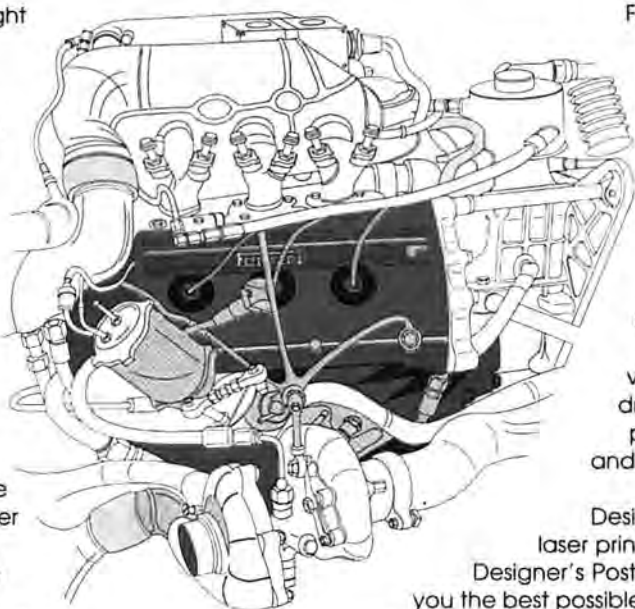
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David Bunnell

Data Long Legs

The human interface to your computer is changing dramatically. The new machine not only has a soul, it also has a memory. Yours.

The premise is quite simple: You *can* take it with you. Your entire data storage system. Your files. Your programs. Everything.

Everything—except for your PC's keyboard, CPU, and monitor. In this new method of computing, those components are just the husk of the machine. They become almost as disposable as today's throwaway cameras, which are built around a cartridge of film.

I'm referring to a technology that recently received a shot in the arm from Tandon Computer Corporation. Although removable storage products have been around for quite a while (see "Removable Resources," *PCW*, December 1987), Tandon's Personal Data Pac takes the idea a step closer to the big time.

Tandon's promotional material modestly describes the Data Pac as the "world's first and only portable Winchester hard disk." It's actually much, much more—an entirely new form of systems architecture, a computing-environment-to-go. You can access data,

update files, run a program, put up a personal schedule—whatever you need to do.

When I first saw the Data Pac at COMDEX last fall, I thought it was just about the only significant new product at the entire show. It's like a hard disk you slip out of your PC as effortlessly as you remove a cassette from your VCR. It weighs only about 2 pounds, is as rugged as a tank, and retails for about \$350 per 40MB of memory.

When you get to wherever you're going—office, home, hotel, Club Med—you simply attach an "Ad-Pac drive receptacle" to a nearby PC and plug in the Data Pac. Presto, instant computing!

I'd been doing that kind of thing for years before Tandon brought out its Data Pac. But I suffered for my habit. I'd carry my hard-disk-equipped Compaq Portable Plus between my home and office. It weighs a ton. I developed a wrist hernia from lugging it to the car every day.

(continues)

But I'm getting smarter. I got an external hard disk and installed a disk controller in both my home and office computers. Now, all I have to do is unplug the drive and cable from the office machine and bundle them up for the commute home. When I get there, I plug the hard drive in, and I'm ready to work.

Removable mass storage is a great concept because you're not just carrying your files, you're carrying your programs too.

Removable mass storage is a great concept because you're not just carrying your files, you're carrying your programs too.

In the past, I would copy a file from my office computer onto a floppy, intending to do some work at home. But I might not have had the particular program I needed at home. Just as frustrating, sometimes the version of the program I had at home was an old one, incompatible with the new version. Primal scream time, right?

That's another reason devices like the Data Pac are a godsend. You can always be sure that you've got the same program and the same version. It's so much easier to plug in the Pac than it is to copy files onto disks, take them home, and upload them onto a hard disk.

Transportable hard disks and drives are going to become an important part of personal comput-

ing. As the technology improves, you'll be able to fit more and more data into a much smaller space.

One day soon we'll have a hard disk in a little box the size of a cigarette case or a calculator. It will plug into your laptop, your desktop, your home computer, or the system you rent when you're on the road.

But despite the Data Pac's usefulness, Tandon faces a few problems with it. For one thing, you need to install the Ad-Pac hardware on each machine you use. And if you travel, you may not be able to rent a machine that supports the Data Pac. It's not yet standardized. You can't just take the box and plug it into John and Mary's PC unless they've got a setup for it.

Data Pac developer Chuck Peddle is a longtime PC pioneer. He designed the Motorola 6800 chip, as well as the 6502 chip that became the heart of both the Apple II and the Commodore PET. He was also president of Victor Technologies, a company perhaps best known for its now-defunct line of Victor 9000 PCs. Together with Bob Taylor, Peddle developed the Personal Data Pac in the years between 1984 and 1987. "We had to establish ourselves as a PC clone supplier before we could bring out Data Pac technology," Peddle explains, discussing the product's long development time.

The project was funded in part by Xerox before Peddle sold his company to Tandon. Tandon, the Moorpark, California, maker of PC-compatible disk drives, was of course looking for an opportunity like this.

As befits a PC guru with an eye sharply focused on the marketplace, Peddle has been keenly aware of the Data Pac's long-range significance to the industry.

"A lot of very, very smart systems architects have spent a lot of time asking about the social and technological implications of the ability to move large blocks of data around and take them with you," he notes.

"People got a little upset when I introduced the Personal Data Pac as 'the computer which you carry in your hand,'" Peddle explains. "But architecturally, it's exactly that. As long as you're running MS-DOS, you can move from an XT to an AT to a 386 machine.

"It's not just the data," Peddle insists. "It's the whole environment. Everything that's personal about the computer—the programs you want to run, the data and the way you get it organized—everything that's important is contained in the thing you carry around. It's not the thing attached to the keyboard."

I think Chuck Peddle is right. In the future you'll have this little box containing all your files and

(continues)

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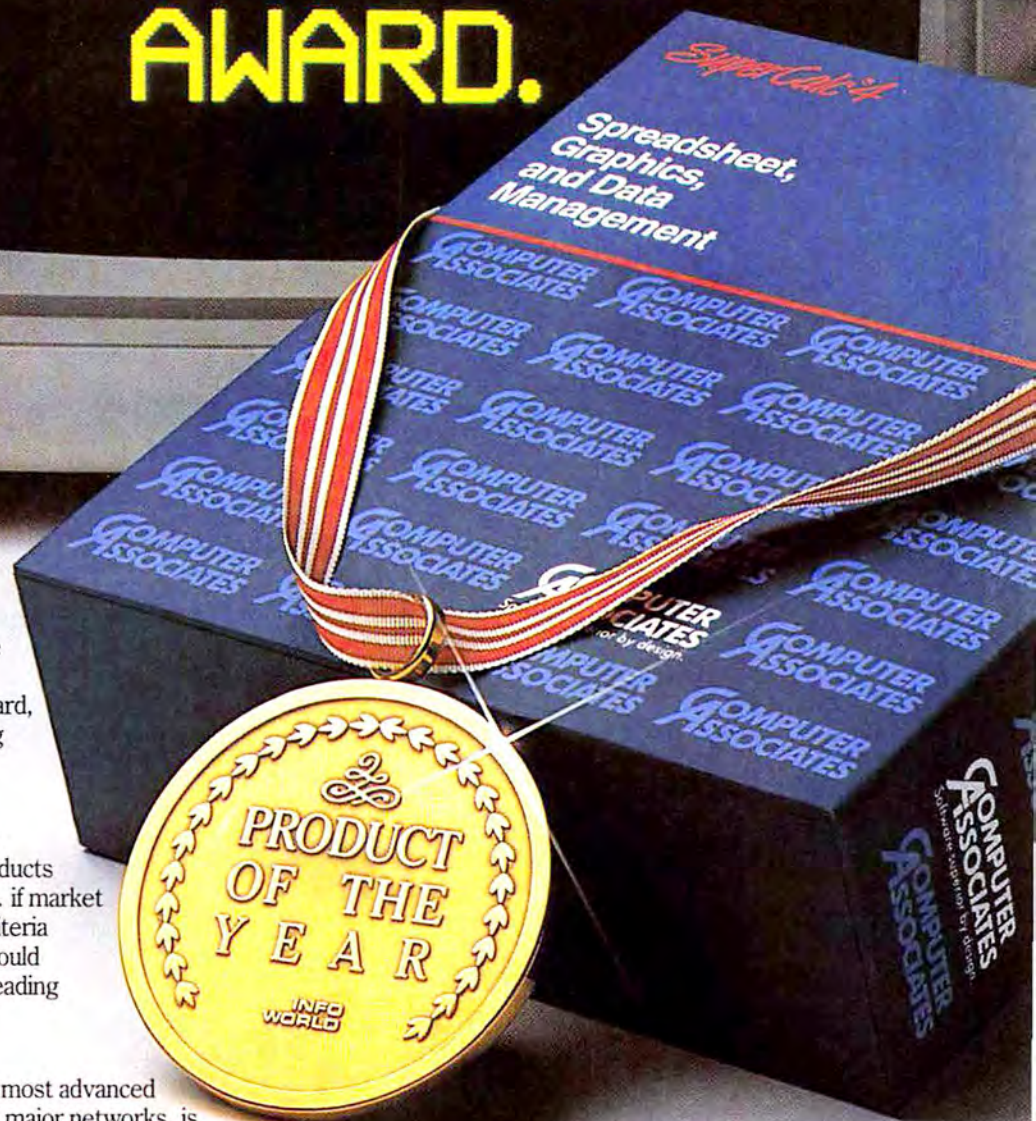
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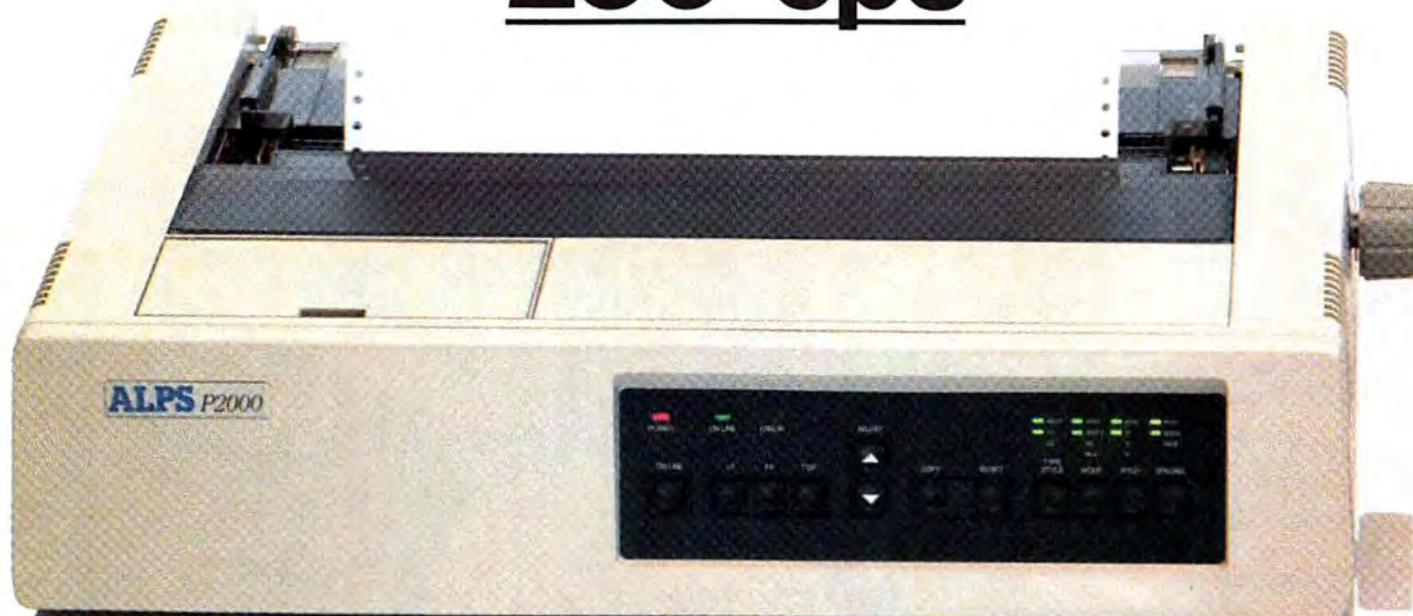
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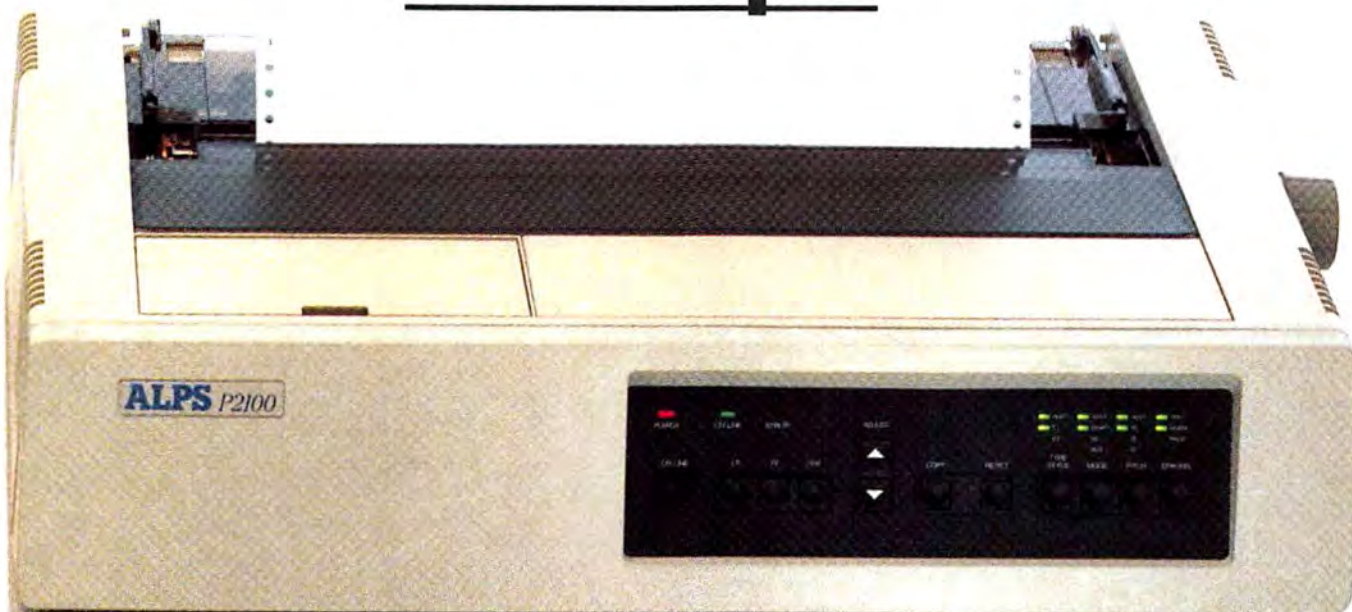
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programs, which you'll plug into each generic machine. If you extend that concept, it's very likely that eventually people will always carry their data with them.

If tape drive technology (such as the new DAT technology from Japan) continues to improve, then you won't have to bother carrying cartridges and a hard disk—you'll only need to carry a tape.

Your medical records, the names and vintages of all the wines you've ever liked, your correspondence, phone numbers, tax records—all kinds of personal and business data—will be there.

If that happens—if the industry focuses on this as the approach to portability—then it will really be feasible for hotels, even airplanes, to offer computers to the public. You'll take your Data Pac with you, whip it out, and plug it into a PC booth somewhere.

Somehow, all this portable data will be automatically backed up. In fact, Peddle hints that future Personal Data Pac products will feature "two-spindle" data-back-up features such as those currently found in minicomputers.

"All kinds of extensions could dramatically change the way people use data bases," he suggests. "You could start flailing

away on your data base without the fear—still very real today—that you might accidentally wipe everything out.

"The next thing that has to happen," Peddle proclaims, "is the integration of a variety of peripherals with crashproof machines. When you get to that stage, you will have a system that totally changes the way in which you use a computer—and, I think, the way in which you work and live."

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A Number of Reasons A Number



1. Designed for the 80386

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compatible with the millions of PC-compatibles. Power without nothing less from the new standard bearer.

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 existing PCs, PC ATs, and

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.

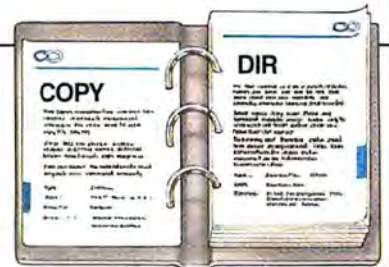
Think of it! Programs like dBASE III, WordPerfect, Lotus 1-2-3 and Symphony, WordStar, MultiMate...literally thousands of DOS programs—all compatible and multi-user available.



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.

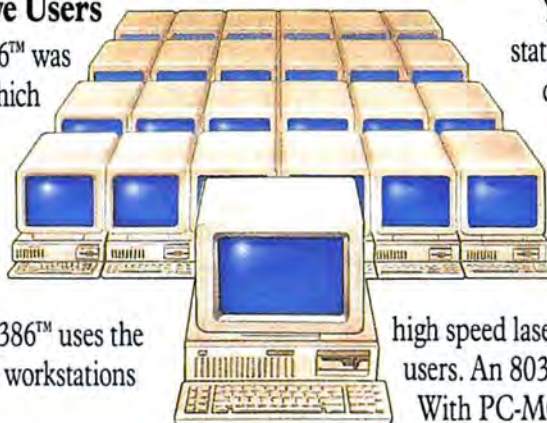
Instead, the system builds on the knowledge you already have. "COPY" still copies files, and "DIR" still gives you a directory listing. As you might expect, we didn't stop there. There's a wealth of features that have strengthened the commands you know, making them more powerful and easier to use.



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.

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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.

PC-MOS/386™ solves both aspects of this problem. Password protected security allows you to assign file, directory, and task access to each user. Plus, files and records are locked using either PC-MOS' proprietary system or NETBIOS emulation.

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.

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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.

And consider this.

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Letters

Reactions and responses from the PC World community



No Club Ties

I applaud David Bunnell for his thoughtful essay on computer journalism ethics ["Benchmarking PC Ethics," *PCW*, October 1987]. Ours is a "clubby" industry where personal connections sometimes outweigh objectivity. Blurring the line between editorial and advertising departments at personal computer publications is a very real problem.

PC World's testing agreement with National Software Testing Laboratories represents a strong stand for editorial independence. Vendors who, like *PC World*, put the user first will welcome this independent product review process. Those who don't may not be around for very long anyway.

Larry Hauptman
Ann Arbor, Michigan

Throwing Stones

I read "Benchmarking PC Ethics" with interest but felt that it might be a little too smug and self-congratulatory in tone. A look in the back of (oh, my!) *PC World* revealed the very same reader service cards that David Bunnell so correctly criticized. Perhaps Mr. Bunnell's future columns will be edited more cautiously, with the those-who-live-in-glass-houses adage in mind.

Scott Pierce
Arlington, Texas

Read again, and you'll find that Mr. Bunnell's gripe was with reader service numbers appearing in product reviews. —Ed.

No Cure Needed for Remedy

I appreciate your review of our Remedy Removable Winchester drive ["Removable Resources,"

PCW, December 1987], but I feel that several clarifications are in order.

Michael Goodwin contends that "installing the drive is a job for a professional." If so, then the same could be said for any disk drive, since the Remedy drive uses the same mounting screw locations and configuration as a standard 5¼-inch drive, uses the same ST506 controller and cables, and has daisy-chaining requirements typical of multiple fixed drives.

Mr. Goodwin makes "switching hard-to-reach drive jumpers, removing and replacing terminating resistors" sound like difficulties unique to the Remedy drive, indicating his inexperience with hard disk technology. From the point of view of both hardware and software, installing the Remedy drive is identical to installing a hard disk drive.

I hope readers won't be overly influenced by his negative commentary.

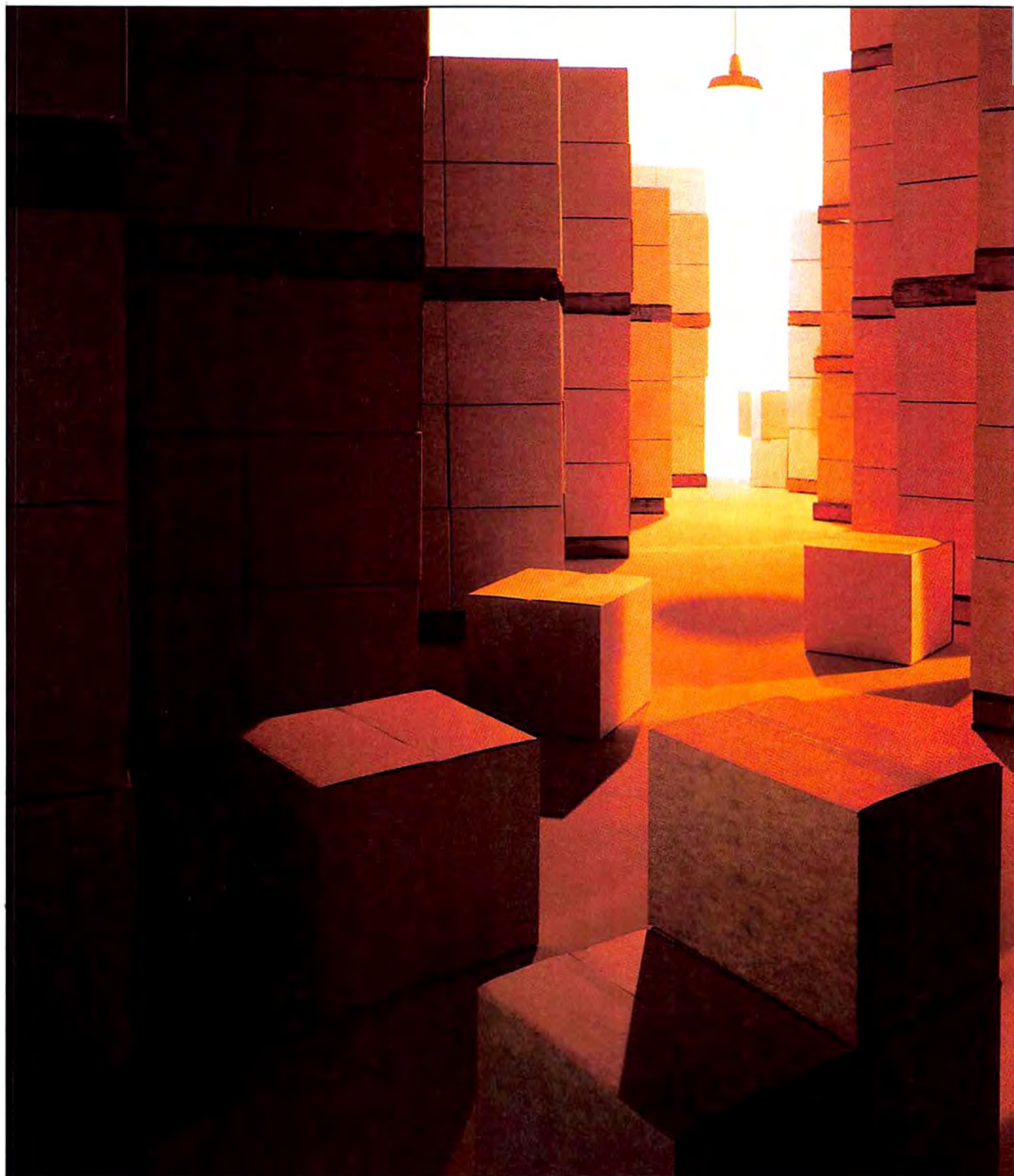
Bob Richard
President
Systems Peripherals
Consultants
San Diego, California

Stuck with a Loser

I was quite distressed after reading Ralph Soucie's review of *Dac-Easy Accounting 2.00* ["Dac-Easy: Still Small-Time Accounting," *PCW*, November 1987]. When I was in the market for a computerized accounting package, I based my decision to buy *Dac-Easy Accounting* partly on the fact that it was the top accounting program in the World

(continues)

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Class PC contest two years in a row. Now I'm stuck with *Dac-Easy Accounting*, and I wonder how a program with such serious flaws could be named a "winning product" in your magazine. I rely on the judgment of experts when it comes to computers and software, but in this case I'm confused. Who should I trust?

Rod Johnson
Tipton, Iowa

The experts who selected Dac-Easy Accounting 2.00 as the top program in the accounting category were none other than PC World's readers. They clearly indicated a preference for an inexpensive, albeit imperfect, accounting package. Mr. Soucie's review, while noting Dac-Easy Accounting's serious weaknesses, affirms the program's value to small businesses unable or unwilling to pay \$500 to \$2500 for a more professional accounting package. —Ed.

Graphic Gripe

Your roundup of data transfer programs ["Media Movers," PCW, November 1987] was informative but graphically flawed. Depending on which set of bars you are looking at, a bar 27/8 inches long represents 6 minutes 25 seconds, 1 minute 56 seconds, 1 minute 21 seconds, or 37 seconds. A glance at these graphs might lead you to believe that *Fastwire II* takes almost twice as long to transmit a binary file as it does to transmit a text file, when in fact the exact opposite is true.

This violates an important principle of graphical integrity: "The representation of numbers, as physically measured on the graphic itself, should be directly proportional to the numerical quantities represented" (Edward R. Tufte, *The Visual Display of Quantitative Information*, Graphics Press, Cheshire, Connecticut, 1983). Since all four sets of bars indicate the same measurement—the time to transmit 300K of data—the ratio of time to length should be the same for all four. As presented, the graphs are confusing.

William Meacham
Austin, Texas

In the past, we presented benchmarks in a format similar to the one you describe, with all graphs drawn to the same scale (see Figure A). Unfortunately, when the

results of quick- and long-running performance tests are plotted side-by-side, readability suffers. You can't easily compare products that finished one test in 5 seconds because the scale must also accommodate a test that runs, say, 3 hours. Our new format breaks with tradition somewhat (see Figure B), but we think it will help readers quickly see how products perform on a test-by-test basis. —Ed.

Where's the Review?

I subscribe to *PC World* and find many of the articles helpful in my work. Recently, though, I was disappointed by an article on statistics by Jeff Moad ["The New

(continues)



Figure A: An old-style chart



Figure B: The new graphic format

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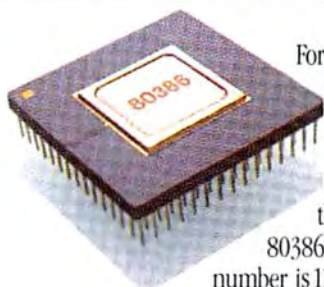
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Storage Devices	1.2MB FDD, 40MB HDD, <28ms average access time	1.2MB FDD, 40MB HDD, <30ms average access time
Coprocessor Support	80387	80287
Keyboard	Enhanced 101-key with tactile feel	Enhanced 101-key with standard Compaq feel
Warranty	One-year, includes 4-month on-site service by TRW	One-year, Service at dealer site.
Suggested List Price	\$3995	\$6495
*Base model.		

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Circle 49 on reader service card

Statistics," PCW, October 1987]. I use statistics in my work and turned eagerly to the piece, hoping to learn something about statistical software. To my dismay, the article was superficial and written for a reader with no knowledge of statistical methods.

When you publish a piece on word processing or spreadsheets, you write for people familiar with those kinds of products, and you compare the features and shortcomings of the top products available. There are plenty of statistical packages on the market, so why not give them some ink?

Joseph C. Finney
Salinas, California

We do review statistical packages in our pages. But the purpose of a feature such as "The New Statistics" is to examine how people are using programs to solve everyday business problems. We hope, of course, that readers will benefit from the experiences of others. As for the article's intended audience, you're quite right—we wanted to inform managers, small business owners, and others who aren't statistics pros about the possible competitive advantages to be gained by using PC-based statisti-

cal packages. Don't be discouraged, however; PC World will continue to evaluate statistical programs in future issues. —Ed.

Down with Gurus

William Rodarmor's article on training ["Computer Training: My Place or Yours?," PCW, November 1987] recommended, "For most in-house training in popular applications, promote your gurus." In my experience, those self-taught gurus don't make good teachers. More often than not, the local guru is good at figuring things out but not at transferring that understanding to others. A

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good trainer needs the patience to repeat "slash, copy, enter, period, down, down,...enter" the 15 or 20 times novice 1-2-3 users need to hear it in order to learn the procedure.

Before you promote that guru, ask yourself this: Is the guru a "people" person? An experienced teacher? Mr. Rodarmor does point out that "good training always comes from people," but he fails to describe the skills a successful computer trainer needs.

Dan Derrick
Brownsburg, Indiana

Caveat Communicator

I have to agree with Judy Getts's assessment of the bargain-priced modem market ["Penny-Pinching Modems," PCW, December 1987], but she failed to mention that there are ways to reduce the risks of buying hardware or software sight unseen. Buy from a mail-order firm that offers guaranteed satisfaction or trade-up policies. That way, in the event that the product doesn't fit your needs, you have the option to get your money back or buy a different product. Honorable firms offer such policies but require that you notify them of problems within

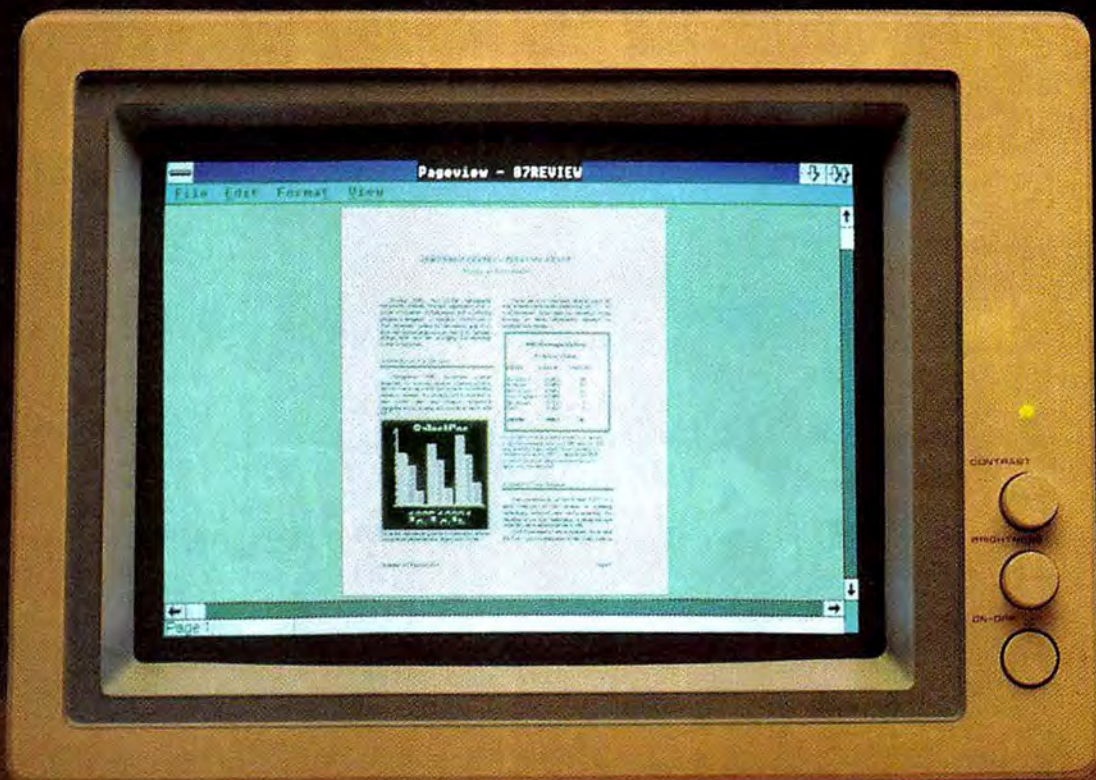
30 days of receiving a product and obtain a return authorization number before sending back rejects. This may seem simplistic, but it works.

Harold Daniel
Danbury, Connecticut

Going All the Way

I just have to respond to Stewart Alsop's column ["Laptop Fantasy," PCW, November 1987], just in case a manufacturer like Toshiba happens to be listening in.

(continues)



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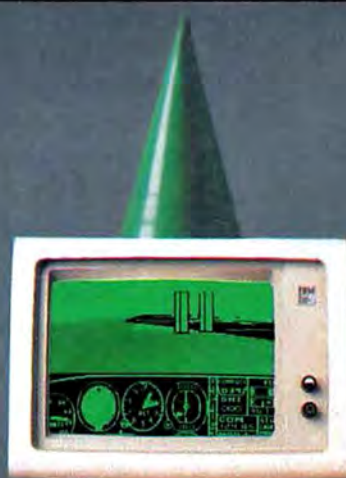
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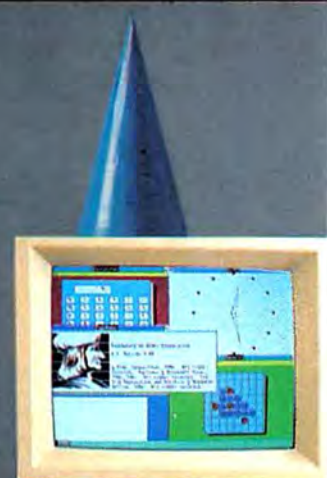
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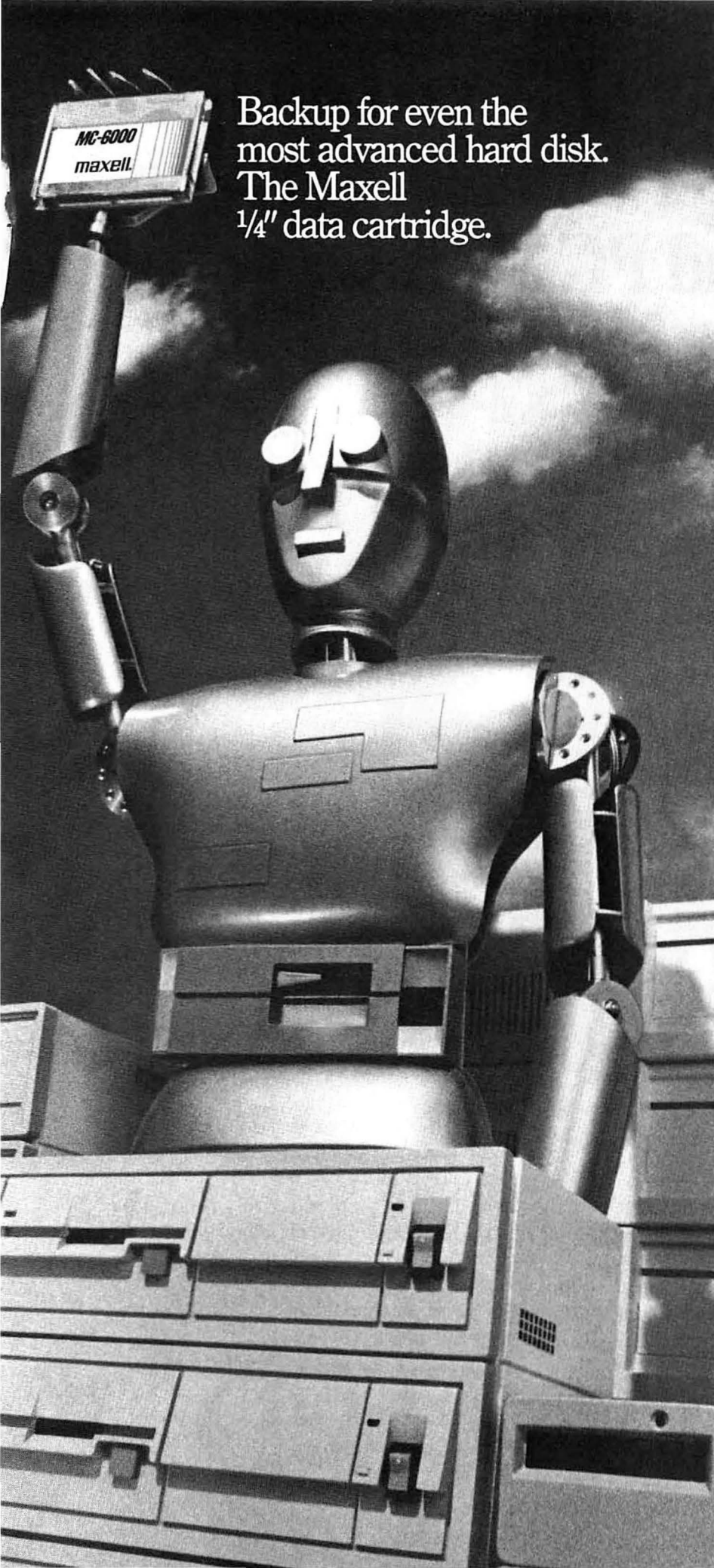
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How Farsighted Executives Are Using Their PC's For The Fun Of Profit.

By William J. Spink

For years now you've been hearing about the wonderful things personal computers will do for The Executive of the 80's—at least in theory.

But what's the *reality*? Can a PC help you enjoy your work more and show a greater profit, here and now? According to your peers, the answer is "yes."

"With just a few keystrokes," says Al Lynch, Director of Corporate Planning and Research for JCPenney Company, "I can screen companies, find possible acquisitions or 'scope-out' competitors. It's a real competitive edge."

Walt Casey, V.P. of Communications at ConAgra says, "I spend a lot of time each day poking into this and tracking that. It's *much* easier when you can immediately get the facts from a computer, rather than having to make a series of phone calls."

"One of Dow Jones News/Retrieval's services, QuickSearch, is a Godsend," adds Jim Posner, a respected retail consultant. "It gives me detailed corporate reports within minutes—I don't even have to leave the office."

Instant information: the executive advantage.

To lead in today's marketplace, you need information like *that*," Lynch says, snapping his fingers.

He recalls an example of how Dow

Jones News/Retrieval®—the business and financial information service from Dow Jones & Company, Inc.—gave JCPenney Company a real advantage.

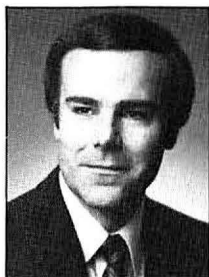
"Let's just say that a 'major player' in our industry was being acquired. Within a few hours we knew more about the takeover candidate than the bidder did. Honestly, we knew more than some investment bankers did."

Decision-making with the leading edge.

"Then we started getting the corporate insider trading data," Lynch continues. "It showed us some things that influenced a major deal."



Al Lynch
Director of Planning
and Research,
JCPenney Co.



Walt Casey
Vice President,
Corp. Communications,
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James Posner
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"No problem," according to Posner.

"There's no difficulty using the service. I ask for pointed, specific information and get exactly what I need. It's much easier than manual research."

Walt Casey agrees. "Dow Jones News/Retrieval is simple enough for anyone who's at all comfortable with computers to use it effectively from their very first day online."

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"I've had other services, but Dow Jones News/Retrieval has the most useful business information in the right form," says Posner. "The time I spend 'playing' on the computer makes more money for me—and for my clients."

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Bruce Lupien
East Bridgewater,
Massachusetts

WordPerfect Exonerated

Perri Natalizio's letter ["Display-Write or WordPerfect," *Letters*, PCW, November 1987] pointed out some "glaring deficiencies" in *WordPerfect* that simply do not exist. Far from the two-per-document limit cited, *WordPerfect* permits unlimited header changes in a document. Natalizio may have been confused by the program's ability to place and independently control up to two headers and two footers on the same page.

As for the program's inability to place page numbers in a specific footer line when using hard page breaks, footer and page number locations are always specified by the user with both hard and soft page breaks.

I suggest that the writer or anyone else with questions concerning *WordPerfect* contact the Independent WordPerfect Support

(continues)

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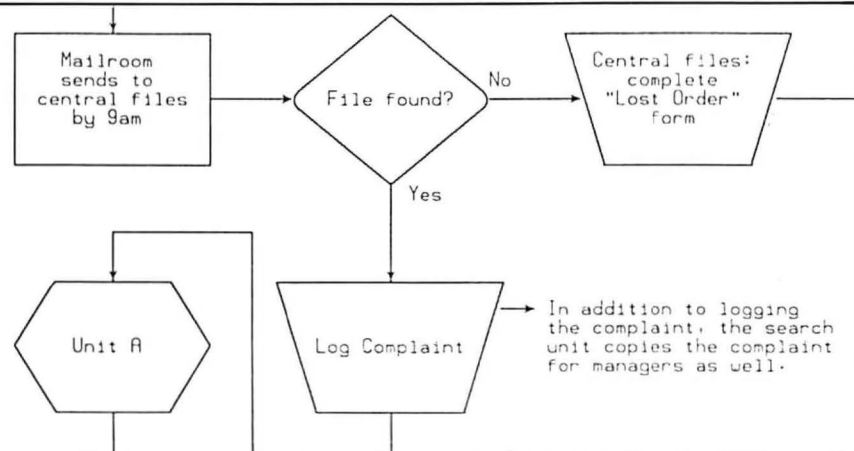
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* March 10, 1987 issue, page 278

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Name That Laptop

The photo on page 152 of *Product Outlook* [PCW, November 1987] is wrong. Rather than the Portable Vectra CS described in the caption, we mistakenly showed a Hewlett-Packard Portable Plus. Check next month's *Hardware Shelf* for an accurate photo (and a review) of the real Portable Vectra CS.

Letters should be mailed to Letters, PC World, 501 Second St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD/179-3813, CompuServe 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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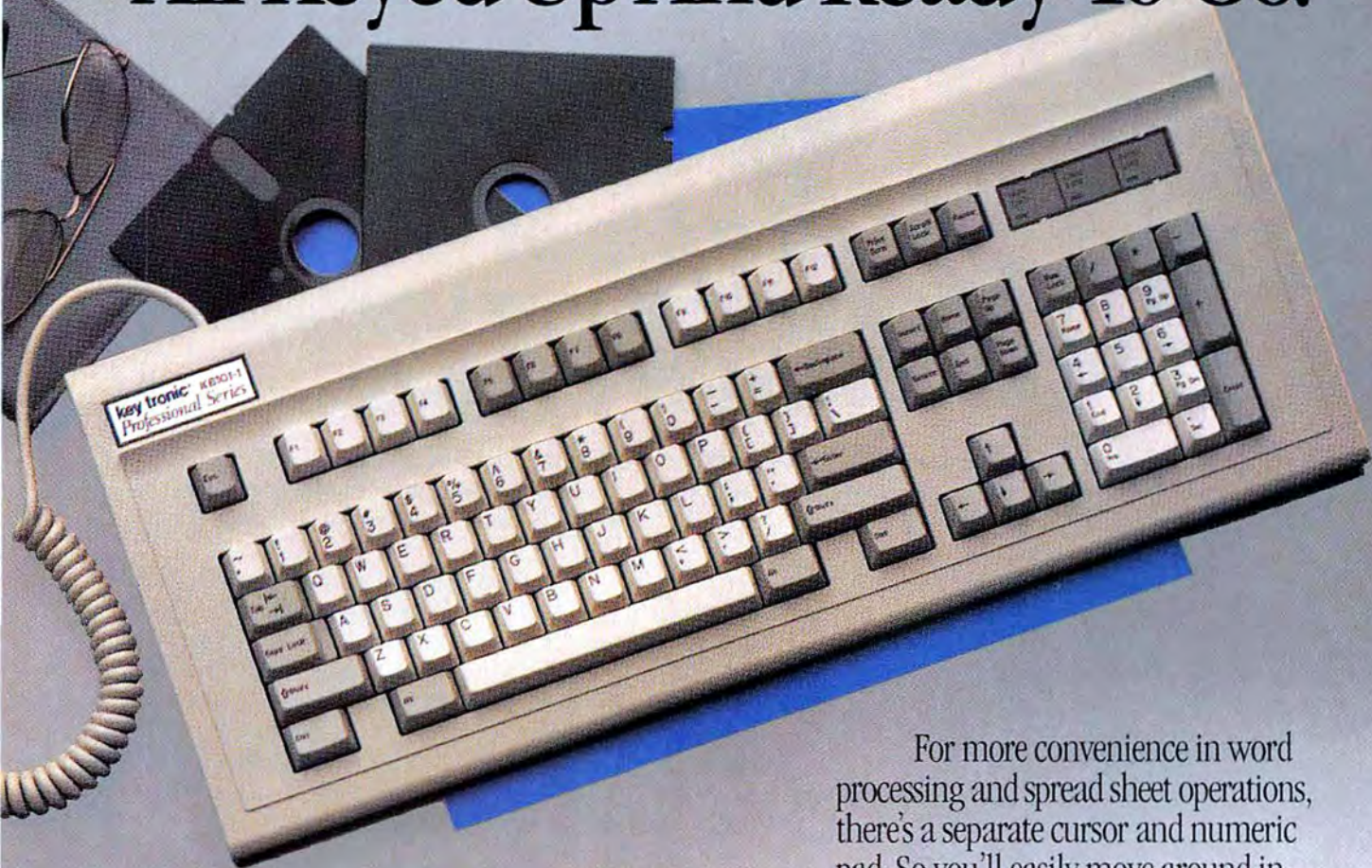
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Richard Landry

The Next Software Revolution

The personal computer community is splitting in half! But that fracture is shaking loose new notions of how to fit software to users' needs.

The best-kept secret of 1988 so far is the software revolution that's brewing among developers. While publicly lining up behind OS/2 and the Presentation Manager, many are training their sights on a wide new playing field that's opened up beyond this operating system. Their efforts will make you less dependent on specific hardware platforms and provide a better fit between the software you buy and the kind of work you actually do.

What is it that's bringing about this change in the way software is conceived and developed? On the surface, nothing less than a lot of bad news for small business users. Recent corporate estimates have pegged the average cost of an OS/2 upgrade at about \$1500 per system; that doesn't include the cost of the new communications and data base solutions that OS/2 is bringing in its wake. IBM's OS/2 Extended will sell for a cool \$795 and its *LAN Server* for \$995, while Ashton-Tate and Microsoft's *SQL/Server* will go for between \$1500 and \$3000 (see *Top of the News* in this issue).

Even more disturbing than the money involved is the contradiction that's developed between OS/2's promised ease of use and the reality of ever-more-complex hardware interactions. As it turns out, OS/2 is far more hardware-dependent than DOS ever was. It must be adapted with drivers for specific brands of computers. If you bought more than one brand of equipment for your office, you'll need versions of OS/2 for each; if you bought a no-name clone instead of a big-name compatible from a manufacturer with the bucks to modify OS/2 for its hardware, there's a chance you may never get the operating system up and running at all!

So OS/2 drives a wedge between big business, whose needs have outstripped the old DOS technology, and small business, which for the most part has only begun to taste the benefits that personal computers can bring. Meanwhile, software developers

(continues)

are left with the choice of providing products for either a relatively stable base of large corporate clients or the enormous untapped segment that needs low-cost, easy-to-use solutions.

A grim standoff? Well, not exactly. Software firms with the programming muscle to develop products for more than one environment are exploring ways to

386 extender technology, and the Mac, most pundits blew it off as another round of vaporware. But Borland president Philippe Kahn explains the announcements as nothing less than a survival strategy for the product. "Our big corporate users have asked for certain OS/2 solutions," he says, "but for one solution to be viable, it has to be part of a whole palette of com-

will transparently link Macs and PCs on a LAN, allowing them to share compatible programs and data.

More significantly, some companies are taking the concept of applications compatibility a step further, shaping families of programs that cover not only a broad span of operating systems but also a spectrum of user needs. Jeff Raikes, director of applications marketing at Microsoft, describes this approach as a cornerstone of his company's "integrated office systems" strategy. One obvious direction: Augment the current versions of *Microsoft Word* on the Mac and PC with a high-end OS/2 package that includes sophisticated desktop publishing features. Then standardize the file formats among all three versions.

Microsoft is not the only firm following this strategy. Symantec Corporation, publisher of the *Q&A* flat-file data base and the *Time Line* project management package, has been gobbling up Macintosh technology in a quest to put together an integrated product strategy that cuts across operating systems. According to Symantec vice president Rod Turner, the company aims to bridge the gap between software design specifications influenced by a relative handful of corporate users and the often very different needs of millions of personal and small-business users. While MIS department managers continue to make purchasing decisions based on laundry lists of features, most

(continues)

One day even small companies will be able to run a mixed computing environment that includes low-cost DOS machines, OS/2 workstations, and even Macintoshes.

create families of applications that transcend the arbitrary boundaries set by operating systems. And instead of building all-in-one tools that somehow have to strike a balance between the ease of use required for novice users and the sophisticated features needed by power users, software vendors are matching features more closely with the hardware platforms on which they're expected to perform. The result? One day even small companies will be able to run a mixed computing environment that includes low-cost DOS machines, OS/2 workstations, and even Macintoshes.

Take Borland's *Paradox*, for example. When Borland announced last year new versions of its data base for OS/2, UNIX, DOS with

patible solutions across the spectrum of operating systems." *Paradox* users connected by a LAN will be able to share data and applications written in the PAL programming language, whether they're running the program on a PC or a Mac.

Kahn's not alone in taking this tack. Microsoft, WordPerfect, Fox, Blyth, and Microrim, among others, have already announced or are shipping different versions of the same product that run under different operating systems. Furthermore, versions that are not fully compatible are being pulled into line. WordPerfect plans to upgrade the Mac version of its word processor to make it capable of sharing files with its PC counterpart; Microsoft is working on a way to share *Excel* PC files not only with Macs but with VAX minicomputers as well. And as of this writing, rumors persist that a new version of Novell's Netware

Thanks To The T3200, The Desktop PC Can Now Take Its Place In History.



When the eagerly awaited PC first hit the desks of the public, everyone figured it was there to stay. It was, after all, powerful and functional. And considering it weighed about 40 lbs., it would take a lot to unseat it.

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With its two internal expansion slots, you can connect to a LAN, a mainframe, or add peripherals.

It also has a 12 MHz 80286 micro-processor, a 40MB hard disk, and a 720KB 3 1/2" diskette drive.

And when it comes to memory, the T3200 rivals your clunky desktop. With its 1MB RAM that expands to 4MB. We even gave it a built-in, gas plasma EGA display and monitor port. Which, by the way, are optional on your old desktop.

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And ask to see the first portable PC powerful enough to push the desktop right into the history books.



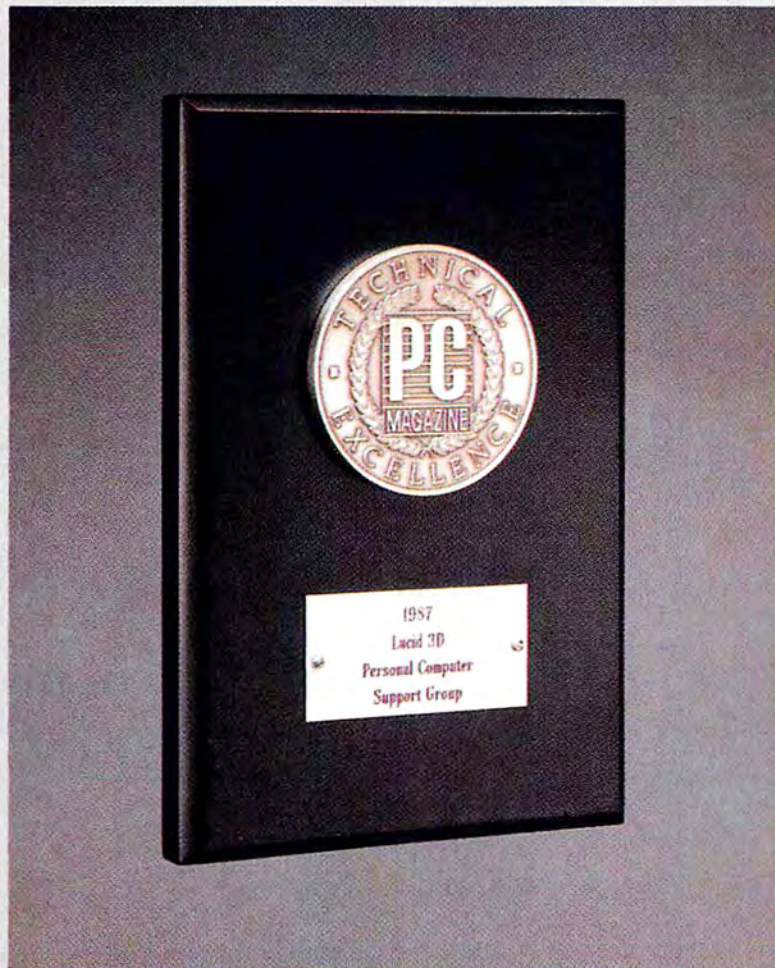
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Lucid is as simple as the pictures show. And you don't have to write formulas to do that. All you do is look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid works that way. Users say "It is so intuitive that I really don't need a manual." That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said, "If there ever was an interface idea so good it ought to be stolen and widely used, this is it."

Memory Resident

You can pop Lucid up instantly while working in your word processor or any other program. You can cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note window that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

Other Features

Lucid has over 100 innovations that cause users to say it is the best of all the spreadsheet offerings! Things like: **Speed** - background, minimal and visible recalc. **Macros** - learning macros, autoexecute macros, macros work between spreadsheets, user defined macro menus. **Mouseability** - total Mac-like mouse access, but easy keyboard control as well. **Color or Mono** - 17 user controlled color displays. **Audit** - six displays and printouts. **Windows** - multiple sheets on screen at

same time. Multiple views of the same sheet. Pop-up windows of function formulas, range names, favorite labels, macro names, file names, even a calculator. All let you select and insert right



Fig. 2. Here we are instantly. Notice the lower left corner showing we are on level 2. Grey - takes you back. There is no limit to the levels you can go. Move right down to transaction level if you like.

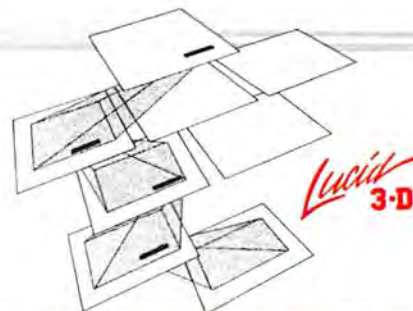
into your spreadsheet. All windows (even notes) resize and move where you want them. **Cut and Copy** - between spreadsheets, documents and between sessions. **Help** - press F1 anywhere, you get help specific to what you are doing.

Masterwork

Lucid is more than a bag of features. It is a masterwork. The overall feel is tight and polished. In fact, Paul Somerson, executive editor of PC Magazine, used one word to describe it. "Slick".

PCSG has built an excellent reputation as a developmental laboratory. Now those who have worked with Lucid 3-D tell us "you have done it again. This is software everyone should have."

Even if you don't plan to abandon 1-2-3, Lucid makes sense. Files are converted between them with ease so there's not



"The Best idea I've seen for a spreadsheet in years"

Jim Seymour, Columnist, PC Magazine, PC Week



Fig. 1. Let's get the detail on those ad costs, just move the widebar to that cell and press one key (grey +).

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The other winner:
Microsoft's Excel



Fig. 3. Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different directories, different drives, even down as many 3-D levels as you like. No one else can do that.

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people find themselves using only a minor fraction of any program's power. Most individuals in large corporations and small business alike would benefit from a choice, not only among hardware platforms but also among software packages geared to different applications and levels of skill.

Soft-Letter editor Jeffrey Tarter predicts that this year's big winners among software companies will be those firms that carefully target products at well-defined classes of users. The big losers? "People who continue to treat their buyers as [marketing] abstractions...and who offer generic technologies rather than well-conceived tools and solutions." Watch for Symantec to start unleashing a barrage of products geared to a number of different hardware platforms. Each product will be designed for a different class of user and offer a different set of features than the other members of its application family. But each will be able to share data with its counterparts, so that all members of an application family can be used together in a mixed-hardware environment. And users will be able to carry their work with them as they graduate to more sophisticated systems. Isn't that the way software should have been designed all along?

In this issue, *PC World* takes its first look at the coming hardware story of the year: the birth of PS/2 clones. Despite the reluctance of compatibles manufacturers to discuss what they're doing about Big Blue's new

line, News Editor Mike Hogan names the major players and sets a realistic schedule of when you can expect the first Micro Channel clones to appear.

PC World also wades knee-deep into the turbulent spreadsheet waters with an in-depth review of

the state of the art in communications. Eric Brown and Art Wilcox review *Smartcom III*, pitting this product against its inevitable competitor, *Crosstalk Mk.4*, while their review of the Hayes V-series modems underscores the likelihood that at last a viable standard

Some companies are taking the concept of applications compatibility a step further, shaping families of programs that cover not only a broad span of operating systems but also a spectrum of user needs.

Microsoft's *Excel*. The first truly formidable application to arrive under the *Windows* operating environment, *Excel* foreshadows the kinds of tricks you're likely to see under OS/2 with the Presentation Manager: background recalculation, worksheet linking, and the ability to update a worksheet in one window and watch the effect on a graph in another window. But *Excel* must compete with a host of other packages that claim to be its equal in the basic tasks of building worksheets, writing macros, and creating reports and graphs. And, of course, there's *1-2-3* release 3.0. Look to this magazine in the coming months for exhaustive coverage of the exciting developments taking place in spreadsheets.

We've also pulled together a set of articles that neatly summarizes

will emerge for high-speed modem communications. We round out this coverage with a feature on electronic mail and some practical advice on turning it into a strategic productivity tool.

Finally, *PC World* presents the ballot for the 6th Annual World Class PC Awards. Take a few minutes to vote for your favorite hardware and software, and you may end up walking away with an enormous prize. Last year's winner took home a World Class system worth over \$30,000. This year's winner could easily do even better. The first 100 readers to submit a ballot will each receive a special thank-you prize as well.

As always, I'm eager to hear your opinions on these or any other subjects. Write to 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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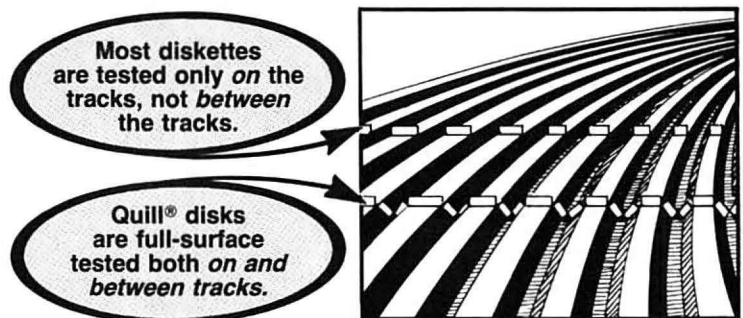
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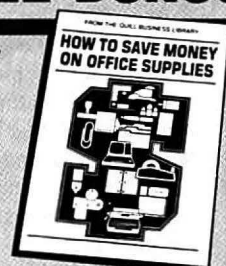
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Next in PC World

April

LAN WORD PROCESSORS

With all the debate over the merits of one local area network operating system versus another, it's easy to forget that the most important building blocks in a LAN environment are the applications, not the operating system. *PC World* examines products in one of the applications you're most likely to run on a local area network—word processors.

Also, we take an in-depth look at the battle heating up between Microsoft, Novell, and IBM for control of the LAN market.

QUATTRO

Borland's new entry in the spreadsheet wars is supposed to be the ultimate 1-2-3 knockoff. But does it bring anything new to the party that would make you want to switch from the Lotus standard? *PC World* pits *Quattro* against its closest competitors, 1-2-3 and Microsoft's *Excel*.

THE SOUL OF THE NEW MACHINES

OS/2 has finally arrived, and it's raising more questions than ever. In the first of a series of articles about this next-generation operating system, *PC World* answers users' questions about OS/2 setup, installation, and documentation.

Plus, an in-depth review of *Windows/386*.

Circle 121 on reader service card

FROM CREATION



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Stewart Alsop

The Sun Also Rises in America

Stewart Alsop puts his neck on the block to predict the rise of a new computer that will outshine both IBM's and Apple's: the Sun PC.

Sometimes it amazes me how fast this industry can change its collective mind. In January of 1985 it was nearly impossible to get any vendor of PC compatibles—hardware, software, or peripherals—to agree that the Apple Macintosh could ever be taken seriously as a development environment. By June 1986 most vendors of PC-compatible software and peripherals had come to believe that the Macintosh was not just a hot machine to develop software for but that it was actually setting the pace in computer design, particularly in the area of system software. (Not surprisingly, hardware vendors still aren't very enthusiastic about the Macintosh, since they can't get a license from Apple to build compatible machines.)

This rapid change in perspective emboldens me to make a prediction: The hottest new personal computer for software development in January 1990 will not be compatible with either the PS/2-OS/2 or Macintosh architecture, nor will it be made by IBM or Apple. Instead it will be made and

sold by a company called Sun Microsystems.

It might seem safe to predict the arrival of a new, incompatible architecture now that Apple has managed to make the Macintosh successful in the face of the IBM juggernaut. After all, if one company can do it, why can't another? The fact is, that prediction is fraught with peril. If you listen to the industry now, vendors want to believe that they will have only two basic environments to deal with for the foreseeable future: the PS/2-OS/2 environment and the Macintosh environment. So it's going to take Sun a whole lot of persuading and smart decision making to get the kind of massive software development the company needs for its new personal computer architecture to succeed.

Indeed, my Sun PC prediction is probably fraught with as much peril as another prediction I made about 18 months ago, albeit a little less publicly. At that time, I bet

(continues)

George Morrow, peripatetic industry visionary and computer engineer, that within 18 months IBM would show an operating loss (not just a drop in revenues) for the first time in its history. As you know by now, I owe Morrow restitution on that particular wa-

ful small car (say Ford's Mustang or Nissan's original Datsun 240Z) and then proceeding to add all kinds of stuff to it until it no longer appeals to the original audience. Unless new architectures come along, computer users will never see any substantial improve-

mainframes as handy peripherals to the devices that are ultimately in control. But Apple is very much committed to (and stuck to) its own framework, which holds that technology must be proprietary to be profitable and that software's appearance and quality must be tightly managed and controlled for products to be useful to the user.

Sun Microsystems, on the other hand, seems to live by the rule that the automobile business has essentially lived with since the late 1940s: Any technology should be widely available and standardized for its products to be truly useful. Sun is working on a new personal computer architecture, facetiously referred to as the Sparcintosh, that will use standard, widely available parts for both hardware and system software and will ultimately be available from many companies, not just Sun Microsystems.

This system will use the SPARC (Scaleable Processor ARChitecture) chip that Sun recently developed and has already licensed to three semiconductor companies. The SPARC chip is supposed to provide three times the basic performance of an existing 80386-based computer. The system will run under a completely standardized version of UNIX being developed jointly by AT&T and Sun, which will be identical on all other machines, including those based on the 80386, VAX, or IBM 370 architecture. And the system will have a standardized graphic user interface with the same roots as the Macintosh in-

By 1986 most vendors of software and peripherals had come to believe that the Macintosh was not just a hot machine but was setting the pace in computer design.

ger. What I'm saying is that the likelihood of Sun Microsystems' successfully establishing another major personal computer architecture is about the same as the chances of the most profitable company in the world—IBM—actually losing money.

In any case, I'm willing to make the prediction—partly from just plain orneriness. I like to see new architectures come along because they make life difficult for the companies responsible for the old ones. It's in the nature of product management that companies like to stick with something proven and successful. So computer companies end up making their existing architectures fancier and fancier. They go well beyond the original specifications' basic capabilities instead of taking chances by introducing whole new architectures that can deliver new performance and functionality. This phenomenon is similar to a car company's introducing a success-

ments. Instead, we will just get bigger tail fins and chrome bumpers.

But mostly I'm willing to make this prediction because I don't think we've completely figured out what computers are capable of doing for us. The idea that the Macintosh II or the OS/2 Presentation Manager on an 80386-based machine with either a PC or PS/2 bus might be the be-all and end-all of personal computing is too distressing for words.

There's got to be more to life than what we already have. If there is, and the "automatic transmission" of the personal computer has yet to be designed, then I think Sun might be better able than either IBM or Apple to invent that automatic transmission. IBM is still struggling with what is now being called its mainframe-centric view of the world, the view that the world revolves around the design and operation of large, centrally managed computing devices. Apple is more progressive in its worldview: It sees

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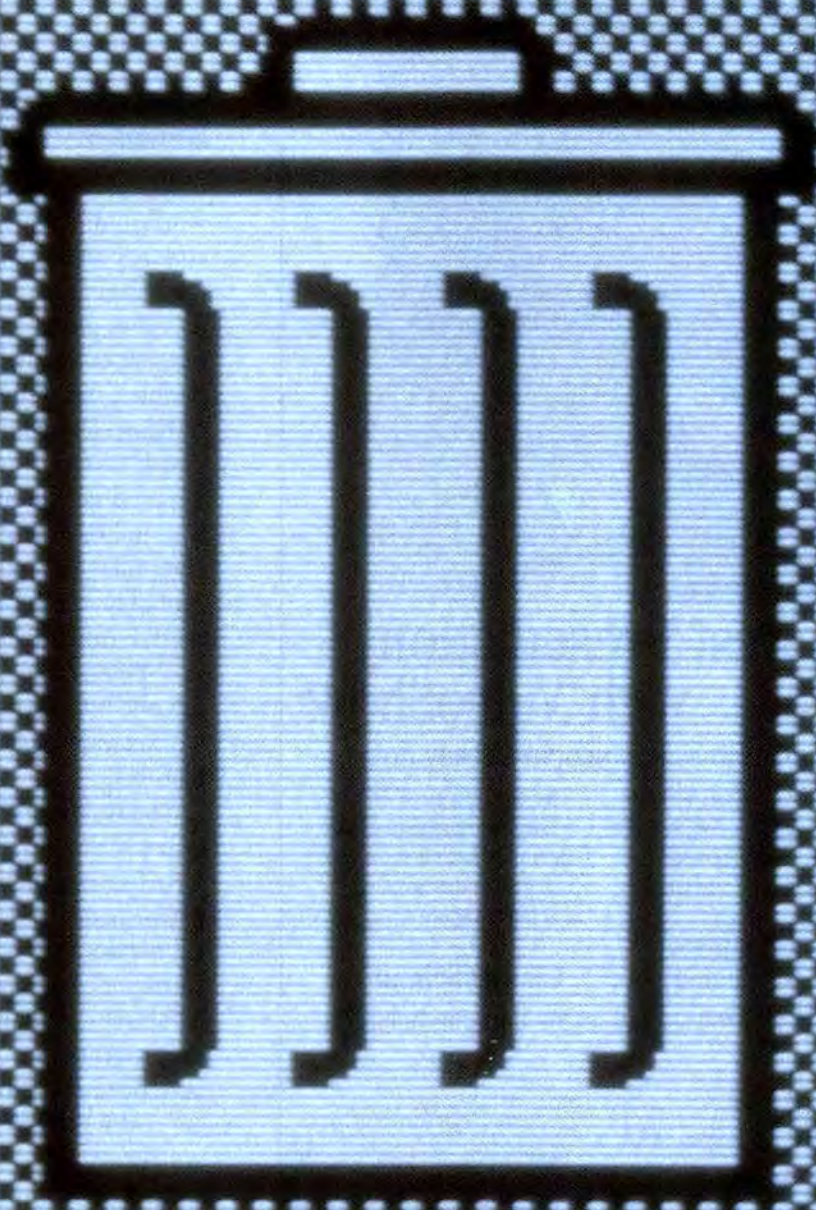
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terface, namely Xerox PARC's work in the sixties, but probably codeveloped by Sun (which already has part of the interface in its News windowing system) and another company. Like PC compatibles, the system will have a standard format so that any Sparcintosh user can stick his or her floppy disk into another machine. But, unlike any other personal computer, the Sparcintosh will probably also have high-speed network hardware built in and a very-high-resolution display, like the one usually packaged with workstations, as a standard feature.

The way that Sun Microsystems looks at things, the Sparcintosh is a perfect machine. It has a high-performance architecture with local networking built in so that software developers will get excited about it. It has a standardized graphic interface so that both experienced users and novices can get real work out of it. And it uses widely available parts that aren't controlled or protected by any single company, so you're not dependent on one company's ability or willingness to improve the basic technology.

I'll stick my neck out and say that Sun's environment will be the hottest one for software development two years from now. But I won't turn that prediction into a bet. And certainly not for an expensive dinner in San Francisco, which is what I owe George Morrow now. ●

Stewart Alsop is editor and publisher of P.C. Letter and a contributing editor for PC World.



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William F. Zachmann

IBM's product strategies have been driven by external market forces rather than its own technological goals. The result: No matter how hard it tries, IBM loses out.

On IBM: What's Important About SAA?

It is always tempting to try to look at IBM's personal computer strategy the way we might look at Compaq's, say, or Apple's. In fact, however, the matter is very different with IBM. For IBM, personal computers are only part of a much larger picture. For IBM, the strategic imperative is to maintain account control by linking personal computers to its high-profit mainframe systems. SAA (Systems Application Architecture) is a key element in that strategy.

SAA is likely to play a very important role in the way you and I use our IBM and compatible personal computers over the next few years. Even if we aren't the least bit interested in communicating with a midrange or mainframe IBM computer, it is unlikely that we will be able to steer clear of SAA.

By IBM's own description, "Systems Application Architecture is a collection of selected software interfaces, conventions, and protocols.... [It] will be the framework for development of consistent applications across the future offerings of the three major IBM

computing environments: System/370 (TSO/E under MVS/XA, and CMS under VM); System 3x; Personal Computer (Operating System/2)."

The proliferation of hardware architectures in IBM's product line is what defines the need for SAA. In part because of the 1969 antitrust suit filed against IBM by the U.S. Department of Justice and in part because of the economics of selling computers, IBM created a plethora of noncompatible architectures during the 1970s and the early 1980s.

Until the Reagan administration's version of the Justice Department dropped the antitrust suit against IBM a couple of years back, IBM faced the possibility of being forced to split into two or more companies. The 1969 suit claimed that IBM engaged in monopolistic, anticompetitive practices, and as a remedy it sought the breakup of IBM.

In the early 1970s IBM organized into a corporate structure

(continues)

designed to minimize the disruption that a breakup of the sort sought by the Justice Department would create. Separate divisions were formed to target the markets for mainframe systems in large businesses on the one hand, and for smaller systems in smaller businesses on the other.

vendor's system. No other vendor was as successful at this as IBM.

With the rise of the minicomputer in the early 1970s and the initial success of companies like Digital, Prime, Data General, and Hewlett-Packard, IBM began to feel some competitive price pressure. Relieving that pressure by

Unfortunately for IBM, just as this was happening, Digital Equipment Corporation managed to put its own product line in order around its VAX architecture and the VMS operating system. Unlike IBM, DEC was able to offer a consistent architectural strategy, which by now spans the distance from the desktop to mainframe-class systems. As a result, IBM has lost substantial ground to Digital over the past few years.

SAA is to a very large extent IBM's response to Digital's highly successful competitive efforts. By defining a set of standards to create common user, programming, and communications interfaces across the company's mainframe, midrange, and personal computer architectures, IBM hopes to solve the problem created by its inability to offer a common system architecture across systems of different sizes.

Unfortunately for IBM but fortunately for personal computer users, the form that SAA is taking makes it likely that even if IBM stems competitive losses to Digital, dozens of more aggressively priced microprocessor-based systems will find it easier to take even more business away from IBM. That's because to the extent that SAA makes it possible to write applications that are portable across IBM's systems, it will enable portability between both IBM and non-IBM systems.

Much of what is new with SAA achieves its first, and fullest, expression in OS/2. Together, the

(continues)

The spectacular success of the IBM Personal Computer added yet another basic system architecture to the mix.

IBM created separate divisions of the company, each with its own planning, research and development, manufacturing, and sales organizations, to service the two primary user groups: large and small businesses. Each in turn created its own collection of computer system architectures.

The IBM 360/370 architecture provided the backbone for the mainframe systems aimed at large national accounts. Quite different architectures defined the foundation for small business systems such as the IBM System/3 and, a few years later, the IBM Systems 32, 34, 36, and 38.

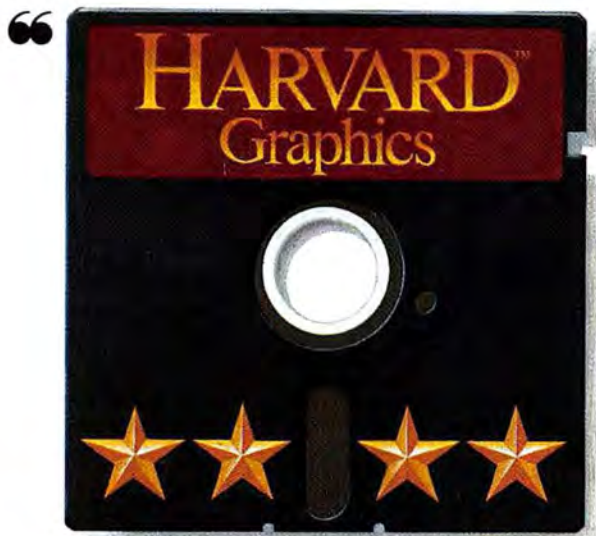
From the start, however, something other than a possible breakup of IBM was involved. With the proprietary architectures typical of computer systems from the early 1950s right up to the early 1980s, vendors were able to tie users' software investments to the unique architecture of a particular

dropping system prices, however, would have threatened to undermine IBM's traditionally high margins in mainframe systems.

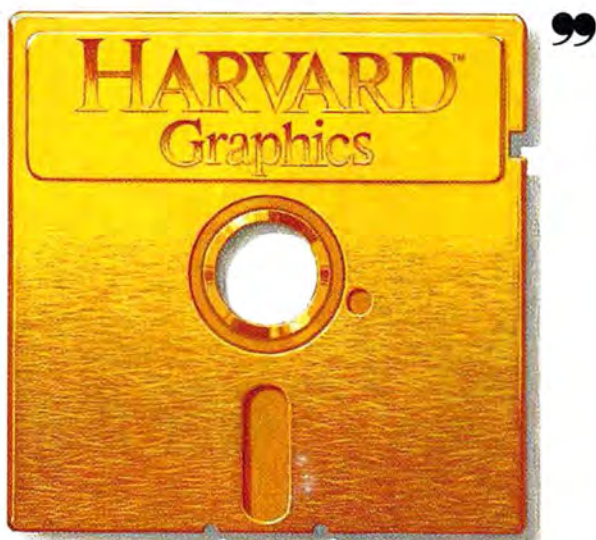
By creating additional, incompatible system architectures targeted at small businesses, IBM was able to offer more competitive systems without undercutting the sales of its own, more expensive mainframe systems.

However, with the rise of the personal computer in the 1980s (coincident with the Reagan administration's dropping the IBM antitrust suit), what had been an asset turned into a liability. No longer faced with the prospect of breaking up into several companies, IBM suddenly had to figure out how to unify several incompatible product lines.

At the same time, the spectacular success of the IBM Personal Computer added yet another basic system architecture to the mix, while dramatically heightening interest in finding ways to knit personal computers, midrange systems, and mainframes into unified, coherent systems.

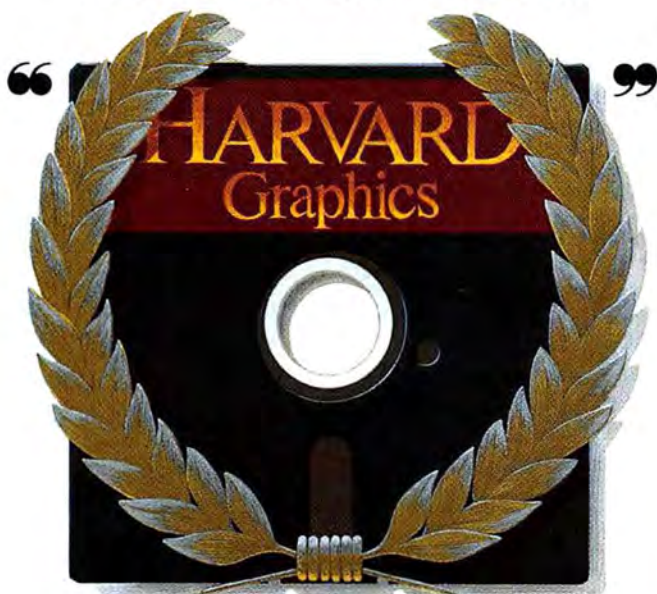


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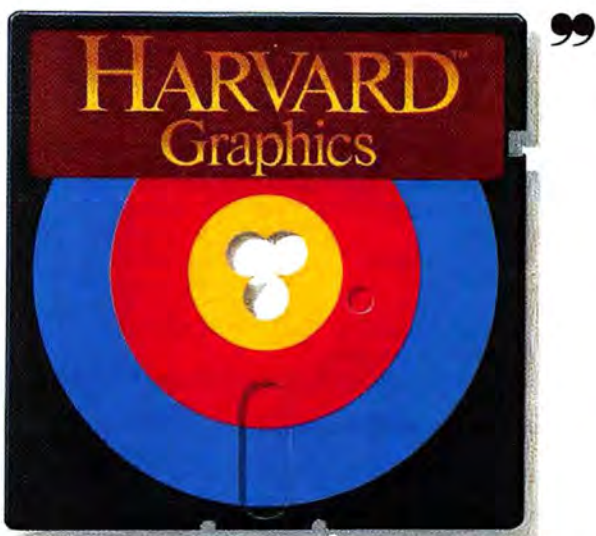


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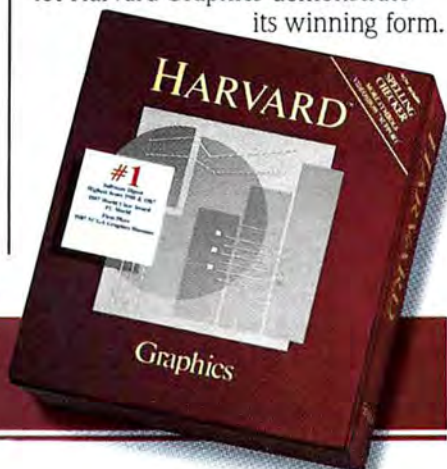
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William F. Zachmann is senior vice president at International Data Corporation.

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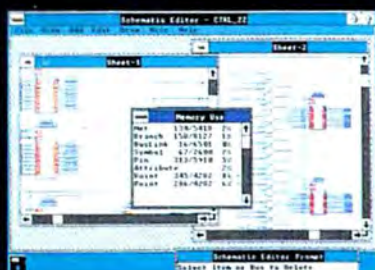
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Applications keep pouring



Engineering Capture System, CAD/CAM Application, The CAD/CAM Group.



Paradox, multi-user relational data base application, Ansa Software, A Borland Co.



Windows Mail, electronic mail application, DaVinci Systems.



The Network Courier, electronic mail application, Consumers Software, Inc.



PC Paintbrush, color design and graphics application, ZSoft Corporation.



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Windows Spell, spell checking application, Palantir Software.



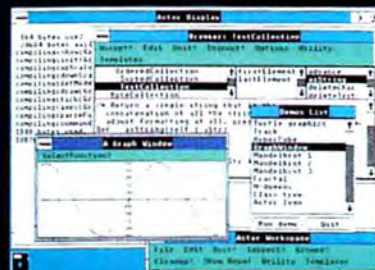
SnapShot, electronic photography application, Aldus Corporation.



Guide, hypertext application, OWL International, Inc.



In*a*Vision, intermediate CAD application, Micrografx, Inc.



Actor, programming language (4th-generation), The Whitewater Group, Inc.



Windows Filer, filing and reporting application, Palantir Software.



Windows inTalk, desktop communications application, Palantir Software.



ClickStart!, applications organizer application, hDC Computer Corporation.

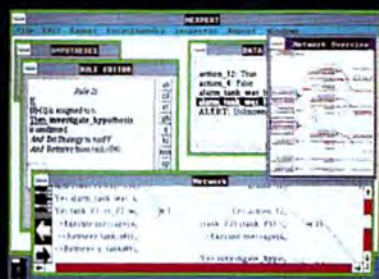


VIEW/PC, host data base access system application, DB/ACCESS, Inc.

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Nexpert Object, AI graphical expert, system application, Neuron Data.



Designer, CAD application, Micrografx, Inc.



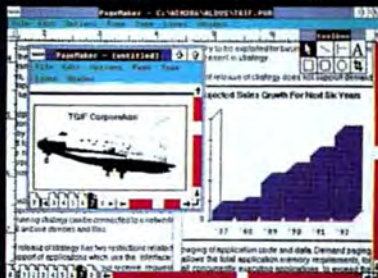
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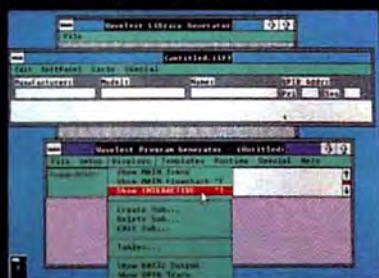
Windows DRAW, presentation graphics application, Micrografx, Inc.



Omnis QUARTZ, multi-user database application, Blyth Software, Inc.



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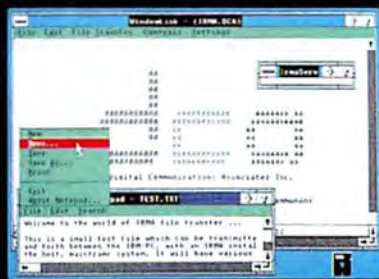
Wave Test, GPIB test program generator, Wavetek San Diego, Inc.



Microsoft Pageview, page preview/graphics integration for Microsoft Word.



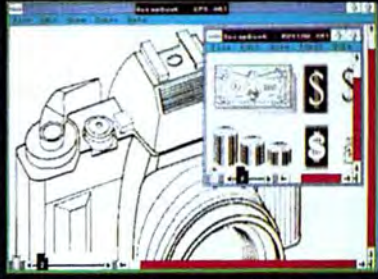
Opus One, database management application, Roykore Software, Inc.



Windowlink for IRMA, 3270 terminal emulation, DCA, Inc.



Windows GRAPH, business graphics/charting application, Micrografx, Inc.



Scrapbook, art images application, T/Maker Company.



Beacon, 4th-generation language, Micro Data Base Systems, Inc.



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FormBase, relational data base application, Columbia Software, Inc.

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Circle 271 on reader service card

Top of the News

Mike Hogan

MCA Compatibles Move a Step Closer

Chips and Technologies (C&T) and Adaptec have jointly announced products that improve the chances that computers compatible with IBM's Micro Channel Architecture will appear on the market this summer (see "A License to Clone" in this issue). C&T of San Jose, California, expects to ship samples of a five-chip core-logic chipset compatible with the PS/2's Micro Channel Architecture (MCA) by the end of March, with vol-

ume deliveries beginning in June. Also in June, Adaptec of Milpitas, California, is scheduled to begin quantity shipments of the first of three MCA-compatible disk controllers. The joint press conference—also attended by Phoenix Technologies of Norwood, Massachusetts, which unveiled a BIOS for the C&T chips—signals a strategic alliance between C&T and Adaptec. The two firms expect to gain from cooperative research and design. With Adaptec con-

trollers and VGA graphics chips, C&T can now offer hardware makers all the building blocks necessary for MCA-compatible designs. The leading supplier of core logic and other components for AT compatibles, C&T is being challenged by giant Western Digital of Irvine, California, which has developed comparable products entirely in-house and plans to ship its four-chip core-logic chipset in March.

Microsoft, Ashton-Tate Plan Data Base Server

In a surprise move, Ashton-Tate and Microsoft will collaborate on data base server software for OS/2 local area networks. Exploiting Structured Query Language (SQL) commands, the two firms' *SQL/Server* will support distributed data base applications that split tasks between a DOS or an OS/2 workstation and a powerful 80386-based server. Intended to support transaction processing and other high-end jobs, the package will ship in the second half of the year. Microsoft will market it to hardware man-

ufacturers, while Ashton-Tate will sell it at retail for between \$1500 and \$3000. Even though other data base suppliers will not be permitted to bundle the server software, they will be encouraged to develop front-end workstation packages, and Borland, Symantec, Information Builders, and Blyth already have signed on. When the next *dBASE* arrives, Ashton-Tate claims, both DOS and OS/2 versions will act as front-end software for *SQL/Server* and allow existing *dBASE* applications to access the

server without modification. The two firms also maintain that *SQL/Server* does not compete head-on with IBM's OS/2 Extended Edition, which includes data base functions that exploit SQL but does not incorporate a dedicated high-performance server. Network suppliers 3Com and Novell have both endorsed the *SQL/Server* concept but are withholding product plans. SQL technology will be provided by Sybase, which has been working on the project with Microsoft since 1986.

Lotus Updates Metro

In mid-March, Lotus will deliver *Metro 1.1*, a mostly technical update of the desktop accessory product that first shipped in January 1987. *Metro 1.1* will include an improved memory-swapping kernel, enhanced support for 101-key keyboards, and formatting of 3½-inch disks by the file manager accessory. The new memory

kernel will require only 64K of memory instead of 120K. *Metro's* 12 accessories can be kept in a 650K RAM disk located in extended or expanded memory or on disk. Research indicated that avoiding RAM-cram was users' highest priority, says *Metro* product manager Chris Noble. The upgrade also features compatibility with VGA display

drivers. Users of the *Lotus Express* electronic mail package who buy the new *Metro* will find their *Express* kernel automatically swapped for the revamped one during installation. *Metro* continues to sell for \$85. *Express*, which will eventually have its kernel updated, sells for \$150.

Borland and Microsoft Claim Successful Spreadsheets

Both Borland International and Microsoft are proclaiming victory in early efforts to break *1-2-3*'s stranglehold on the spreadsheet market. At *Quattro*'s November 15 launch, Borland board member Ben Rosen set a goal of 50,000 sales within the first six months and a 12 percent market share in the first year. Buoyed by a multimillion-dollar promotion campaign, the \$195 product sold 70,000 copies in the

first month, not counting promotional copies. Senior Marketing Manager Neil Snyder thinks that Borland can surpass the market-share goal as well. *Quattro*'s push benefited from a variety of free evaluation copies, sales incentive contests, and print and direct-mail advertising. Pete Higgins, Microsoft's group product marketing manager, will not provide numbers but says that his firm's *Excel* also met its six-month

sales goal one month after its November ship date. In its largest product rollout ever, says Higgins, Microsoft is spending "significantly more than \$1 million" on advertising, dealer rebates, and various end-user promotions, including 20,000 copies of a free *Excel* videotape. Both Borland and Microsoft are pushing hard to gain market share before the third quarter, when Lotus is expected to unleash *1-2-3* release 3.0.

Slow Road to HAL

Sales of *HAL*, a *1-2-3* add-in that offers English-language commands, have dropped steadily over the past year to approximately one-tenth of what they were at product launch. Developed by GNP Development partners Bill and Larry Gross, and sold to Lotus, *HAL* got off to a fast start following its release in fall 1986. It brought GNP shareholders royalty payments of \$366,224.85

for the first 45 days. However, royalties for July, August, and September 1987 amounted to only \$70,312.56, indicating that daily sales had dropped to a little more than 9 percent of what they were upon product release. In a letter to fellow shareholders, Larry Gross described recent sales as "minuscule, with returns actually exceeding sales during August." Gross will not

comment further. Similarly, Lotus will not discuss *HAL* sales or speculation that it is considering merging *HAL* into the next release of *1-2-3*. Lotus has been bundling the \$150 add-in with the \$495 *1-2-3* at a discount since June. Some stores sell the package for as little as \$370. "We are fairly comfortable with *HAL* sales," maintains product manager Kathy Rolan.

Graphics Accelerate With VRAM

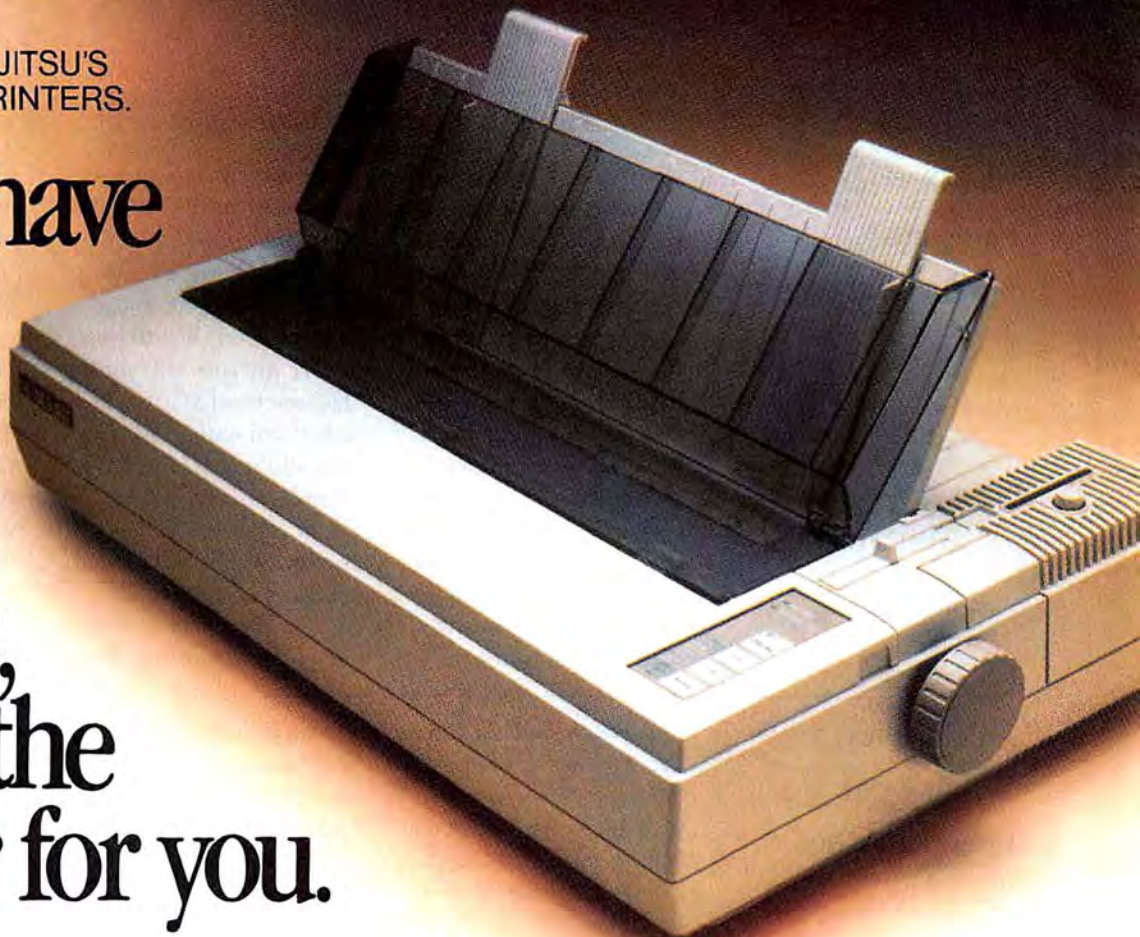
As prices for video random-access memory (VRAM) fall, graphics adapter suppliers are substituting VRAM for dynamic RAM (DRAM) and creating faster graphics boards. Video-7, for example, has developed a VGA-compatible graphics chip that, in combination with VRAM, will enable an adapter to process graphics two to ten times faster than existing products do. Video-7's V7VGA chip will appear in a competitively priced graphics board within months, says a Video-7 spokesperson. That board, which should sell for

around \$600, will achieve color capabilities equal to those of current VGA-compatible boards but give greater color selection at resolutions above 640 by 480 pixels. The V7VGA chip with 256K worth of VRAM yields 16 colors at 800 by 600 and 4 colors at 1024 by 768. Adding another 256K of VRAM yields 256 colors at 640 by 480 or 720 by 540, and 16 colors at 1024 by 768. Video-7 claims its upcoming board will process graphics 10 times faster than IBM's Graphics Display Adapter

and 2½ times faster than Video-7's current \$499 two-chip Vega VGA board. Similarly, Orchid Technologies of Fremont, California, is preparing VRAM-enhanced designs, and Enertronics of St. Louis is offering board makers a development package using VRAM with the Texas Instruments 34010 graphics processor. VRAM runs faster than the more common DRAM because it has two gateways rather than one for communicating with the system processor or graphics coprocessor, speeding writes to the screen.

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WordPerfect Launches Product Blitz

WordPerfect Corporation, which has just shipped version 5.0 of its market-leading word processor, *WordPerfect*, is introducing a network product called *WordPerfect Office* for release in late March. *WordPerfect Office* will provide network users with electronic mail, a calendar, and common scheduling facilities. This office automation product has been running on Data General hardware for a year. The software

firm now will introduce versions both for IBM PCs and compatibles and for DEC VAXs, providing an environment across incompatible hardware. *WordPerfect Office* will cost \$495 for the file server and \$150 for each additional station. *WordPerfect* also is upgrading *PlanPerfect*, with version 3.1 due at the end of April. Version 3.1 will have expanded graphics capabilities, including the ability to write graphs in a *WordPerfect 5.0*

format so they can be imported directly into documents. The package will support a wider range of printers, print sideways, and convert 1-2-3 macros into *PlanPerfect* format. Additionally, the vendor is updating the *WordPerfect Library* utilities to support *WordPerfect 5.0*. The calendar will now show more weeks at a time, and the to-do list will appear on the screen displaying the calendar and appointment book.

HP Teaches Windows an Object Lesson

Hewlett-Packard has introduced a superset of the *Microsoft Windows* programming environment that helps to integrate PC applications and make them easier to use. HP's *NewWave* provides *Windows 2.0* application developers with two extra data management functions. The first is an object-management facility that lets the user designate any piece of information as an object represented by an icon. An object may be a spreadsheet cell, a word processing file, a graphic or

scanned image, or an entire data base. Icons are stored in a Macintosh-like file drawer and can be joined into compound documents with a few clicks of the mouse or with keyboard commands. The second facility is a macro recording capability with which users can easily automate a sequence of commands across different applications. Programs written to *NewWave's* application program interface will use its common object-oriented macros and simplify file manipula-

tions. Unlike with *Windows'* dynamic-data-exchange facility, applications need not be running for their data files to be linked. HP has released an \$895 developer's tool kit and plans to ship the environment with its own *NewWave* applications in the second half of the year. One package, developed by Forum Systems of Santa Barbara, California, will manipulate *NewWave* icons to represent, store, and forward digitized voice messages in an integrated voice/data system.

Emerald Bay Will Appear in March

Emerald Bay, the 32-bit data base engine being written by *dBASE* author Wayne Ratliff, will finally appear at the end of March. Originally scheduled for release last October, *Emerald Bay* has been delayed due to development snafus and a trade-secret-theft lawsuit filed by Ashton-Tate. Developed by Los Angeles's Ratliff Software Productions and marketed by Migrant of Incline Village,

Nevada, the product will tie to two "surfaces," or application programs. The first is a data base, code-named *Eagle*, that offers *dBASE* functionality and a similar interface but is not *dBASE*-file compatible. The second surface, code-named *Acorn*, will be a relational data base add-in to 1-2-3. *Emerald Bay* is an advanced data processing engine with a small (120K) memory-resident kernel whose power

can be tapped by applications that need not be resident in main memory but can be more closely integrated through using the engine. Customers buying a surface get the engine, the data import/export program, and a data base administrator with which to assign password levels, encrypt data, and customize data structure. Prices had not been set at press time. ●

Case History #60102

"With the addition of PC EXPO in Chicago, NETWORLD, MMA Meeting & Show, National FinCom and National CASEcon, our data processing needs simply outgrew our existing system," said Steve Ianuzzi, Controller for H.A. Bruno Inc., the trade exposition management company. "We decided to look right in our own backyard at last year's PC EXPO in New York, and we found that DataFlex provided everything we needed to turn our multi-user system into a powerful database machine."

DataFlex lets us control the data instead of it controlling us.

"When we were producing only one show, our database needs were simple: a list of prospect names which could be flagged for invoicing as they registered," explained Ianuzzi, "but with several big shows a year, that system quickly became over-

whelmed. We needed software that would let us control the data instead of it controlling us. One company might be exhibiting in all our shows ...another in just two. Our accounting system had to be much more sophisticated than simply a list of prospects. Company profiles, listings for multiple shows and all sorts of details were needed in a form that could interface with our accounting system. We found that DataFlex would answer all of our database management needs."

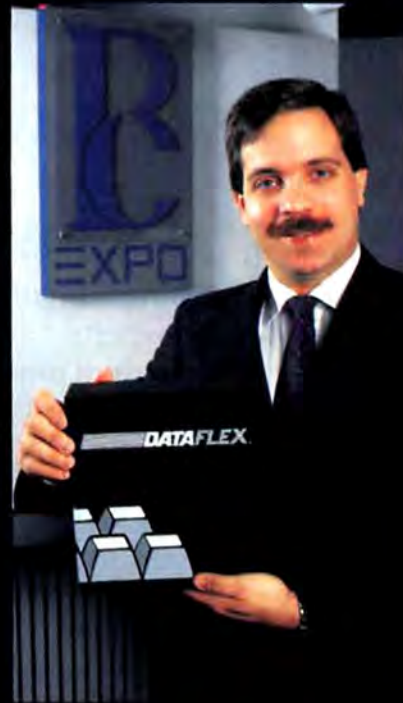
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outside firm to inhouse," said Ianuzzi. "Now, what's behind the scenes at our high tech trade shows will be as sophisticated at what's in the booths!"

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Industry Outlook

Edited by Eric Bender

THE HAYES HIGH-END GAMBLE

Hayes Microcomputer Products is the last company you'd expect to stake its fortunes on a roll of the dice. But its new line of V-series modems represents the communications giant's biggest gamble to date.

As usual, Hayes is under attack on all sides. On the low-cost flank, the Norcross, Georgia, firm risks losing an enormous market to cut-rate-clone vendors as it concentrates on new high-speed modems (see "Thoroughly Modern Modems" in this issue). At the high end, the V-series arrived late to the party, after archrival Microcom had already established the Microcom Networking Protocol (MNP) as the leading high-end asynchronous standard.

Hayes's own error-control protocol is compatible with nothing but the future: The company is betting on the promise of Integrated Services Digital Network (ISDN), which handles simultaneous voice, data, and image transmissions. "Within two years the facilities will be in place for ISDN to happen—much faster than anyone believes," predicts company president Dennis Hayes. The firm currently offers a board to connect PCs to the experimental ISDNs now appearing around the country. And the V-series error-checking



Dennis Hayes: betting on future ISDN networks

protocol, called Link Access Procedure Balanced (LAPB), is very similar to ISDN's emerging LAPD protocol.

Both Hayes and Microcom are asking the CCITT (Comité Consultatif International Téléphonique et Télégraphique) to endorse their respective protocols. But a final decision may not occur until 1991, and other contenders may join the battle in the interim.

Meanwhile, on their home turf, the two rivals are watching the entry of mainframe-style modems that adhere to the CCITT's V.32 standard. Prices have dropped sharply in the last year, with Universal Data Systems' synchronous 9600-bps device listed at \$1600 and Hayes's half-duplex V-series going for \$1299.

The technology required for V.32 devices to run at full-duplex over dial-up lines remains expensive, but users may be swayed by the high throughput and the CCITT's blessing.

"V.32 modems are an important piece of technology," admits Dennis Hayes, "but they're probably always going to be more costly to produce. I think they'll coexist with the V-series."

Back at the low end, Hayes has slashed pricing on its original Smartmodems to stave off competition from low-cost compatibles. But most of these no-name modems still sell for a third the price of the

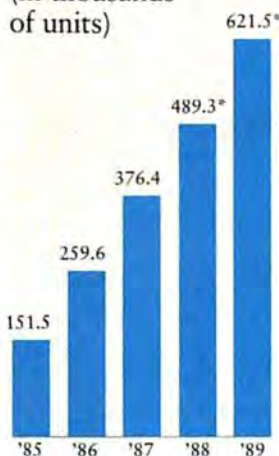
Smartmodems, a deal buyers find hard to resist.

Nevertheless, Hayes insists that modems aren't commodities. "A commodity is something that's the same no matter where you buy it. If you get South African gold or Russian gold, it's still gold. That's not true of modems today," Hayes claims that many low-cost modems are not truly Hayes compatible and that many others are unreliable.

Employing more than 600, Hayes dwarfs most competitors and controls

(continued)

Laptop Computer Sales
(in thousands of units)



* Projected figures

Source: International Data Corp.

LAPTOPS ON THE MOVE

As IBM found out with its PC Convertible, the laptop computer market can be tough to crack. But the last two years have been good to laptop vendors, with 376,400 units sold in 1987, an increase of 45 percent over the previous year.

New Supertwist, gas plasma, and backlit displays are putting laptop readability on a par with desktop monitors. Other explanations for

(continued on page 84)

THE HAYES HIGH-END GAMBLE

(continued)

the major distribution outlets; it can wait for fly-by-night clone-makers to price each other out of existence. The Hayes nameplate still attracts most corporate customers. Furthermore, Hayes controls the AT command set with which all modems must comply, a command set that was further embellished with the V-series. "It's going to take [competitors] a while to develop V-series clones," warns Hayes.

Last year Hayes also upgraded its best-selling

Smartcom communications package. *Smartcom III's* SCOPE programming language allows people to develop extended applications, and Dennis Hayes says he'd "rather stay focused on keeping *Smartcom III* as powerful and flexible as possible than come out with seven different packages."

Hayes will further hedge its ISDN bet by adding a V-series option to support multiple sessions on X.25 phone networks, which are growing quickly. And Hayes is looking into other opportunities, such as facsimile transmission, with its traditional doggedness. Says the founder, "We're not always the first people to do something, but if we do something, it's very carefully thought out." —Eric Brown

CONGLOMERATE PURCHASES DAC

The company that wrote the book on inexpensive small-business accounting software has become an asset of a very large conglomerate.

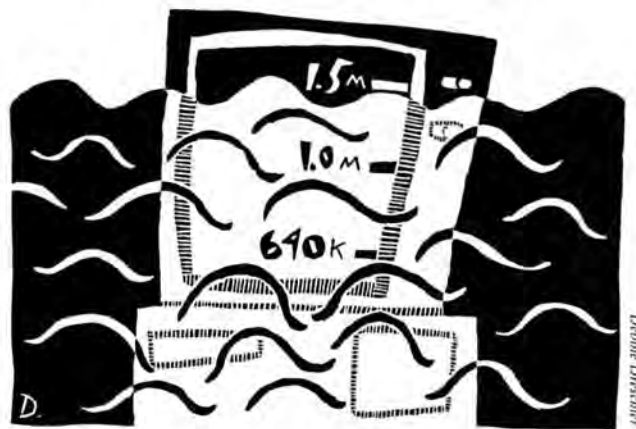
Dac Software, publisher of the popular *Dac-Easy Accounting*, has been acquired by Insilco Corporation, a Fortune 500 conglomerate that owns companies as diverse as Rolodex and Sinclair Paint.

Insilco owns no other computer firms, nor is it looking for any, adds Dac president and cofounder Kevin Howe, who will continue in his present role.

Howe sought to sell when his five Dac partners decided to pursue other interests. Dac chairman and *Dac-Easy* author Jose Hurtado will continue in a consulting capacity. Randolph Marston, president of Insilco subsidiary Taylor Publishing, becomes Dac's chairman.

Dac, which has thus far been financed out of receipts, expects to record \$12 million in sales this year. Howe anticipates support for R&D from Insilco, which has approximately \$870 million in annual revenues. —Mike Hogan

BANKS FOR THE MEMORY



Relentlessly searching for computer power over the past year or two, many users have resorted to the Lotus/Intel/Microsoft Expanded Memory Specification and similar schemes to circumvent DOS's direct-address limit of 640K. Fortunately, those who want to pioneer with OS/2 as well and who now require at least 1.5MB of memory are not forced to scrap their existing memory investment.

Whether you have the exotic static RAM of Compaq's Deskpro 386 or regular dynamic RAM, OS/2 can use it. "It doesn't have to be anything special," states Mark Butler, Quadram's marketing manager for board products. "The amount of RAM is critical, but as far as type, it doesn't matter."

What may be more surprising for customers now upgrading is that memory prices have held steady in the last year. Depending on features, memory boards cost about 65 to 75 cents per kilobyte. Memory chips

themselves stayed constant at \$10 for a 64K set and about \$30 for a 256K set.

The handful of customers who added more than 2MB of third-party memory to their PS/2s were in for another surprise. "The initial shipments of OS/2 went out, and people found problems in memory and video displays," explains Michael Goulde, a senior analyst with The Yankee Group.

While the market for PS/2 memory cards is still unfolding, International Data Corporation vice president Aaron Goldberg notes that PS/2 add-in cards are slightly more expensive than those made for the PC bus. List prices carry about a 10 percent premium.

Overall, Quadram's Butler says, this year looks promising. "We see memory cards getting a good swift kick," Butler says. "I think the people who are going with OS/2 are going with it fast." —Daniel J. Rosenbaum

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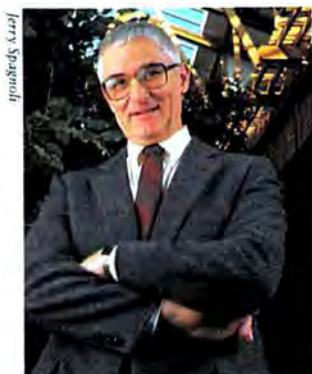
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Units							
Part Number	Description	Unit	Qty	Price	Total	Unit	Price
10001	Frame	1	1	100.00	100.00	1	100.00
10002	Fork	1	1	100.00	100.00	1	100.00
10003	Seat	1	1	100.00	100.00	1	100.00
10004	Handlebar	1	1	100.00	100.00	1	100.00
10005	Stem	1	1	100.00	100.00	1	100.00
10006	Headset	1	1	100.00	100.00	1	100.00
10007	Spacers	1	1	100.00	100.00	1	100.00
10008	Seatpost	1	1	100.00	100.00	1	100.00
10009	Seat	1	1	100.00	100.00	1	100.00
10010	Seat	1	1	100.00	100.00	1	100.00
10011	Seat	1	1	100.00	100.00	1	100.00
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10087	Seat	1	1	100.00	100.00	1	100.00
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10091	Seat	1	1	100.00	100.00	1	100.00
10092	Seat	1	1	100.00	100.00	1	100.00
10093	Seat	1	1	100.00	100.00	1	100.00
10094	Seat	1	1	100.00	100.00	1	100.00
10095	Seat	1	1	100.00	100.00	1	100.00
10096	Seat	1	1	100.00	100.00	1	100.00
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10100	Seat	1	1	100.00	100.00	1	100.00
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10159	Seat	1	1	100.00	100.00	1	100.00
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10167	Seat	1	1	100.00	100.00	1	100.00
10168	Seat	1	1	100.00	100.00	1	100.00
10169	Seat	1	1	100.00	100.00	1	100.00
10170	Seat	1	1	100.00	100.00	1	100.00
10171	Seat	1	1	100.00	100.00	1	100.00
10172	Seat	1	1	100.00	100.00	1	100.00
10173	Seat	1	1	100.00	100.00		

THE FORMAT OF FUTURE FLOPPIES

If you find yourself caught in the cross fire between the four common but incompatible PC floppy disk formats, try to relax, because it will get worse before it gets better.

Leading system suppliers are pushing two densities in each of two form factors (360K and 1.2MB for 5¼ inch, 720K and 1.44MB for 3½ inch). Fortunately, software vendors are starting to solve part of the problem by offering their wares in all flavors. Comments Jim Porter, president of Disk/Trend, a Mountain View, California, market research group, "That's just something that the software firms will have to live with."

Porter expects that resellers eventually will sell software the way hardware stores sell paint—the cus-



Jim Porter: Incompatible formats won't go away.

tomers will pick the format, and then the store personnel will mix up a batch. While salespeople aren't too happy about the prospect of formatting each disk, there's no insoluble technical problem and, Porter maintains, no real alternative.

Disk/Trend's 1987 *Report on Floppy Disk Drives*—which covers worldwide

shipment of floppy disk drives, more than 75 percent of which end up in PCs—shows that the incompatible formats won't go away.

Among 5¼-inch drives, the report shows shipments of 360K models dropping from 8.5 million last year to 7 million in 1988 and 5.2 million in 1989. Deliveries of 1.2MB models are climbing from 5.1 million last year to an estimated 5.8 million this year and are expected to peak at 6.1 million next year. Figures for double-sided microfloppies (which include both 720K and 1.44MB) show the greatest increase: from 9.9 million last year to a projected 12.9 million this year and 16.2 million in 1989.

To further complicate life, Porter predicts, this year

vendors will announce microfloppies that store 16MB and more. He says they will offer a lot of advantages compared to tape cartridge drives, their early competition. From a vendor's point of view, high-density floppies bypass software problems and minimize hardware requirements. They should cost about the same as a tape drive but be easier and faster to use.

Of course, just because the very-high-density drives will be available to manufacturers doesn't mean that they'll be incorporated in mainstream PCs anytime soon. And there's no standard in sight; that probably would require a move by IBM, Apple, or Compaq, Porter suggests. —Eric Bender

UPDATE: THE SYSTEM SOFTWARE SAGA

For years PC software developers clamored for more memory and the ability to run multiple applications together and ignored graphics interfaces like *Microsoft Windows*. Now that IBM and Microsoft are offering an initial release of OS/2 that supports the first two features but omits the last, developers are storming ahead, right?

No. Most authors are waiting for OS/2 version 1.1

in order to get the Presentation Manager, and they see the first OS/2 release as just an interim measure.

The first OS/2 applications will include notable members—1-2-3 release 3, *Paradox*, and the next *dBASE* among them—but they'll represent a rather thin crop until late this year. Then OS/2 packages will begin to branch off in earnest, with rich new functions offered in product families from the major vendors.

In time, predicts Jeffrey Tarter, publisher of *Soft-*

Letter in Cambridge, Massachusetts, "you will see DOS and OS/2 versions sold side by side, with OS/2 as the supercharged version." It's not yet clear how pricing will evolve. In any case, not everyone will buy. As Tarter points out, "OS/2 is an incredibly expensive way to get a little more memory," if that's all you need.

Customers don't need more support headaches, emphasizes Mort Rosenthal,

chairman of Corporate Software, a reseller in Westwood, Massachusetts.

"There's a whole slew of new problems raised by OS/2. People are scared; they want to minimize their support burden. For many, 3½-inch disks have been a disaster, and those are software compatible. OS/2 isn't."

Industry rumors raise other worries. Some, like hints that IBM and Microsoft are creating different Presentation Managers,

(continued)

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LAPTOPS ON THE MOVE

(continued)

the sudden growth in sales include lower prices, more software on 3½-inch disks, and the appearance of inexpensive third-party peripherals.

And there's no longer a lack of storage options, once another obstacle to laptop sales. The first laptops with built-in hard disks practically demanded a wall outlet, but low-power drives now let you take a complete system on the road.

Originally, laptop vendors targeted only mobile customers, like salespeople. While such vertical markets are far from saturated, the real growth is in horizontal applications. Businesspeople are beginning to buy laptops as their second computer for home use or for toting to meetings. In fact, today some customers buy laptops as their only PC.

"The price of laptops keeps coming down, and it's hit a threshold where they're a reasonable buy," says Peter Teige, a Dataquest industry analyst. "However, a portable machine will always demand a higher price because of the more exotic components."

Currently you can get a laptop with a readable Supertwist display, 640K of memory, and two floppy drives for about \$1500 to \$1700. But adding a hard

disk, a faster clock rate, and a gas plasma display generally pushes the price well over \$3000.

Along with affordability comes a trend toward generic tasks, says Peg Conway, Zenith's product marketing manager for portable computing. "People have begun to realize the convenience of portability," she notes. "A lot of people see a portable as an ambidextrous tool, for both the office and the road."

A few obstacles persist. The first is the lack of a standard bus for expansion slots, which limits the use of third-party boards. And battery technology still lags. The goal is a battery-powered laptop that will run all day without recharging. While that's possible on some stripped-down models, if you add a hard disk, a modem, and a backlit display, you're limited to a few hours of work at best.

This year, Zenith is expected to release an 80286 laptop with an LCD that rivals gas plasma but draws a fraction of the power. At the same time, hard disk developments could make current technology obsolete. "By the early nineties," predicts Teige, "you'll see 3½-inch floppies that will hold 20MB. That will save a lot of energy."

Now that a low-power-draw CMOS version of the 80286 is available, 80286-based laptops are becoming commonplace, and even a few 80386 models are appearing.

The next breakthrough will come in color. Current flat-panel color displays are too small to be easily read, and they have difficulty displaying colors other than blue and green. But these wrinkles will be ironed out in the next year and a half, says Teige.

Zenith, Toshiba, and Grid currently lead the pack of laptop vendors. Zenith continues to mop up the high-volume government contracts. Grid pushes technology with its high-priced

"prestige" laptops. Toshiba has overcome the threat of trade sanctions to entice general-interest users.

Among other major players, NEC and several additional Japanese suppliers may soon take a larger share. Not only has the PC Convertible found a few niches, last fall IBM unveiled a Toshiba-like prototype in Tokyo. And at some point, Compaq will decide that you no longer need a 20-pound lunch box to get high performance.

—Eric Brown

UPDATE: THE SYSTEM SOFTWARE SAGA

(continued)

seem unfounded. Others concern drawbacks that have been acknowledged since the software debuted—like those of the "compatibility box," which will offer significantly less than 640K of memory for DOS applications.

Additionally, the box just won't run DOS communications packages, and vendors aren't falling over themselves to offer OS/2 equivalents. "Right now, we don't see the demand," comments Jerry Metcoff, vice president for development at VM Personal Computing in Danbury, Connecticut. Hayes, DCA Crosstalk Communications, and other players agree that such software may not begin to appear until the second half of 1988.

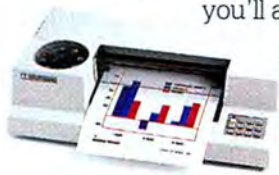
On the hardware front, vendors are falling in line behind IBM. Zenith was the first, shipping its own OS/2 in late December. Other major suppliers are expected to follow throughout the first quarter. But it may be a long, long time before many smaller manufacturers follow suit—if they ever do.

—Eric Bender

Eric Brown is a PC World contributing editor, Mike Hogan is PC World's news editor, and Daniel J. Rosenbaum writes about computers and communications.

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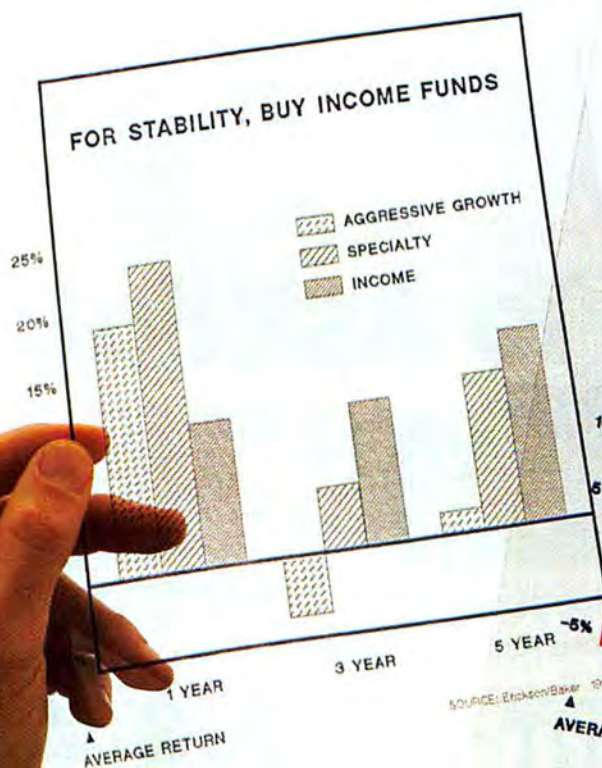
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*News
you can use
about recent
PC product
announcements
and upcoming
releases*

Mike Hogan

Managing Miscellany

Until recently, if you needed to store and retrieve large amounts of information flexibly, you were left in the hands of a relational data base manager. That's fine for keeping records of the company's transactions, but what about the reams of personal business data you plow through daily? That data doesn't come in neat little records, each one like the next.

The answer lies in a personal information manager like Valor Software's *Info-XL*, which is designed to bring you the relational power of a data base without putting heavy-handed strictures on your electronic freedom of movement. *Info-XL* lets you capture those bits and pieces of random, but important, information—notes, memos, letters, appointment schedules, names and addresses—in free-form fashion and painlessly provide structure later.

Info-XL gets personal with a set of six on-screen windows, yours to use and combine as you choose. The main window is a powerful outliner and thought processor. A comments window

accepts up to 10 pages of free-form text per item, while a records window accepts records of up to 10K in a more traditional data-field form.

You can add dynamic links to your data at any time using the main window outline or *Info-XL's* search window. This window lets you search for text strings and then create relationships among them by tagging—even if the strings are in dissimilar files. So when you call up data on a project, you can see everything related to it, including notes, schedules, and the names of the people involved.

Info-XL also incorporates daily and monthly time-management windows, which let you tag and arrange information by date and time. As you scroll through the monthly calendar window to see the big picture, the daily schedule shows you appointment details for a given day.

Additionally, you can get a head start on data entry with information already on file. The program

will import and export data in ASCII and *WordStar* formats, and can export in the *dBASE* ASCII-delimited format. *Info-XL* retails for \$265 and requires 384K of RAM and DOS 2.00 or a later version. Valor Software Corp., 1700 Don Ave., San Jose, CA 95124; 408/978-3044.

High, Wide, and Handsome

While PCs keep getting stronger and more silent, they still tend to arrive with a noisy sidekick. But Canon now presents a quiet and relatively inexpensive alternative to the clackety-clack of traditional dot matrix and daisy wheel printers. The **Canon Bubble-Jet BJ-130** is a new variation on the ink jet theme, combining high throughput, wide-carriage printing, and laser quality output with quiet 45db operation.

Thanks to printhead innovations, the BJ-130 can handle all of your printing chores—high-speed drafts, letter quality text, graphics, and 136-column spreadsheets

—at dot matrix rather than laser printer prices.

The Bubble-Jet's built-in printhead is similar to that popularized by Hewlett-Packard's ThinkJet. But instead of a replaceable printhead/inkwell cartridge, Canon uses a long-lasting ceramic printhead with 48 nozzles for high resolution. The ceramic construction and other design features make the printhead strongly resistant to clogging and crusting. A proprietary fast-dry ink formulation eliminates the need for special paper stock and facilitates higher-resolution printing.

As a result, you get letter quality text at speeds of up to 110 cps and graphics resolutions of up to 360 dpi, and for drafts and spreadsheets you can switch into 220-cps overdrive. The BJ-130 has a built-in automatic sheet feeder for standard cut sheets or envelopes, and an optional tractor assembly for fanfold paper up to 15 inches wide.

The printhead is designed to print 100 million to 200 million characters (about 50,000 to 100,000 pages) before a failure, depending on print speed. The ink cartridge, which is about the size of a pack of cigarettes, installs in a few seconds through a front panel that automatically opens it and starts ink flowing.

With IBM Proprinter XL emulation and a parallel interface, the BJ-130 sells for \$995, as much as \$400 less than similarly accoutred

Info-XL's windowed interface lets you enter random comments and store them in a relational data base.



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Circle 260 on reader service card

Achieve letter quality text at 110 cps, high-speed drafts at 220 cps, and 360-dpi graphics with the Canon Bubble-Jet.



thermal-transfer printers offering comparable resolution at a slower speed. Seven variations of Courier font are resident, with proportional spacing. Gothic, Gothic Outline, and Orator font cards are optional, as are a serial interface and a tractor feed. Canon USA, One Canon Plaza, Lake Success, NY 11042; 516/488-6700.

Ex Post Facto PostScript

Not all laser printers are created equal, but most can easily be brought up to par. If you want to upgrade your low-priced model to a desktop publishing system or buy an inexpensive model today and upgrade later, Personal Computer Products, Inc. (PCPI), has a solution.

PCPI's **ImageCard** printer controller card brings PostScript-compatible text and graphics to most popular laser printers via ImageScript, PCPI's emulation of the PostScript page description language. It produces 6 to 15 pages per minute.

ImageCard fits into a single 8-bit slot, if an end slot is available. It will shake hands with any laser engine but insists on doing so through an external video interface such as that found on Canon and Ricoh printers and the Hewlett-Packard LaserJet Series II. (HP's LaserJet Plus, however, lacks such an interface.)

ImageCard is equipped for full- and partial-page bit mapping and all of the popular PostScript desktop publishing functions like creating and scaling fonts and rotating text and graphics. Its configuration software lets you specify various printer parameters, graphics, and font choices easily, using pop-up menus. Also on board are emulations of the full HP LaserJet series, the IBM Proprinter, the Epson FX/80, and the Diablo 630.

Since all emulations reside within the controller, ImageCard makes minimal demands on your computer's CPU. It comes with its own 10-MHz Motorola 68000

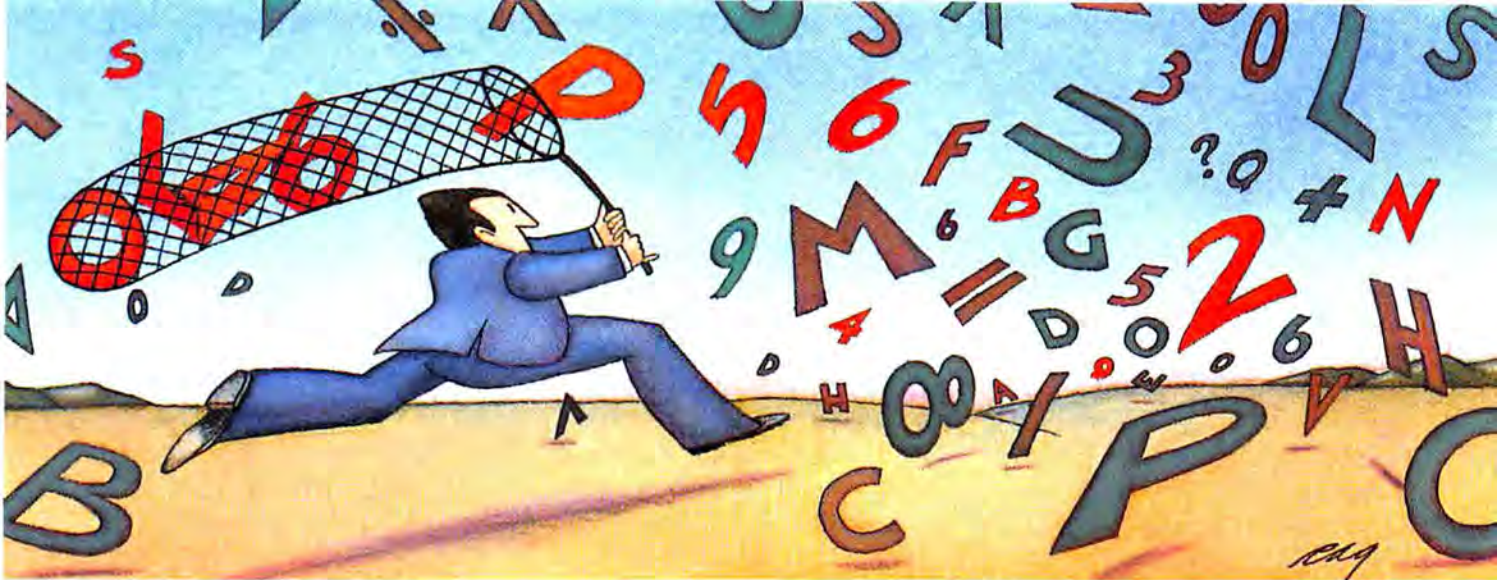
processor and 1.5MB of main memory, expandable to 2.5MB on the board.

ImageCard is bundled with Centronics parallel and two types of serial interfaces and sells for \$2495. Owners of a PCPI Laser-Image printer outfitted with the usual 1.5MB of memory also can get ImageScript on a plug-in printer card, which comes with a 68020 processor and 512K of memory for \$1795. Or, after upgrading your printer memory to 2MB, you can add the page description language with a \$1495 ROM cartridge. Personal Computer Products, Inc., 11590 W. Bernardo Ct. #100, San Diego, CA 92127; 800/225-4098, 800/262-0522 California.

True to Form

American business runs on forms, and filling them in occupies much of the clerical workday. Form-Worx Corporation has devised a way to automate this boring but necessary task, letting you design PC templates for the myriad of government, medical, and insurance forms now plaguing someone at your company.

No more correction fluid, smudgy erasures, or sudden disappearances of hard-to-replace documents—**Fill & File** lets you paint identical templates of others' forms on screen in what-you-see-is-what-you-get fashion. You can even make your own contribution to the paper blizzard, custom-designing sales logs, invoices, and expense reports from the program's predesigned samples.



Disk Optimizer™. The original un-fragment software now has un-format. Un-believable!

It's still the safest, most effective way to put the zip back in hard disk performance.

For more than two years now, Disk Optimizer has helped PC users everywhere safely restore and maintain the smooth, slick, fast performance of their hard disks.

And now there's a new and improved Disk Optimizer that un-fragments files even more effectively. And includes enough additional disk management tools to make it one of the best software values anywhere.

So, who needs Disk Optimizer, anyway?

Simply everyone who owns a hard disk and relies on the speed and convenience it gives them.

That's because DOS is constantly slowing your hard disk down. It does it by breaking files up into pieces. Storing different chunks in different places. And that makes everything slower—loading, sorting, retrieving, backing up—because your hard disk has to chase all around to read and write different pieces of your file.

Disk Optimizer restores the speed of your hard disk by putting files back together in one contiguous piece—where they belong.

Disk Optimizer is absolutely, positively "disaster proof."

It's sad but true. Some other un-fragmenting software could lose your data if something goes wrong in the process. Like a routine reading or writing error. Or even a power failure.

But have no fear with Disk Optimizer. Nothing will go wrong because nothing can go wrong. Even if you yank the plug from the wall in the middle of the program. It's because only Disk Optimizer copies each file, piece by piece, then checks the newly un-fragmented version for completeness. Only then does it go back and erase the fragmented version. Not power spikes, disk failures or DOS errors—not even earthquakes—can cause data loss. And only Disk Optimizer makes you that promise. So why trust your disk to anyone else?

It's like a precision tune-up for your disk.

In addition to un-fragmenting, Disk Optimizer also lets you quickly choose the optimum layout for your disk. So your most-used files have the fastest access. And program and other unchanging files can be permanently un-fragmented and set aside on their own area on the disk.

The simple menu makes it a snap.

Un-format—one of the powerful new reasons to buy Disk Optimizer

Oops! Make a simple mistake at the keyboard and you could wipe out your hard disk with a DOS Format command. But don't worry. "Un-format" will recover your entire disk, and all your data, in just moments. It's included with your new Disk Optimizer.

Plus, you get the new "Analyze" program with a graphical display that shows your disk's condition so you'll always know when it's time to optimize again. You also get "Sorts" for organizing directories for the best appearance and sequence. "Findfile" for searching out hard to find files. "Delfile" for locating and erasing unwanted files. "Lock" and "Unlock" for file security. And more.

You could spend hundreds on other utilities and still not get all the functionality packed into Disk Optimizer at no extra charge.

Use it once and you'll discover what nearly 200,000 users already know—\$69.95 is a small price to pay for the speed, convenience and safety you get only with Disk Optimizer.

Look for the new Disk Optimizer at software dealers everywhere. Or order directly from SoftLogic Solutions by calling us toll-free.

Just a few of Disk Optimizer's rave reviews:

Selected PC Magazine's "Best Of The Best" utilities.

—June 1987

"I find Disk Optimizer excellent. Disk access, even at 4.77MHz, is much faster. And loading 100 Fantasy fonts now takes seconds."

—Elizabeth Joan Doyle, Indiana

"I feel this is essential software for anyone with a hard drive."

—D. Sorenson, Texaco, California

"Easy to install, use, and most importantly, it works!"

—Dan Neilsen, General Electric Information Systems, NY

Disk Optimizer \$69⁹⁵

SOFTLOGIC SOLUTIONS

SoftLogic Solutions, Inc.

One Perimeter Road

Manchester, NH 03103

800-272-9900 (603-627-9900 in NH)

Call 800-272-9900

1-2-3 is a registered trademark of Lotus Development Corporation.

0146

Fill & File can build forms templates as large as 240 columns by 198 rows. Pulldown menus speed the selection of solid, bold, and dotted lines as well as boxes and blanks. A variety of ASCII graphics symbols help the on-screen form resemble its printed counterpart, with a choice of foreground and background colors to highlight critical fields.

Once the template is built, entering data into your forms is as easy as tabbing from field to field and filling in the blanks. The templates are locked against accidental change. Data can be loaded automatically from *Fill & File*'s own data base or any dBASE- or ASCII-compatible data base. You also can export information from *Fill & File* to other data bases to tap their summaries, reports, mailing labels, and form letters. Records can be printed in batches of thousands.

Fill & File will even do simple math to expedite completion of number-oriented forms like sales reports, purchase orders, expense reports, and invoices.

Fill & File's \$149 price includes unlimited telephone support and the FormWorx Programming Language for creating custom data-entry menus and form defaults to further speed data entry. The package supports more than 100 printers, including all Epson, IBM, and Hewlett-Packard laser printers. It requires 512K of RAM and DOS 2.00 or a later version. FormWorx Corp., 1601 Trapelo Rd., Waltham, MA 02154; 617/890-4499.

Crossing the Channel

After three generations of expansion bus types in seven short years, many work groups are left with a smorgas of boards and queasiness over IBM's switch to Micro Channel Architecture (MCA). If your work group is dragging along a number of trailing-edge XT machines while pushing toward the leading edge of

tightly knit group to share memory cards, graphics cards, tape controller devices, and network cards on the expansion device.

In fact, you can build a "wireless" Novell Netware network with ADC's TransFormer 2, PC Exbus, and another ADC product, the \$1195 PCII two-user card. With two 8088 processors and 512K of RAM, the PCII offers keyboard and monitor support for

By putting a friendly face on Pixie with Microsoft Windows, Zenographics gains broad data-exchange flexibility.

PS/2 technology, don't fret. Advanced Digital Corporation has a way you can leverage an investment in XT-bus expansion boards while you're waiting for a larger selection of PS/2 add-ons to come along.

It starts with ADC's TransFormer 2, a \$695 combination of two boards and a cable that lets you use your favorite 8-bit expansion boards with the new MCA-equipped PS/2 Models 50, 60, and 80. The TransFormer 2 board sits in any PS/2 slot and connects via a 6-foot cable to the accompanying ADC XI Card, which is placed in a PC expansion device. (The XI Card is compatible with most of the installed base of 500,000 external PC expansion boxes, says ADC president Hossein Asadi.)

If you've got the boards but lack the expansion device, ADC suggests its PC Exbus. For \$1195, the Exbus provides ten 8-bit expansion slots and a 300-watt power supply. The system can save you money by permitting your

one or two workstations. Casting a single PS/2 Model 50, 60, or 80 in a file-server role, the PC Exbus can support up to eight PCII cards or 16 workstations. Advanced Digital Corp., 5432 Production Dr., Huntington Beach, CA 92649; 714/891-4004.

Pearls In, Pearls Out

If good just isn't good enough for your presentation, Zenographics hopes you'll find the necessary magic in *Pixie*, a high-end object-oriented graphics program for the PC.

By putting a friendly face on *Pixie* with *Microsoft Windows*, Zenographics gains broad data-exchange flexibility and output-device driver support. *Pixie* takes full advantage of the mouse and the Microsoft environment's windowing capability.

To choose one of seven *Pixie* chart types, simply click on it in

No One Computer Can Meet All Of Your Needs, But One Company Can.

Priorities. They're different for every department. Some need more power in a computer that takes up less space. Others want state-of-the-art performance today with engineering innovation to keep up with tomorrow.

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AST Research. We've been providing quality enhancement boards, peripherals and connectivity solutions for years. Now, with our complete family of high-performance computers, AST provides a single source for a broad range of needs. And model for model, AST Premium™ computers feature solid compatibility and superior performance for the best value on the market.



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next generation of microprocessors.

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Wait States	0-1	0	1
Standard Memory	Up to 2 MB	1 MB	1 MB
Expandable to	13 MB	13 MB	4 MB
Video Adapter	Optional	EGA/HGC (most models)	EEGA/EGA/HGC module
Expansion Slots	7*	7**	2
Fixed Disk	40/90/150 MB	20/40/70 MB	40 MB
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†Three software selectable speeds for timing-sensitive programs.

*One 32-bit dedicated to memory; three AT-compatible 16-bit multibank and one 16-bit AT-compatible; and two 8-bit in standard models.

**One 8-bit, six 8/16-bit including 2 FASTslots™; and four user slots in standard models.

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AST Research, Inc., 2121 Alton Avenue, Irvine, CA
 92714-4992 Attn: M.C.

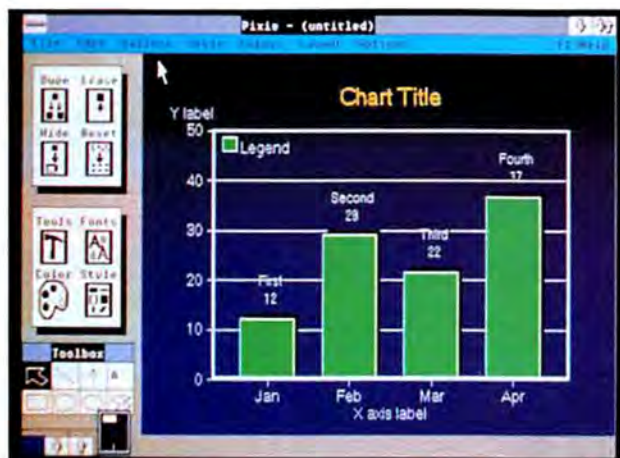
PC World 3/88

the *Windows* pulldown menu. Then customize your chart with *Pixie's* drawing capabilities—adding or editing lines, rectangles, circles, polygons, and text. You can paste clip-art and bit-mapped images using the *Windows* clipboard, and *Pixie's* own import facility handles 1-2-3 worksheet ranges and graphs.

There's no flip-flop between graphics and alphanumeric modes; changing the values in a *Pixie* chart alters its dimensions before your eyes. You explode a slice from a pie chart by clicking on the slice and pulling it away from the pie. You change a title by clicking on it and typing in changes or altering typeface styles and sizes. Finally, you pick either slide, portrait, or landscape presentation with another click of the mouse, assured that the output will be correctly proportioned.

Pixie groups the 98 most popular colors into four standard palettes and lets you mix up to 16 million gradations. The software supports all *Windows*-installed fonts, such as Times Roman and Helvetica, plus three Zenographics typefaces that can be scaled to any size.

Pixie combines vector-based graphics under a Microsoft *Windows* interface for graphics sizzle and ease of use.



Since *Pixie's* graphics architecture is object oriented rather than bit mapped, output isn't limited by screen resolution. The program will create both the Computer Graphics Metafile (CGM) files used by Genigraphics cameras and the Scanned Conversion Object Description Language (SCODL) files employed by the 4000-by-3000-dpi-resolution Matrix cameras for the highest-quality output possible. It also creates output in *Windows' Graphic Device Interface* and *Zenographics Image* file formats.

Priced at \$195, *Pixie* requires 512K of RAM, DOS 3.00 or a later version, and *Microsoft Windows*, which retails for \$99. Zenographics Corp., 19752 MacArthur Blvd. #250, Irvine, CA 92715-9976; 714/851-6352.

Crossing Over Foreign LANs

Networking is supposed to mean communications and connectivity, but a lack of standards has kept most local area network denizens just that—local. Try to cross the border into another network alone, and you'll find yourself just

another stranger in a strange LAN.

But Bridge Communications not only gets you to another network in style, it also helps you with the language. Bridge's new **GS/1-IP Gateway Server** is an internetwork router that connects geographically dispersed as well as architecturally disparate networks.

The connection is made with TCP/IP high-level protocols along X.25 private or public data lines; any TCP/IP device can both send and receive information packets. Bridge chose to implement the TCP/IP protocol, according to a company spokesperson, because it is as close as the industry comes to a standard approach to all the functional levels of a network.

Based on the Motorola 68020 processor, the GS/1-IP server supports up to 48 virtual circuits over eight physical lines, enabling multiple-gateway networks with a virtually unlimited number of communications sessions. You also can call up your favorite mainframe or minicomputer, creating hybrid network environments. The eight communications ports can be independently set for speeds between 1200 and 64,000 bps.

Priced at \$10,500, plus \$2000 for a software license fee, the GS/1-IP includes an X.25 interface and an Ethernet, IBM PC Network-compatible broadband, or Token-Ring interface. Additional interfaces are \$2500 each. Bridge Communications, 2081 Stierlin Rd., Mountain View, CA 94043; 415/969-4400.

Roger Staubach and Terry Bradshaw on Dac-Easy Light.



For Once They Agree! Light's Less Filling Accounting for Home & Office.

Roger: Of course I'd never argue with you, Terry, about Dac-Easy Light because I know it's perfect for office accounting.

Dac-Easy Light let's me concentrate on doing business, not accounting. Using the predefined chart of accounts, ideal for small business, I can enter customers and vendors — and start processing invoices and checks in just minutes!

Terry: Roger, when did we ever disagree about anything? You know Dac-Easy Light is perfect for home accounting. Light makes home finances fast, fun and easy. The preset home chart of accounts has everything I need. I can write checks and do bank reconciliations by computer without knowing the first thing about accounting.

Roger: Light makes it a snap to track sales and budget expenses for up to 12 months on-line. With Light, I know my business' current financial status in *minutes*.

Terry: It's the same with home accounting finances, Roger. I can get my personal net worth in *seconds* since Light instantly reflects the effect of changes, payments, withdrawals and deposits.

Roger: Light gives me the option of handling accounting on a cash or accrual basis. Plus, if I forget any account or customer, I can quickly call it up in a window.

Terry: Well don't forget this, Roger. With Dac-Easy Light I can quickly set up new credit card accounts, post receipts, and keep tabs on current card balances. Plus, I don't have to know debits or credits because the system knows and automatically does them for me.

Roger: Terry, for once I think you're right. Light's so smooth and easy to handle, *even you can use it*.

Terry: And you're right, too, Rog. Using Light, you'll have more time to spend on the golf course. I just hope you're not trying to compete with my *hall of fame game!*



\$69.95

Dac-Easy Light. Ideal for the home, office or both! Within minutes, you can install and begin using a complete accounting system working behind the screen. There's no need to know accounting. And with Dac-Easy Light there are no surprises. Everything you already know about writing checks to creating invoices is on-screen in a format you'll recognize. So get a taste of the good life with Dac-Easy Light. A less filling accounting program for the home and office.



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Minimum Hardware Requirements: IBM PC or 100% compatibles. 1 disk drive, MS-DOS or PC-DOS 2.0 – or later, 80 column printer able to print 132 column in compressed mode, color or monochrome monitor, 256K memory. Trademarks: IBM, PC-DOS, MS-DOS. Dac-Easy is a trademark of Dac Software, Inc., Dallas, TX. 75244. 5-1/4" & 3-1/2" disks available.

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Circle 246 on reader service card



Unretouched Photo.

Buy The One On The Left And You'll Have To Put It Where The Sun Don't Shine.



The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new *Flat Technology Monitor* from Zenith Data Systems—winner of *PC*

Magazine's coveted "Technical Excellence Award" in the hardware category for 1987.

You Have To See Zenith To Believe It

So clear. So precise. So lifelike. It's the only monitor with a completely flat screen. A breakthrough that has redefined monitor quality forever. Industry experts are already convinced. And once you see it in person, you'll be a believer, too.

Bigger, Brighter, Glare-Free

Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

The Flat Technology Monitor is virtually glare-free. So you can work longer without the usual headaches

and eyestrain. And that means greater productivity. But to get the whole picture, you have to see it with your own eyes.

Backward And Forward Compatibility

You also get full compatibility with the high resolution VGA Video generated by IBM's new PS/2® computers. And with Zenith's Z-449 or other VGA-class video cards, you can enjoy CGA, MDA, Hercules and EGA graphics as well.

Experience Zenith's Latest Technology Breakthrough

Obviously, a mere picture can't do justice to our new Flat Technology Monitor. It demands a face-to-face evaluation. For a hands-on demonstration, call today for the name of your nearest authorized Zenith Data Systems dealer—the Flat Technology Monitor is available in quantities right now.

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**data
systems**

THE QUALITY GOES IN BEFORE THE NAME GOES ON®

Briefly Noted

DataPerfect 2.0

WordPerfect Corporation is out to prove that data base software doesn't have to be big to be fast, powerful, and easy to use. *DataPerfect 2.0* is a fully relational data base that requires only 192K of main memory but can store up to 16 million records.

Packed onto a single 360K floppy, *DataPerfect 2.0* takes up only one-third to one-half the main memory and disk space other relational data base managers demand. But its developers say it will find any record in a 350,000-record data base in less than a second.

Unlike many relational data bases, *DataPerfect* is not based on an applications language (although it does have a powerful formula processor with both mathematical and logical functions that can be combined to perform operations even as data is entered). Instead, the heart of *DataPerfect* is its menu structure.

The program lets you create forms with up to 80 fields in definition mode. You move fields around at will until you're ready to switch to data entry mode. In that mode, you can choose either a form view or a tabular view.

DataPerfect 2.0 accepts records from other WordPerfect products in merge format or as delimited text. Information also can be

transferred from the clipboard of WordPerfect's \$129 *Library Shell*. The same *DataPerfect* package can be used as either a single-user or local area network data base without reconfiguration. It locks at the field level, so more than one network user can view, enter, and modify data in the same record simultaneously.

DataPerfect requires DOS 2.10 or a later version for single-user work and DOS 3.00 or a later version for network use. It retails for \$595 for the initial copy or file-server use; you get another five network versions for \$495. WordPerfect Corp., 288 W. Center St., Orem, UT 84057; 801/225-5000.

Diconix 300W

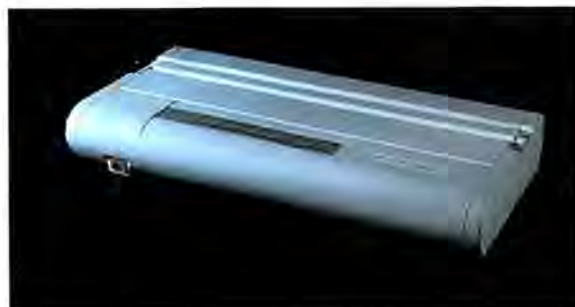
Diconix, the Kodak subsidiary that brought ink jet printing to your briefcase, has introduced a new wide-carriage portable that lets you take spreadsheet printing on the road. Measuring about 19 inches wide by 9 inches deep, the *Diconix 300W* has outgrown your briefcase, but at 13 pounds it isn't too heavy to tote in its leath-

er carrying case, if you simply must print out spreadsheets or other reports while you travel.

The 300W can print as many as 136 columns of black-and-white text on nonwaxed paper up to 14.8 inches wide, keeping the noise below 48db. The new ink jet device offers a choice of pica or elite type. Maximum speeds for pica type are 258 cps in draft mode, 61 cps for near letter quality, and 40 cps for letter quality. Corresponding speeds with elite type are 310 cps in draft, 73 cps in NLQ, and 48 cps in letter quality mode.

A new ink formula lets the 300W print at 192-by-192 resolution in letter quality mode, making full-size graphics possible. The Hewlett-Packard ThinkJet-style disposable ink cartridge/printhead snaps in quickly and cleanly.

The tractor-equipped 300W accepts fanfold and cut-sheet paper and can move both up and down. It also prints on acetate and label stock. The \$795 printer emulates the IBM Proprinter, IBM Quietwriter, and Epson FX-85/100



The 13-pound Diconix 300W ink jet gives you letter quality text, 310-cps drafts, and 136-column spreadsheets at a whisper.

printers through DIP switch settings. Disposable ink cartridges are \$10 each, and the carrying case is \$30. Diconix, 3100 Research Blvd., Dayton, OH 45420; 513/259-3100.

NexView

Need to consolidate 1-2-3-compatible worksheets from various users? That's the main selling point for a recent entry in the spreadsheet Olympics. *NexView* from Windjammer Software is a Lotus clone that lets you consolidate results from different divisions or departments in your company—a major feature of current and upcoming releases from Lotus, Microsoft, and others.

But unlike the cell-linking methods those competitors employ, *NexView* lets you retrieve a cell range, such as a sales total or gross margin, by its first-row-or-column label. This feature enables you to pull the information you select into your master worksheet irrespective of its location in other worksheets. Labels also can have synonyms, like *sales* or *revenue*. You can use wild cards or perform conditional searches for different label intersections—for example, *sales* and *western region*—using common logical operators such as IF...THEN and ELSE.

NexView's keystroke recorder translates keystrokes into 1-2-3-compatible macros, and the program has a utility that produces a directory of label locations in all your worksheets. Also, *NexView's* consolidation capability can be used in reverse during financial

Open View Acc Row Col cell Close Stat Formula Write Names P(ON) W(0) L(N) T(0)						
LITEMS		D	Y87	Y88	Y89	Y90
			Yr 1987	Yr 1988	Yr 1989	Yr 1990
TITLE1	Yr 1991					
TITLE2						
HISTORY	His Master File Name: DEMOMF					
TOTMKT	Tot Number Of Spreadsheets Linked: 3					
MKTSHR	Mar Number Of Row Lexicons: 24					
GRSALES	Gro Number Of Column Lexicons: 7					
COGS	Cos Lexicons Linked To Window: 0					
CONTRIB	Con					
PROMOTION	Pro Current Row Lexicon Range: TITLE1 TO DCASH					
MKT	Mar Current Column Lexicon Range: LITEMS TO TOTAL					
G&A	Gen					
R&D	Res					
DEPR	Dep					
TOTEXP	Total Expenses		3,949	4,628	5,177	5,003
INCBTAX	Income Before Tax		-921	1,637	4,534	4,186
INCTAX	Income Taxes			818	2,267	2,093
INCAFTAX	Income After Taxes		-921	818	2,267	2,093
DEPREC	Depreciation		1,000	1,000	1,000	1,000
CHGWORKCAP	Chg In Working Cap		1,009	1,079	1,149	-174
OPER.CASH	Operating Cash		-931	739	2,118	3,267
F1end F2places F3window F5goto F6cellinp F8help F9pause F10endmac						

NexView lets you link worksheets by cell range labels and play "what if" by working backwards from goals.

modeling: You can set goals and work backward to the performance targets each department or division must reach if those goals are to be met.

NexView is file compatible with 1-2-3 versions 1A and 2.x but not with Lotus .PIC files. Data can be consolidated via menus or a command line. A windowing interface facilitates the use of multiple worksheets. But you don't need to import an entire spreadsheet into memory to access desired cells; *NexView* will search across an unlimited number of files on a hard disk to find the cells and retrieve them byte by byte.

NexView retails for \$595 and requires 512K of main memory, 1MB of disk storage, and DOS 2.00 or a later version. Windjammer Software, 567 Park Ave., Scotch Plains, NJ 07076; 201/322-6363.

The Wheel

Dalin has taken the on-screen calculator one step further for students, engineers, and businesspeople by rolling out *The Wheel*. The calculation processor comes in three memory-resident versions.

The Daily Wheel performs common arithmetic calculations in decimal or foot/inch units and their fractions. The \$139.95 program can automate repetitive calculations that contain a variable and also converts units for length, area, volume, weight, angles, and temperature. You can edit calculations and create your own calculation files library.

Cross desktop publishing and word processing...

CATS

The Cheetah.

It is the Formula 1 racing machine of the animal world, attaining speeds in excess of 55 mile per hour in seconds. The cheetah's maneuverability and stopping power at such speed is quite impressive. It uses its relatively large paws and non-retractable claws for traction and stability.

A supreme hunter, the cheetah works its terrain like no other cat. It does not stalk, or rely so greatly on stealth and surprise, but instead uses its great speed to literally overtake its prey.

Specifications.

Length: body--55--59 inches.

Tail--23.6--31.5 inches.

Weight:132 lbs.

Coat: tawny brown with black spots.

Gestation period: 90--95 days (1--8 young)

Family Felidae: subfamily Acinonchinae.

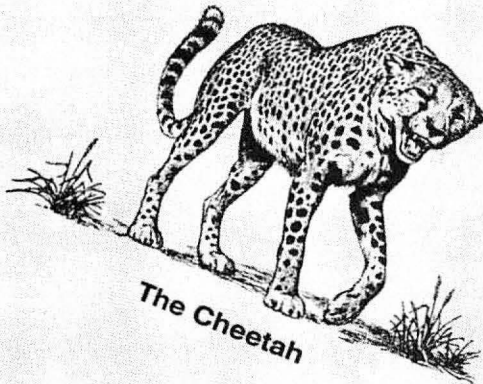
Species include Asian Acinonyx venatica; African jubatus, and the striped Acinonyx rex.

Velocity.

The Cheetah reaches its maximum speed in seconds. In fact its 0 to 60 mph reading is which makes high performance Italian race like family station wagons.

Cheetah's Prey.

Gazelle. Antelope



The Cheetah

The Scientific Wheel, also priced at \$139.95, has the same capabilities as *The Daily Wheel* but can also convert between number bases and adds three sets of function keys with built-in logarithmic, trigonometric, and hyperbolic mathematical operators. It can do both integral and derivative calculus.

The Professional Wheel adds extended unit calculation and statistical analysis, including mean, median, and standard deviation. Unit conversion capability also includes velocity, flow, density, viscosity, pressure, power, and energy. It sells for \$239.95. Dalin, 16421 Clymer Ave., Granada Hills, CA 91344; 818/360-7058.

CM-1430

Seiko Instruments is challenging IBM's highest-quality PS/2 color monitor with a 1024-by-768-pixel unit that sells for 30 percent less. Seiko's CM-1430 is fully compatible with IBM's PS/2 Color Display 8514 but lists at \$1095; the 8514 costs \$1550.

The analog RGB CM-1430 gives you a growth path from high-quality presentation graphics to the most demanding desktop publishing and CAD applications. Like IBM's 8514, the Seiko monitor supports the CGA, EGA, PGA, and VGA modes of the VGA and the high-resolution

(1024-by-768-pixel) color modes of the 8514/A video adapter. The CM-1430 uses a Sony black Trinitron nonglare CRT, with a 60/72-Hz noninterlaced refresh rate for CGA, EGA, and PGA modes and a rate of 43 Hz for 1024-by-768 mode.

fers higher resolution than IBM's VGA implementation and is up to 50 percent faster.

The VGA Professional Card provides standard VGA resolution of 640 by 480, but with 256 colors at once rather than IBM's 16. It also has 16 colors at 800-by-600

Seiko Instruments is challenging IBM's highest-quality PS/2 color monitor with a 1024-by-768-pixel unit that sells for 30 percent less.

The Trinitron monitor's flat-screen faceplate reduces light reflection, and the use of a single large electrode gun sharpens focus, says Seiko. The CM-1430 comes with an integrated tilt-and-swivel base. Seiko Instruments USA, 1130 Ringwood Ct., San Jose, CA 95131; 408/943-9100.

Paradise VGA Professional Card and VGA Plus Card

Paradise Systems has announced two Video Graphics Array controller cards that bring VGA graphics to classic PCs and the IBM PS/2 Models 25 and 30 faster and cheaper than IBM does. The VGA Professional Card and the VGA Plus Card are based on Paradise's single-chip video controller, which Paradise claims of-

resolution and a monochrome maximum of 1024 by 768, with a 132-column display for power users of word processing, spreadsheet, and data base applications. Meanwhile, the half-size VGA Plus Card is \$200 cheaper than the IBM VGA adapter it is intended to replace.

Paradise claims that both cards are hardware- and software-compatible with the VGA video controller found in IBM PS/2 Models 50 through 80, ensuring compatibility with future operating system and application software. The VGA Plus Card's suggested price is \$399. The VGA Professional Card sells for \$599. Paradise Systems, 99 S. Hill Dr., Brisbane, CA 94005; 415/468-7300.

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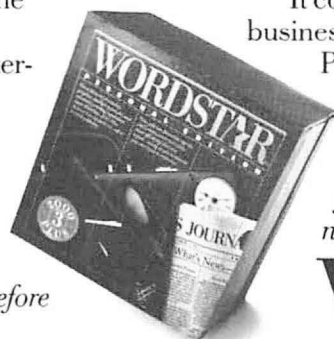
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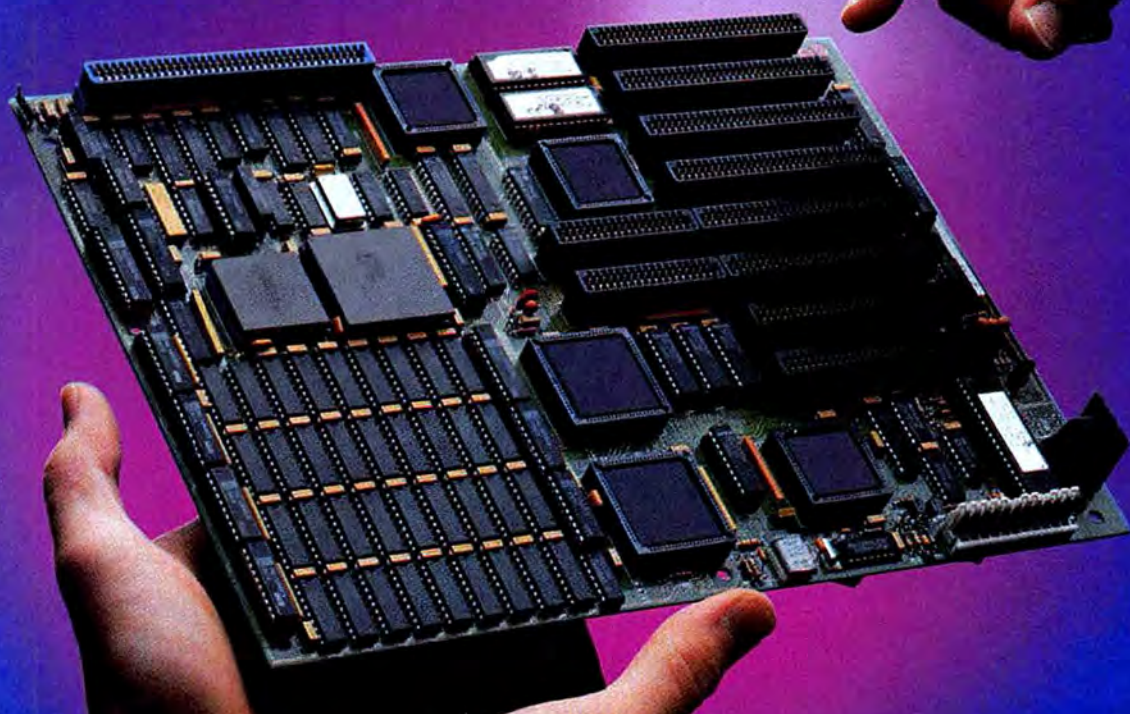
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Word For Word

Work-group members wanting to share files among incompatible word processors now enjoy more options. Mastersoft has released version 3.0 of **Word For Word**, the file conversion program that translates form and function codes among most popular word processors. **Word For Word** has been updated to read *WordStar 4.0*, *Microsoft Word 4.0*, *WordPerfect 4.2*, *DisplayWrite 4*, *Multi-Mate Advantage*, *VolksWriter 3*, *XyWrite 3.2*, the *pfs* family, and EBCDIC and ASCII files. **Word For Word** also provides a "smart" ASCII capability that retains the original document's margins, columns, and paragraph breaks, inserting hard carriage returns only at the end of paragraphs.

The program requires 256K and DOS 2.00 or a later version and comes on both 3½- and 5¼-inch disks for \$149. Current users can upgrade for \$25. Mastersoft also has a **Word For Word LAN** version 3.0 for \$300. Single users can upgrade to the LAN version for the difference in price. Mastersoft, 4621 N. 16th St., Ste. A-108, Phoenix, AZ 85016; 602/277-0900.

Clipper Summer '87

Nantucket has refitted its flagship *Clipper*, the *dBASE* language compiler. **Clipper Summer '87** compiles five times faster than the previous version, has optional

dBASE-compatible indexes, and offers new commands and functions to ease application development. **Clipper Summer '87** has pulldown menus and pop-up windows for viewing program status as well as easier access to low-level DOS commands. It can maintain 250 open files per process and handle data base records of up to 1024 fields and strings of up to 64,000 characters.

Clipper Summer '87 compiles both single-user and multiuser applications, converting them into stand-alone executable files compatible with most popular LANs,

Quicksilver Diamond Release

Another *dBASE* compiler with a new look and new capabilities emerges from WordTech Systems. **Quicksilver Diamond Release** is 30 to 40 percent faster than the previous version, demands less memory, and incorporates an unusual distributed processing feature that lets you take advantage of idle nodes on your LAN.

Quicksilver Diamond Release delivers the unique ability to send any executable DOS task from

Quicksilver Diamond Release delivers the unique ability to send any executable DOS task from one network workstation to an idle one for execution.

including IBM's Token-Ring, Novell's Advanced Netware, and 3Com's 3 + Share. The suggested retail price is \$695. Registered users of *Clipper Autumn '86* are eligible for free update disks. **Clipper Summer '87** requires 256K of RAM and DOS 2.00 or a later version for a single user and DOS version 3.10 for multiuser environments. Nantucket Corp., 12555 W. Jefferson Blvd. #300, Los Angeles, CA 90066; 213/390-7923.

one network workstation to an idle one for execution. Its LAN environment provides messaging between workstations, record-locking, and the ability to determine which user has locked a particular record; it also warns you if the data you're working with in memory has been modified on disk.

Quicksilver Diamond Release supports five resident graph types. It exports graphs and data to popular desktop publishing packages like *PageMaker* and spreadsheets

like 1-2-3, and accepts data from those programs. *Quicksilver Diamond Release* requires 512K of RAM and DOS 2.00 or a later version. Suggested retail price is \$599. Upgrades are available for \$75. WordTech Systems, P.O. Box 1747, Orinda, CA 94563; 415/254-0900.

Zenith Z-183

Zenith Data Systems has added a 20MB hard disk to its Z-183 portable PC, calling it the first 20MB-equipped laptop with 5 hours of battery operation per charge. The Z-183, equipped with a 3½-inch floppy drive and a 10MB hard drive, will sell at a reduced price of \$3199. The new 20MB version will be available for \$3499 with a 3-hour battery; an optional 5-hour battery costs \$129 more.

The 20MB Z-183 achieves its extended battery life through the use of energy-efficient CMOS disk controllers, a more efficient disk-access coding scheme that reduces power drawn per access, and automatic power-downs when the disk isn't being used.

The Z-183 includes an 8-MHz 80C88-2 processor switchable to 4.77 MHz for slower software, 640K of RAM expandable to 1.64MB, and an electroluminescent Supertwist LCD display. Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; 800/842-9000.

Close-Up 3.0

Norton-Lambert has enhanced *Close-Up*, its two-way communications program that lets you control an application from a remote PC. The new version is designed to be used after hours and supports automated high-speed ac-

Close-Up 3.0 Customer/Terminal retails for \$195; *Close-Up 3.0 Support/ACS* sells for \$245. Both components are needed for remote support functions. Upgrades from version 1.1 are available for \$50. Norton-Lambert Corp., P.O. Box 4085, Santa Barbara, CA 93140; 805/964-6767.

Cubit release 2.0 can reduce a 1-2-3 worksheet or compatible file by an average of 70 percent.

cess to remote PCs over phone lines.

The new *Close-Up 3.0* has two components. Corporations and software publishers can use the *Close-Up 3.0 Support/ACS* version to train and provide technical support to remote users of any program who are equipped with Norton-Lambert's *Close-Up 3.0 Customer/Terminal* package. Changes on one PC are duplicated on all.

Both packages now transmit screen changes more quickly across phone lines and LAN bridges by supporting new 9600-bps modems like the Hayes V-series. *Close-Up 3.0 Support/ACS* can start batch processing in dozens of locations after hours by using a task file written in its command language. *Close-Up Customer/Terminal* version 3.0 can now collect, print, or save electronic mail to disk in background mode. The packages also provide additional security through a multiple-password scheme, password encryption, and dial-back phone checks.

Cubit Release 2.0

SoftLogic Solutions' file compression utility, originally optimized for word processing and text files, now works on spreadsheets. *Cubit* release 2.0 can reduce a 1-2-3 worksheet or compatible file by an average of 70 percent. The memory-resident program also slims down text files by an average of 55 percent, data base files by 45 percent, and programs by 25 to 35 percent. Files are automatically decompressed when you open them.

Cubit release 2.0 ships with six separate utility programs, including one that enables you to swap compressed files with another user who lacks *Cubit*. *Cubit* release 2.0 requires 256K of RAM and DOS 2.00 or a later version, and it sells for \$49.95. Upgrades are available for \$17.50. SoftLogic Solutions, One Perimeter Rd., Manchester, NH 03103; 800/272-9900. ●



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Excel— Should You Switch?

By offering powerful new features and a user interface that won't quit, Microsoft is determined to prove that Excel heralds the next generation in spreadsheets.

Ralph Soucie

Ever since 1-2-3 usurped *VisiCalc*, Lotus's favorite has reigned supreme in the realm of spreadsheets, and most users haven't bothered to support any of the new pretenders to the throne. But now a serious challenger—indeed, a better product—has made its debut: *Microsoft Excel*. Aside from offering a functional base that lives up to the 1-2-3 standard, *Excel* delivers a stunning Macintosh-like interface with mouse support for darting in and out of windowed files; dozens of new worksheet functions; a powerful macro language; tightly integrated error-checking and analysis tools; sophisticated graphics op-



Patrick McDonnell

tions; and print formatting that lets you produce hard copy as smashing as *Excel*'s screen display.

On the debit side, *Excel* is harder to master than *1-2-3*: Its longer list of options steepens the learning curve. It is also slower on 386 machines than *1-2-3* teamed with *Speedup* (a utility available from Lotus for a \$20 shipping and handling charge) and requires a minimum of 2MB of disk space (4MB with sample applications and all the help files). Still, if you already have the required hardware and need a sophisticated presentation tool, *Excel*, at \$495, is definitely worth the switch. But if you don't have souped-up hardware and you value speed more than looks, stick with what you've got.

■ A Demanding Product

Although *Excel* runs on any DOS machine, it's officially designed only for ATs and compatibles, PS/2s, and 80386-based machines. *Excel*'s list of required equipment is substantial: 640K, a hard disk, an EGA or VGA adapter, and DOS 3.00 or a later version. Microsoft distributes the program only on 1.2MB 5¼-inch floppies and 720K 3½-inch disks;

to get 360K disks you must send in a form included with the software. Although Microsoft lists a mouse as optional, it is so essential to quick productivity that it should be considered required.

Excel doubles *1-2-3*'s maximum worksheet size, providing 16,384 rows by 256 columns. *Excel* automatically detects the presence of expanded memory, which allows it to operate faster and handle larger files. The program is similarly faster in extended memory, but to create larger worksheets you need a 386-based computer with an EMS driver. When OS/2 comes out with the Presentation Manager, an *Excel* upgrade, which will run in memory above 640K, will be available for \$50.

■ Under the Auspices of Windows

Excel, which ships with a runtime version of *Windows 2.0* (not the complete environment) has all the advantages and disadvantages of any *Windows* application. *PageMaker* users will recognize the remarkable *Windows* inter-

face: a Macintosh-like menu of options at the top of the screen, each of which contains a pull-down submenu that leads into dialog boxes where you select other options or supply required information. On the whole, the combination of pulldown menus and centrally placed dialog boxes makes it much easier for beginners to learn *Excel* than *1-2-3*.

Like all *Windows* applications, *Excel* supports windowing and a mouse. If you buy the full-blown *Windows 2.0*, you can also take advantage of utilities such as a clipboard for exchanging data between applications.

The price of this spiffy interface? *Excel* suffers from sluggish screen refresh, even when you do something as modest as inserting a row or paging through a worksheet. And memory-resident programs interfere with *Windows 2.0*.

■ Brave New World

Whether you use a mouse or the keyboard, *Excel*'s guiding principle is to let you have it your way. Practically speaking, that means learning how to use dozens of new commands. Fortunately,

PC World Evaluation

Excel

	75 × 75 matrix		50 × 75 matrix		25 × 75 matrix	
	Compaq Deskpro 386/20	IBM PC AT	Compaq Deskpro 386/20	IBM PC AT	Compaq Deskpro 386/20	IBM PC AT
Addition						
1-2-3 with Speedup	0.8	4.2	0.7	3.3	0.5	2.4
Excel	1.8	4.4	1.1	3.2	0.7	2.2
Division						
1-2-3 with Speedup	1.3	6.8	1.0	5.0	0.7	3.2
Excel	2.1	6.5	1.5	4.7	1.0	2.9
Multiplication						
1-2-3 with Speedup	1.0	4.5	0.7	3.5	0.6	2.5
Excel	1.6	5.0	1.2	3.7	0.8	2.4
Multiplication with Coprocessor						
1-2-3 with Speedup	0.9	4.6	0.7	3.5	0.5	2.5
Excel	1.3	4.4	1.1	3.4	0.8	2.2
Exponentiation						
1-2-3 with Speedup	9.7	49.3	6.6	33.3	3.5	17.5
Excel	17.3	58.6	11.7	39.5	6.1	20.3
Exponentiation with Coprocessor						
1-2-3 with Speedup	1.4	8.3	1.1	6.0	0.7	3.7
Excel	9.0	42.4	6.2	28.6	3.4	14.9

Excel performed at its best on the AT but definitely lost the race to 1-2-3 with Speedup on the Compaq Deskpro 386. (All times are in seconds.)

Performance benchmarks were conducted with a 75-by-75 matrix on an IBM PC AT and a Compaq Deskpro 386/20. 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 all tests, 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.

Complete recalc (75-by-75 matrix)
For the complete recalculation tests, the value in cell A1 was changed to 1, except for the exponentiation benchmarks, where it was changed to 2.

Partial recalc (50-by-75 matrix)
After the full recalculation benchmarks, the cursor was moved to cell A26. The formula in that cell was replaced with 0, and the spreadsheet was recalculated. The times for this initial recalculation are not shown. Next, 1 was entered into cell A26, except for exponentiation tests, where 2 was entered. (Unlike Excel, 1-2-3 takes longer to recalculate a worksheet when a formula is replaced with a value than when a value is replaced with another value.

These benchmarks measure recalculation time when values are replaced with values because that test more accurately reflects typical worksheet use.)

Partial recalc (25-by-75 matrix)
After the 50-by-75 matrix was benchmarked, the initial formula was restored to cell A26 and the spreadsheet was recalculated. Starting at cell A51, the procedure used with the 50-by-75 matrix was used to benchmark the 25-by-75 portion.

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

Excel's approach to data entry is interactive, lucid, and consistent, particularly for mouse users. Need to widen a column? Simply position the mouse and drag until the column reaches the desired size. Want to copy parts of a complex formula to another part of the worksheet? Just select and copy any chunk of it. How about when you make a mistake? *Excel* lets you undo most commands.

Some *Excel* operations will annoy 1-2-3 veterans, although their design marks an overall improvement. For example, in *Excel* you must select ranges for worksheet operations *before* issuing commands. The payoff, of course, is that Range operations become obsolete.

In comparison, 1-2-3 seems counterintuitive, full of blind alleys and uncertainty. How many times have you fiddled with various 1-2-3 key sequences, branching farther and farther up the wrong menu tree? With *Excel*, you start to realize just how much time you devote to 1-2-3 keyboard movements. And if you use a mouse with *Excel*, you'll minimize the interruptions to your thought processes.

Recalculation With a Twist

Conveniently, *Excel* recalculates in the background while you work. Whereas 1-2-3 recalculates all cells in a worksheet (unless you use *Speedup*), *Excel* has minimal recal: It first determines which cells are affected by changes made since the last recalculation, then recalculates only those cells.

Full Functionality

By adding 42 new functions to 1-2-3's 89, *Excel* has filled in a lot of little corners. If you happen to need these added functions—for matrix algebra, statistics, and interest computations, among other things—they're certain to save you a lot of work.

If you don't find the function you want, you can create your own with a function macro. Sim-

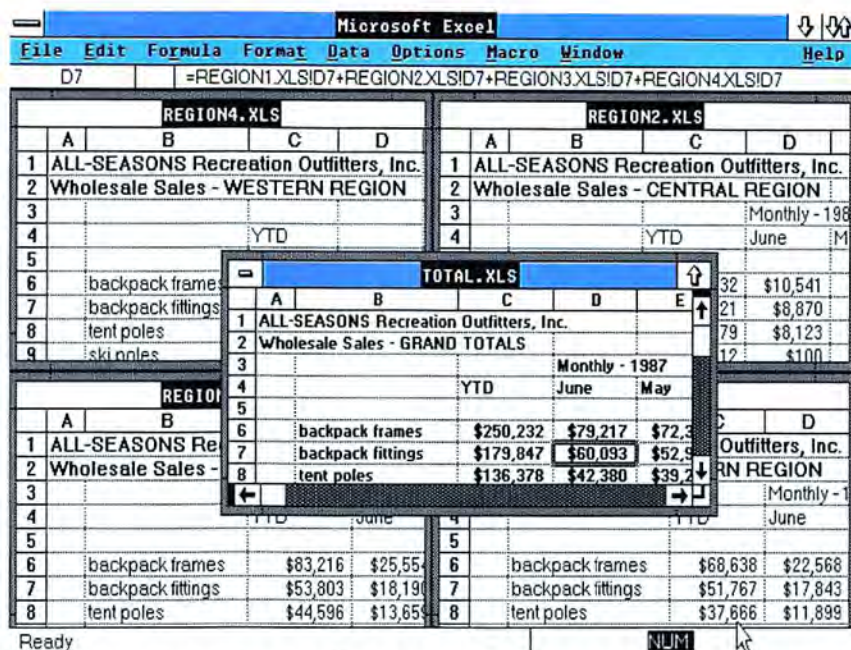
Although some claim that *Excel* recalculates more quickly than 1-2-3, what really counts is how soon the program returns control to the user. *Excel's* *Windows* interface makes it much slower on 386 machines than 1-2-3 with *Speedup*, according to benchmarks by the National Software Testing Laboratories. However, on 286 machines, the difference in speed is slight except during exponentiation tests.

ply open a macro sheet and type in the arguments, then specify any name you wish for the new function. From then on you can reference that name in any cell formula. Function macros are ideal for long, often-used formulas; you can paste in the function instead of cluttering up the worksheet with the entire formula.

Macro Power

With macros, *Excel* outruns 1-2-3 in functionality and ease of use, providing a whopping 355 macro operations. All 131 worksheet functions can be called with macros, and *Excel* also provides 224 macro functions that are roughly analogous to 1-2-3's advanced macro commands.

Excel's macro capability is designed for ease of use. Macros reside in special macro sheets;



Excel's data entry form makes it easy to enter new records or to scroll through existing ones.

Excel Face-to-Face With 1-2-3

Program parameters	Excel	1-2-3 version 2.01
Maximum number of rows	16,384	8192
Maximum number of columns	256	256
Maximum cell width	255	240
Maximum number of elements per formula	1	120
Supports expanded memory	◆	◆
Supports 3-dimensional models		
Supports <i>n</i> -dimensional models		
Supports dynamically linked files	◆	2
Editing		
Global search and replace	◆	
Insert range	◆	
Invisible/hide feature	◆	◆
Display characteristics		
Maximum windows per screen	3	2
Maximum models viewed concurrently	3	1
Color tied to value	◆	
Lock any row or column	◆	◆
Sorting		
Maximum keys sorted concurrently	3	2
Column sort	◆	
Calculation features		
Minimal recalculation	◆	4
Background calculation	◆	
Report generation		
Maximum report width	14"	240 characters
Print sideways	◆	
Spooler	◆	
Built-in graphics support		
Number of font styles per worksheet	4	1
Number of colors supported	624	7
Maximum number of plottable data points in a series	2000	8192
Two continuous variables in scatter plots	◆	◆
Free text on charts	◆	
Macro/Programming features		
Dedicated macro files	◆	
Maximum number of macros per model	3	3
Maximum number of characters per macro	3	3
Macro learn mode	◆	2
IF...THEN...ELSE statements	◆	◆
DOS access from macro procedure	◆	
Other features		
Password protection	◆	◆
Data encryption	◆	

¹Varies depending on the exact nature of the formula.

²With HAL.

³Limited only by available RAM.

⁴With Speedup.

simply load your macro sheet library, and all the macros become accessible from your worksheet. Unlike 1-2-3, *Excel* offers a learn mode for recording macros—one that does more than record keystrokes or mouse operations. *Excel*'s learn mode actually produces instructions that resemble a procedural language, a useful feature for editing and debugging. Debugging features include a Step mode that lists the macro commands in a window as they execute, and the Values View command, which displays the values computed at each step.

Overall, *Excel*'s macro capability allows you to customize your worksheets almost without limit; you can even create custom menus and dialog boxes. To key you in to some of these possibilities, *Excel* includes 19 sample macros for tasks such as consolidating, debugging, and auditing worksheets.

Auditing and Data Security

Excel's auditing features are extremely strong. The Info Window lets you view just about everything about a given cell: its names, value, formula, direct and indirect precedents and dependents, and any attached notes. With the Formula Select Special command, you can search a document or specified ranges for cells that contain formulas, data, text, blanks, or other information.

Excel's data security features also go way beyond standard fare. You can prevent a document on disk from being opened without a password or protect part of a document or window from un-

authorized changes. The same version of *Excel*, with these data protection features, runs on network servers and on nodes in NETBIOS-compatible networks.

Forging Links

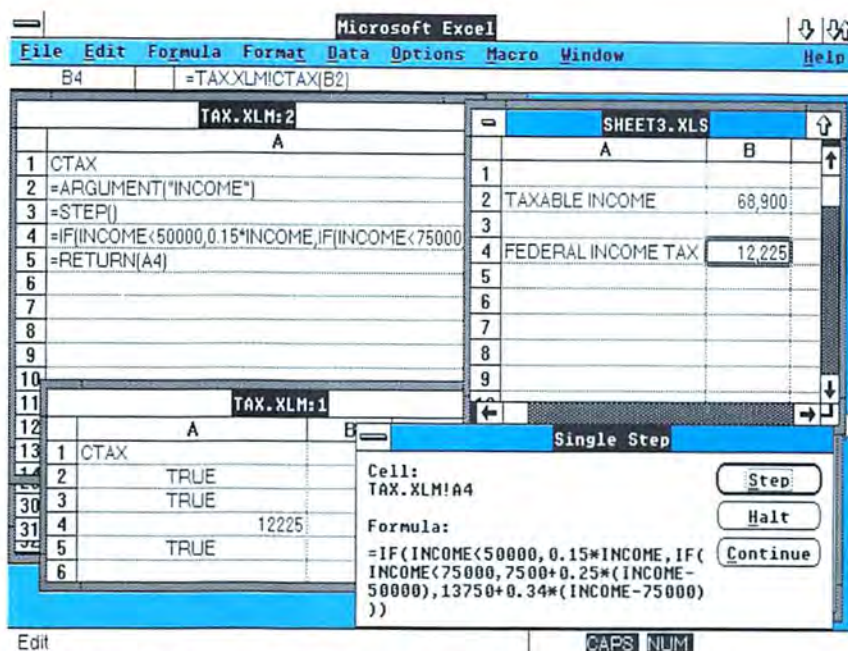
1-2-3 permits static linking of worksheets using the File Combine command. With *Excel* you can forge dynamic links so that when you change cell information, the cells in the related worksheets also change. Note that *Excel* does not have three-dimensional capabilities; if you want to consolidate multiple worksheets, your consolidation formula must reference the file name of each one. As in *Framework*, links in *Excel* are not updated when you move referenced cells or ranges in supporting worksheets, unless the references are to cell names.

Conveniently, *Excel* allows you to save a related group of files as a workspace. Reopening the workspace automatically retrieves the entire group, with all documents retaining their former window positions and sizes.

Data Base Overview

Excel's data base features are comparable to 1-2-3's, with a few extras. You can perform operations on a data base residing in another worksheet, sort by up to three criteria simultaneously, or use an excellent data entry and editing form that remains on screen while you scroll through the data base. You can skip all records not meeting your selection criteria, and jump back and forth between the records that do.

Excel's Find and Extract commands work like 1-2-3's, except that *Excel* requires you to select



Two of *Excel's* macro-debugging tools—the Step mode and Values View (bottom left)—are illustrated here. Note that =CTAX is a function macro that computes the federal tax on corporate income.

the extract range each time you execute the commands, whereas 1-2-3 “remembers” the previous extract range. With that exception, data base operations are as convenient as in 1-2-3.

Links to the Rest of the World

Excel reads and writes .WKS, .WK1, CSV, ASCII, DIF, and dBASE II and III file formats. Just open the file as you would any *Excel* file, then select a different format when you save it. Writing to non-*Excel* formats is just as straightforward.

Companies that use both Macintosh computers and PCs can

share *Excel* files, including macros, by using the SYLK format (and a Mac-to-PC conversion utility). But the process isn't transparent—printing formats won't convert, nor will windowing formats such as size and position. However, according to Microsoft, these problems will disappear when Macintosh *Excel* version 1.5 is released this year. That version will automatically save files in the BIFF format, the native format for PC *Excel*. And with *Excel's* built-in PostScript driver, you can print worksheets on an Apple LaserWriter.

For 1-2-3 users, *Excel* also comes with a utility for translating 1-2-3 macros. Though it has trouble with certain macros (those that edit formulas, are self-mod-

ifying, or don't have exact *Excel* equivalents), the procedure is surprisingly effective, and it goes step by step so you can correct errors as they arise.

Graphics Extraordinaire

As a presentation tool, *Excel* is unsurpassed in the spreadsheet domain. Not only does *Excel* produce eight graph types—area, line, bar, column, scatter, pie, high/low/close (for graphing stock prices), and combinations of these—it also offers several variations on each theme, for a total of 44 formats. And you don't have to address these formats by name; you make your choice by pointing to prototypes displayed on screen.

If you aren't sure which graph type will have maximum impact, you can display the alternatives in separate windows and compare them side by side. Change the values in the supporting worksheet, and the graphs will change dynamically. You can refine a graph further with the chart editing commands, which allow you to mix and match dozens of colors and patterns. Text formatting is equally flexible: You can add free text, shadowed boxes, or arrows that emphasize data.

Whatever you see on screen is what you'll see on paper, assuming your printer has the juice to keep up with *Excel*. It's unnecessary to leave the main worksheet menu to print graphs as required in *1-2-3*. *Excel* replaces the work-

sheet menu with a special Chart menu whenever a chart window is active, so you can modify the graph or print it out.

Progressive Printing

With *Excel*, there's no guessing with printing as there is when you use *1-2-3*. The Print Preview command displays a reduced, but zoomable and scrollable, picture of how your document will look on paper. Sideways printing is built in, as is a print spooler, so you can print while continuing to work.

Excel offers 16 printer drivers and plotter support; unfortunately, making port assignments is tedious. Worse yet, at press time *Excel* did not include any color printer drivers. If you need color documents, your only resort is to use a plotter or call your printer manufacturer and ask if a *Windows* driver is available.

Of course, you can add to the list of printer drivers as well as add new fonts, including downloadable fonts. *Excel* also offers superb formatting features: for example, headers, footers, and hard page breaks. Even mundane documents can look as if they were prepared with sophisticated desktop publishing tools.

To Buy or Not to Buy?

For veteran *1-2-3* users, it's a difficult decision. *Excel* is bold, sleek, and fun to use. The visual shell is much more than a gimmick, boosting productivity through its support for the mouse and windowed files. Clearly, *Excel* is tailor-made for applications

Executive Summary

Microsoft Excel

Spreadsheet software

If you had to describe *Excel* in two words, you'd have to use *better* and *bigger*: better because of the remarkable *Windows* interface, and bigger due to a slew of features. Beyond *1-2-3*-like functionality, *Excel* provides mouse support, windowing, background recalculation, 131 functions, a macro learn mode, auditing features, the ability to link worksheets, superb graphics and printing features, compatibility with Macintosh *Excel* files via the SYLK format, support for PostScript printers, and a thorough on-line help facility. The drawbacks? *Excel* takes time to master and doesn't work with RAM-resident programs unless you buy *Windows/386*. And *Excel* performs more slowly on 386 machines than *1-2-3* with *Speedup*.

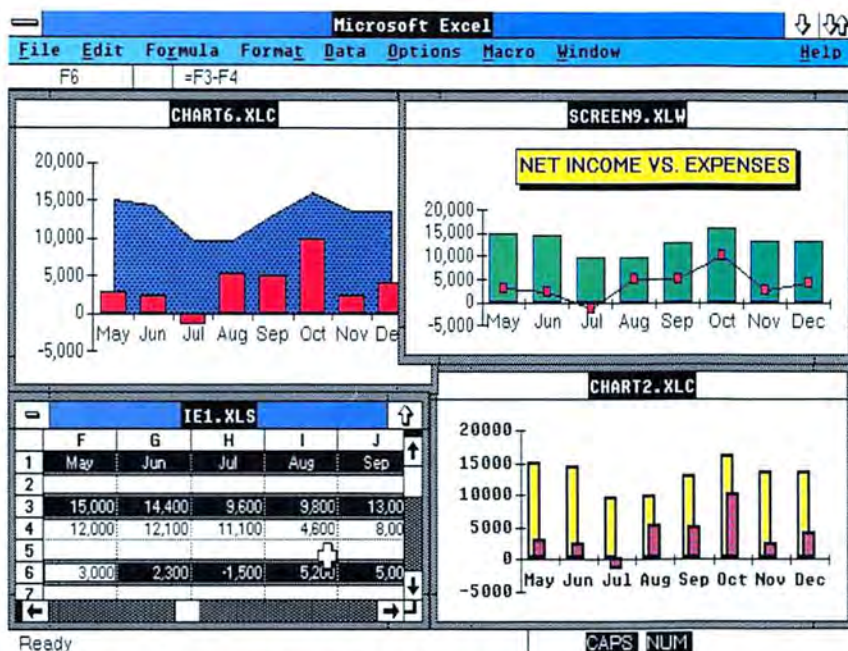
Microsoft Corp.

16011 N.E. 36th Way
#97017

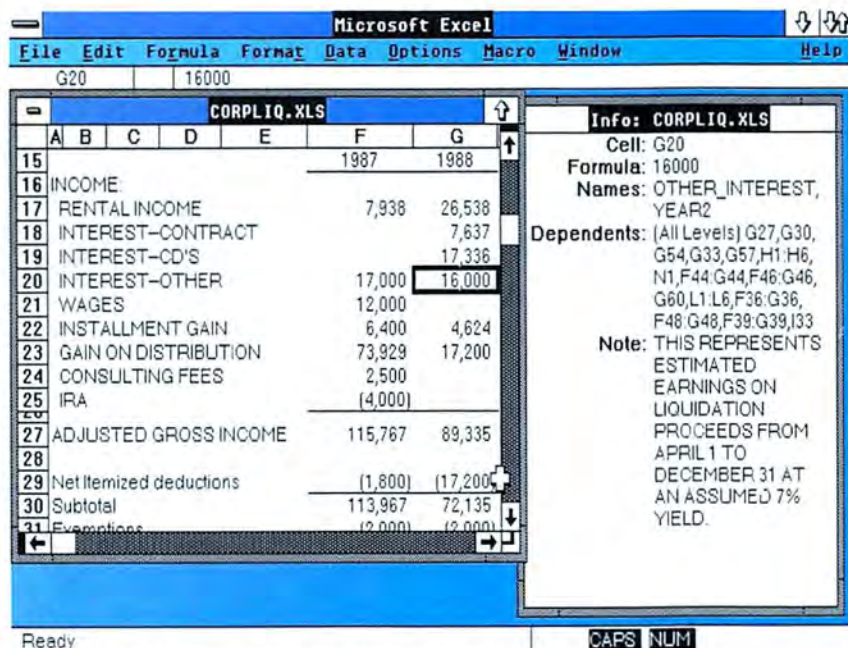
Redmond, WA 98073-9717
206/882-8088

List price: \$495

Requirements: 80286- or
80386-based PC, 640K,
DOS 3.00 or later version,
hard disk, EGA or VGA
video display; *Windows 2.0*
required for some uses
Not copy protected



By creating several different graphs for the same worksheet, you can find the best way to present data.



With the Info Window you can add helpful notes about a cell and view information about its formula, value, precedents, and dependents.

that require custom programming, sophisticated graphics, forms automation, or polished output. Compatibility with Macintosh *Excel* files is a big plus. And if you purchase *Excel* prior to March 31, you can take advantage of a no-questions-asked refund offer for 30 days after purchase.

But *Excel* is not for everyone. If you're generally satisfied with 1-2-3, you'll have to decide whether it's worth your time to learn a complex new program. Moreover, *Excel* is slower on 386 machines than 1-2-3 with *Speedup*—and if finding money in the budget for a mouse and a souped-up AT, a PS/2, or a Deskpro 386 is a problem, *Excel*'s productivity will be compromised. Finally, there are the twin shadows of 1-2-3 release 3 and 1-2-3/G, the graphics-oriented product that will run under OS/2 and is certain to compete with *Excel*.

Still, if you need a spreadsheet with better presentation capabilities or programming features right now, you shouldn't hesitate. And if you're in the position of training new spreadsheet users, *Excel* is definitely the product of choice. ●

Ralph Soucie is a contributing editor for PC World.

Thoroughly Modern Modems

With its new line of 9600- and 2400-bps V-series Smartmodems, Hayes has boosted throughput and built in error control and data compression.

*Art Wilcox
and Eric Brown*

|||| It was a conspicuous absence. Over the last several years, most major modem vendors introduced high-speed modems that ranged in speed from 9600 bits per second (bps) to a theoretical 19,200 bps. But where in this high-speed gold rush was the IBM of the modem world, Hayes Microcomputer Products? Was Hayes, the company that set the modem standard for 1200- and 2400-bps communications, willing to write off the high end as a niche market?

Hardly. Last year Hayes struck back with the V-series, a family of feature-laden modems led by two aggressively priced, 9600-bps entries—the external V-series Smartmodem 9600 (\$1299) and the internal V-series Smartmodem 9600B (\$1199). For users in less of a hurry, the V-series also includes versions of the Smartmodem 2400 (\$899) and 2400B (\$849). Lastly, a \$349 modemlike unit called the Modem Enhancer brings V-series functionality to old 1200- and 2400-bps Smartmodems.

All V-series devices offer two fundamental advantages over earlier Smartmodems: hardware-based data compression and error correction. Whenever two V-series devices connect, the proprietary compression and error-handling schemes kick in, resulting in error-free transmission that—under optimum conditions—far outpaces the modems' bps ratings. Without a V-series modem or a Modem Enhancer on both ends of the line, however, Hayes's new entries behave much like garden-variety Smartmodems.

Due to the Hayes name and to prices on a par with those of most competitors, the V-series 9600s may well set a new standard. Users who need to transfer bulky graphics or data base files will, of course, benefit most from a top-of-the-line V-series modem. But the V-series 2400s are no slackers either, offering throughput that, thanks to data compression, is effectively two-and-a-half times that of the original Smartmodem 2400.

For those who buy their modems in pairs—and need to do more than exchange electronic



Philip Anderson

mail and access data bases—having data compression and error correction in hardware means fast, error-free throughput without the usual hassle. However, until upgraded telecommunications packages offer a V-series option on their menus, you may have to tweak your software to get optimum throughput (see the sidebar “How to Tame a V-series”).

■ A Heck of a Handshake

One of the qualities that made the Smartmodem smart was its ability to recognize the speed of the remote modem and, if necessary, automatically adjust to the correct speed. When a V-series modem makes or answers a call, a bit more intelligence is required.

Like a Smartmodem, a V-series device begins by matching the speed of the remote modem. Next, it ascertains whether the remote system is a V-series. If not, the V-series decides whether it's talking to an asynchronous or synchronous modem and adjusts itself accordingly. If so, the two

V-series' error control and data compression features turn on automatically—no selecting protocols from a menu, no compressing and decompressing files.

Hayes's claim that its data compression scheme doubles the bps rate of its modems appears justified—in regard to transferring text files, that is. When tested by National Software Testing Laboratories (NSTL), the V-series Smartmodem 9600 averaged a text-file transfer rate of 16,948 bps, while the V-series 2400 averaged a blazing 6073 bps.

Factor in the NSTL tests that use spreadsheet, bit-mapped graphics, program, and random data files, however, and the V-series 9600 average transfer rate drops to 12,376 bps, while the V-series 2400 falls to 3936 bps—only 29 percent and 64 percent faster than their respective bps ratings. The more difficult the file transfer task, the less difference between the performance of the V-series Smartmodem 2400 and that of its predecessor. That's something to consider if you're thinking about using a V-series 2400 for transmitting graphics or program files.

Still, there's little doubt that the V-series 9600 is at or near the top of its class. When compared to the state-of-the-art, 9600-bps Microcom AX/9624c (reviewed in “Fast-Talking Modems,” *PCW*, January 1987), the V-series Smartmodem 9600 is a tad slower at transmitting program files but significantly faster at transferring spreadsheet files. As with the AX/9624c, the speed of all the Hayes modems tested appears remarkably consistent over clean, average, and dirty lines.

Those with Smartmodem 2400s will be glad to learn that their tried-and-true units will perform at exactly the same speed as the V-series 2400 when connected to the Modem Enhancer. When coupled with the Smartmodem 1200, the Modem Enhancer averaged the equivalent of 1592 bps—a speed increase of one third. Amazingly, when transferring text files, the Smartmodem 1200/Modem Enhancer combo was actually slightly faster than the origi-

inal Smartmodem 2400. That means that if you already own a Smartmodem 1200, buying a Modem Enhancer may be a better deal than purchasing a Smartmodem 2400—provided there's a V-series device on the other end of the line.

I Sync, Therefore I Am

V-series modems are both asynchronous and synchronous. The link between a V-series modem and a PC is always asynchronous, simply because PCs are inherently asynchronous computers. And when two V-series modems connect, they call and answer in asynchronous mode, because most PC modems communicate that way. Once the modems realize they're both V-series units, they immediately switch to synchronous communications, the method used by mainframes.

Hayes's rationale for deciding on a synchronous link between V-series devices is twofold. First, there's simply no standard protocol for high-speed, asynchronous communications, so Hayes found it wise to use a modified version of a universally accepted mainframe protocol, X.25, for V-series error control. Second, the company wants to set the stage for transparent communications between PCs and mainframes.

For a PC to communicate with a mainframe, the PC must emulate a mainframe terminal. This usually requires three elements: terminal emulation software, a synchronous communications adapter card, and a modem with synchronous capabilities. The ex-

PC World Evaluation V-series modems

Clean Line

	Text file	bps
V-series 9600		17,222
Microcom AX/9624c		17,007
Smartmodem 2400 w/Enhancer		6072
V-series 2400		6070
Smartmodem 1200 w/Enhancer		2450
Smartmodem 2400		2385

Spreadsheet

	Spreadsheet	bps
V-series 9600		13,692
Microcom AX/9624c		10,612
V-series 2400		4239
Smartmodem 2400 w/Enhancer		4237
Smartmodem 2400		2373
Smartmodem 1200 w/Enhancer		1711

Graphics

	Graphics	bps
V-series 9600		11,507
Microcom AX/9624c		10,957
Smartmodem 2400 w/Enhancer		3412
V-series 2400		3409
Smartmodem 2400		2339
Smartmodem 1200 w/Enhancer		1388

Program

	Program	bps
Microcom AX/9624c		11,830
V-series 9600		10,534
Smartmodem 2400 w/Enhancer		3184
V-series 2400		3182
Smartmodem 2400		2346
Smartmodem 1200 w/Enhancer		1293



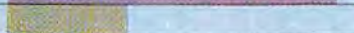
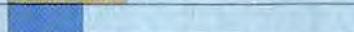


Random

	Random	bps
V-series 9600		9314
Microcom AX/9624c		9094
V-series 2400		2786
Smartmodem 2400 w/Enhancer		2784
Smartmodem 2400		2376
Smartmodem 1200 w/Enhancer		1123



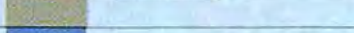



Built-in data compression increases the throughput of V-series devices dramatically. Under optimum conditions, the

V-series Smartmodem 2400 is actually two-and-a-half times faster than the original Smartmodem 2400.



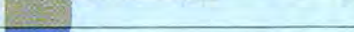



Average Line

	Text file	bps
Microcom AX/9624c		17,065
V-series 9600		16,620
Smartmodem 2400 w/Enhancer		6074
V-series 2400		6068
Smartmodem 1200 w/Enhancer		2448
Smartmodem 2400		2385







Spreadsheet

	Spreadsheet	bps
V-series 9600		13,999
Microcom AX/9624c		10,623
Smartmodem 2400 w/Enhancer		4240
V-series 2400		4235
Smartmodem 2400		2373
Smartmodem 1200 w/Enhancer		1711







Graphics

	Graphics	bps
V-series 9600		11,464
Microcom AX/9624c		10,941
Smartmodem 2400 w/Enhancer		3412
V-series 2400		3408
Smartmodem 2400		2339
Smartmodem 1200 w/Enhancer		1388

Program

	Program	bps
Microcom AX/9624c		11,895
V-series 9600		10,242
Smartmodem 2400 w/Enhancer		3181
V-series 2400		3180
Smartmodem 2400		2346
Smartmodem 1200 w/Enhancer		1291

Random

	Random	bps
V-series 9600		9225
Microcom AX/9624c		9102
Smartmodem 2400 w/Enhancer		2785
V-series 2400		2784
Smartmodem 2400		2376
Smartmodem 1200 w/Enhancer		1123

These benchmarks measured the modems' throughput when transferring different types of files under various line conditions. The modems were tested with two Model 339 IBM ATs running *HyperAccess* from Hilgraeve. Each computer ran at 8 MHz and had a 30MB hard disk.

Line conditions Two modems plugged into a TAS 1010 Voiceband

Channel Simulator transmitted data while impairments were added to reproduce conditions found on clean, average, and dirty lines. To arrive at the proper settings for each line type, we used the 1982-1983 AT&T Bell Labs' "End Office Connection Study." AT&T measured 10 impairments, such as white noise, signal

(continued)

ternal V-series 9600 and 2400 (as well as the Smartmodem 2400, which offers limited synchronous capabilities) are capable of linking up with a mainframe synchronous modem in this configuration, although none of Hayes's internal modems can. A Modem Enhancer coupled with a Smartmodem 1200 also misses the boat, because the Smartmodem 1200 does not offer synchronous capabilities.

Other high-speed modems offer a synchronous mode, but the V-series goes one step further by supplying an intriguing AutoSync mode, which supports synchronous communications without a synchronous adapter. For a user who needs to access MCI Mail or Dow Jones using asynchronous communications and corporate mainframe data bases using synchronous, AutoSync presents a simple, economical way to kill two birds with one stone.

Unfortunately, AutoSync is more a potential than a reality. AutoSync capabilities were actually resident in the original Smartmodem 2400B when it was first released, and in the Smartmodem 2400 for the last two years of its manufacture. The stumbling block is that AutoSync requires terminal emulation software that has the Hayes Synchronous Driver (HSD). Currently, only two such packages exist—DCA's *Remote 3270* and CQ Computer Communication's *CQ-3270R*—although Hayes reports that over 100 vendors have licensed the HSD and plan to include it in future software releases. Ironically, Hayes's

own communications package, *Smartcom III*, does not offer the HSD (see "Smartcom Wises Up" in this issue).

Hayes admits that initial 9600-bps AutoSync implementations have been buggy, although the company claims that 2400-bps AutoSync is fully functional. At press time, new EEPROMs (programmable ROM chips) were being tested that enable V-series 9600s to support AutoSync. Once the kinks are ironed out, the company will send the new EEPROMs to any V-series 9600 owners who were dealt out of 9600 AutoSync capability. Hayes also claims that by the time you read this, all V-series 9600s will come off the assembly line with a 9600-bps AutoSync function that works.

Mainframe Error Control



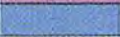



Hardware-based error control is a necessity at 9600 bps. High-speed telecommunications over dial-up lines—even when transferring text files—is simply too error prone for the rudimentary protocols (such as XMODEM) offered by most software. Like Hayes, nearly all manufacturers of high-speed modems use hardware-based error control and require an identical remote unit for 9600-bps transmission.

Because an internationally accepted error-control standard is still years away, Hayes had to devise its own protocol. The company decided on a proprietary version of the X.25 synchronous







PC World Evaluation

(continued)







Dirty Line

	Text file	bps
Microcom AX/9624c		17,114
V-series 9600		16,602
V-series 2400		6077
Smartmodem 2400 w/Enhancer		6075
Smartmodem 1200 w/Enhancer		2451
Smartmodem 2400		2385







Spreadsheet

	Spreadsheet	bps
V-series 9600		12,821
Microcom AX/9624c		10,623
Smartmodem 2400 w/Enhancer		4236
V-series 2400		4228
Smartmodem 2400		2373
Smartmodem 1200 w/Enhancer		1710







Graphics

	Graphics	bps
V-series 9600		11,038
Microcom AX/9624c		10,985
V-series 2400		3411
Smartmodem 2400 w/Enhancer		3411
Smartmodem 2400		2339
Smartmodem 1200 w/Enhancer		1389

Program

	Program	bps
Microcom AX/9624c		11,947
V-series 9600		10,313
V-series 2400		3182
Smartmodem 2400 w/Enhancer		3180
Smartmodem 2400		2346
Smartmodem 1200 w/Enhancer		1292

Random

	Random	bps
V-series 9600		9096
Microcom AX/9624c		9004
Smartmodem 2400 w/Enhancer		2785
V-series 2400		2784
Smartmodem 2400		2376
Smartmodem 1200 w/Enhancer		1123

loss, amplitude jitter, and phase jitter, on 6500 predistorted long-distance phone lines. The study revealed that a clean line had a maximum white-noise level of 30 decibels (db); an average line, a level of 32db; and a dirty line, a level of 35db.

File transfer The proprietary Hyper Protocol included in *Hyper-*

Access was used to transfer five files from hard disk to hard disk under each line condition. The files, each 100,000 bytes long, consisted of an ASCII text file, a 1-2-3 spreadsheet file, a program file, a file composed of randomly generated binary codes, and a bit-mapped graphics file. The

Direct Line (no impairments)

	Text	bps
V-series 9600		17,351
Microcom AX/9624c		17,123
V-series 2400		6077
Smartmodem 2400 w/Enhancer		6077
Smartmodem 1200 w/Enhancer		2451
Smartmodem 2400		2385

Spreadsheet

	Spreadsheet	bps
V-series 9600		14,340
Microcom AX/9624c		10,612
Smartmodem 2400 w/Enhancer		4240
V-series 2400		4238
Smartmodem 2400		2373
Smartmodem 1200 w/Enhancer		1712

Graphics

	Graphics	bps
V-series 9600		11,779
Microcom AX/9624c		11,001
V-series 2400		3412
Smartmodem 2400 w/Enhancer		3412
Smartmodem 2400		2339
Smartmodem 1200 w/Enhancer		1390

Program

	Program	bps
Microcom AX/9624c		12,295
V-series 9600		10,858
V-series 2400		3184
Smartmodem 2400 w/Enhancer		3181
Smartmodem 2400		2346
Smartmodem 1200 w/Enhancer		1292

Random

	Random	bps
V-series 9600		9509
Microcom AX/9624c		9291
V-series 2400		2784
Smartmodem 2400 w/Enhancer		2784
Smartmodem 2400		2376
Smartmodem 1200 w/Enhancer		1123

data compression provided by Hyper Protocol was turned off for all of the tests. The connection between computer and modem was established at the highest speed setting. The throughput in bits per second for each test was calculated by dividing

1 million (100,000 bytes x 10 bits per byte transferred) by transfer time in seconds.

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

protocol used in the mainframe world of packet-switched networks.

The X.25 protocol is normally associated with multiple sessions. However, the V-series version of X.25 omits the protocol's multiple-session layer and retains the Link Access Procedure Balanced (LAPB) layer, which deftly handles single-session, synchronous error control. To bring the strictly asynchronous Smartmodem 1200 into the family, Hayes also developed an asynchronous implementation of LAPB called the Asynchronous Framing Technique (AFT). This enables other V-series devices to communicate with a Modem Enhancer/Smartmodem 1200 pairing and still get hardware-based error control.

By drawing on an existing mainframe communications standard, the V-series' LAPB/AFT combination—which is built into all V-series devices—advances the day when synchronous communications between PCs and mainframes will be de rigueur. In the near future, the company also plans to add X.25's multisession capabilities to V-series error control. Furthermore, because X.25 is similar to the emerging protocols for tomorrow's standard, the Integrated Services Digital Network (ISDN), Hayes has laid the groundwork for compatibility with future communications protocols.

In addition to developing a protocol, Hayes also needed to choose its own modulation standard for 9600-bps communications. The company selected a

How to Tame a V-Series

Any communications program that supports the Hayes Smartmodem supports the V-series modem. However, support is a relative term; if you plan on communicating with other V-series users and want to exploit V-series benefits such as error control and data compression, you'll probably have to do a little software tinkering. With *Smartcom III*, that configuration happens automatically, and future versions of other major packages will undoubtedly make the process as easy as selecting the V-series from a list of modem drivers. However, with most existing programs you'll have to do some fine-tuning, which may be as simple as changing speed parameters or as complex as shifting flow control settings or sending new modem initialization strings.

In most cases, you'll need to go to your program's configuration menu and select the highest-speed Hayes Smartmodem driver available. Next, you may need to change speed parameters. With the V-series 9600

models, select 19,200 bps. For the other V-series units, choose 9600 bps. Selecting the right file transfer protocol is also important. Although any protocol will work, most interfere with the V-series hardware-based error control, thus greatly limiting throughput. In general, select the protocol that works with the largest block size.

Finally, you'll probably have to modify your software's flow control, which dictates the way data is passed between the modem and the PC. Because the V-series uses data compression, it requires strict flow control compatibility. The better your flow control, the better your throughput performance; the RTS/CTS flow control technique will achieve the best performance. You can also use the XON/XOFF or Transparent XON/XOFF technique, but performance will suffer.

If you have difficulty configuring your software, your Hayes dealer can provide you with specific instructions.

—A. W. and E. B.

modified version of the high-end CCITT V.32 standard. Trellis Code Modulation, an important part of this specification, enables V-series devices to minimize errors while sorting audio signals from background noise.

The problem with V.32 is that it's a full-duplex standard, and therefore expensive. A full-duplex modem must use sophisticated *echo cancellation* to suppress interference from the modem's own transmission, enabling it to receive and transmit data simultaneously without error. Most often used for mainframe communications, full-duplex V.32 modems generally start at \$2500.

Hayes provides a less expensive solution: simulated full duplex in the form of *fast turnaround*. This so-called ping-pong technique monitors line transmissions, instantly switching the channel to the modem sending the most data at a given time. Fast turnaround can't quite match the speed of full duplex, but most users will be unable to tell the difference.

New Wine, Recycled Bottle

The V-series modems may be smarter, but it's tough to tell from the outside. All three of the new external units share the style and shape of the original Smartmodem 1200. With the exception of the Modem Enhancer, the external units contain the traditional Smartmodem LEDs. The internal models resemble the Smartmodem 2400B; the full-length boards are equipped with two phone jacks and a handy external switch for changing COM ports.

Executive Summary

V-series Smartmodem 9600, V-series Smartmodem 2400, and V-series Modem Enhancer

High-speed modems and modem enhancement device

Hayes's new V-series includes the company's first 9600-bps modem, which has built-in error control (based on the X.25 standard) and data compression. These hardware-based features extend to the other members of the V-series family, the V-series Smartmodem 2400 and the Modem Enhancer (a modemlike device that brings V-series capabilities to old Smartmodems). In all cases, the data compression raises effective throughput far above the bps rating. Although the new features activate automatically, you need two V-series devices to exploit the new benefits. Moreover, the V-series 2400's \$899 price may be high for some users.

V-series

Hayes Microcomputer Products, Inc.

705 Westech Dr.

Norcross, GA 30092

404/449-8791

List price: V-series Smartmodem 9600 \$1299, V-series Smartmodem 9600B \$1199, 9600B with Smartcom III \$1299; V-series Smartmodem 2400 \$899; V-series Smartmodem 2400B \$849, 2400B with Smartcom III \$899, V-series Modem Enhancer \$349

Like the Smartmodem 2400, V-series devices forgo DIP switches in favor of software-based AT commands, which control functions ranging from adjusting speaker volume to selecting pulse or rotary dialing. In addition, four new AT commands handle specific V-series functions, such as those relating to data compression and handshaking. You can even instruct a V-series modem to hang up if it encounters a non-V-series modem.

For the technically ambitious, Hayes also includes enough non-volatile RAM to store about every imaginable communications parameter, including a whopping 38 S-registers. The modems arrive preconfigured with default factory values saved in ROM, but you can modify these and save the current changes in a user profile in non-volatile RAM. That RAM can store two profiles and up to four phone numbers for subsequent dialing. Like the Smartmodem, the V-series models come with a battery of diagnostic tests.

A Family Affair

With compatibility among V-series products, competitive pricing, and the Hayes nameplate, the V-series Smartmodem 9600 may be the first 9600-bps modem to spawn clones. Features such as data compression, advanced error control, and synchronous support match or improve upon those of 9600-bps competitors. And to sweeten the pot, you can get Smartcom III for a mere \$50 or \$100 extra when you buy a V-

series 2400B or 9600B modem, respectively.

Hayes's boldest stroke, however, is building error control and data compression into the V-series 2400s and the Modem Enhancer. V-series 9600s can communicate with 2400s or enhanced Smartmodems and still cull the hardware-based benefits, while the lower-speed V-series devices profit from high-end, automatic features normally associated with 9600-bps communications.

Nonetheless, the V-series 2400s aren't for everyone. Although it's more trouble, a Smartmodem 2400 with a software-based data compression program (such as *HyperAccess*) can achieve throughput every bit as impressive as that of the V-series 2400. And because reaping the new benefits requires two V-series devices, single-unit purchasers have little reason to pay almost \$900 for a 2400-bps modem—especially when Hayes has cut the price of its trusty Smartmodem 2400s by nearly a third. Until a healthy percentage of users buy into the V-series, large companies interested in bulk modem purchases for branch locations will be the most likely V-series customers.

The surprise winner may be the Modem Enhancer, which for a reasonable price brings powerful new features to a large installed base. And the larger the V-series family, the more chance V-series users have to gain the full benefit of their modems. ●

Art Wilcox and Eric Brown are contributing editors for PC World.

Smartcom Wises Up

Smartcom II's spartan features and simple interface delivered steady but minimal service. With a powerful new programming language, Smartcom III steps up to high-end communications.

Eric Brown and Art Wilcox

For years communications software has been dominated by two superpowers: *Smartcom* and *Crosstalk*. The *Smartcom* line has been the more prosperous, largely due to its reputation for simple operation and the generous discounts given to Hayes modem buyers. Now, the old foes have renewed their blood feud by introducing high-end versions that include menu-driven interfaces, powerful programming languages, and an avalanche of new features (see "Crosstalk Misses the Mark," PCW, October 1987).

Smartcom III, Hayes's current champion, is designed to appeal to advanced users. New features include a sophisticated programming language with a Learn mode, a full-featured text editor, file compression and encryption, and additional error-checking protocols, including remote Kermit operations. *Smartcom III* also supports modems at speeds of 9600 bps and higher and supports Hayes's new V-series modems (see "Thoroughly Modern Modems" in this issue).

Despite these improvements, *Crosstalk Mk.4* has the edge in a feature-by-feature comparison. Its more advanced support for multiple sessions through the X.PC protocol and its programming language, which is more powerful than *Smartcom*'s, make it ideal for high-end applications—but that's about all. *Smartcom III*'s advantage lies in its ability to meet the needs of a wide range of users, with the exception of absolute beginners. Unlike its predecessor, *Smartcom III* is tricky to set up and demands 512K of memory and roughly 1MB of disk space. However, advanced users and those with some on-line time under their belts will find that *Smartcom III* meets their everyday communications needs and more.

The Menu Maze

Smartcom III features an easy-to-use menu-driven interface. From the main menu, single keystrokes access six individual menus: one each for communications sessions, the text editor, disk operations, data link connections, on-line activities, and program settings. The menus' thorough error-trapping system has a typing checker that fills in an entry after you type one or two letters.

Advanced users, however, may find the program's interface stilted. You can't, for example, disable prompts or override menus. The absence of effective hot keys would be tolerable except for one fatal flaw—the program has a marked distaste for RAM-resident macro processors. On both 512K and 640K PCs, *Smartcom III* gave *Keyworks* and *ProKey* the bum's rush and made using other TSRs a problem.

Moreover, *Smartcom III*'s interface has a major bottleneck: the lack of a main base of operations for on-line connections. Rather than place entries in a central dialing directory as you do on *PC-Talk*, you divide on-line session information between two separate menu systems called Connection and Activity. Connection settings cover the data link, which includes the phone number, speed, parameters, modem settings, and flow control. Activity settings regulate on-line details such as session control and the way data is displayed and captured.

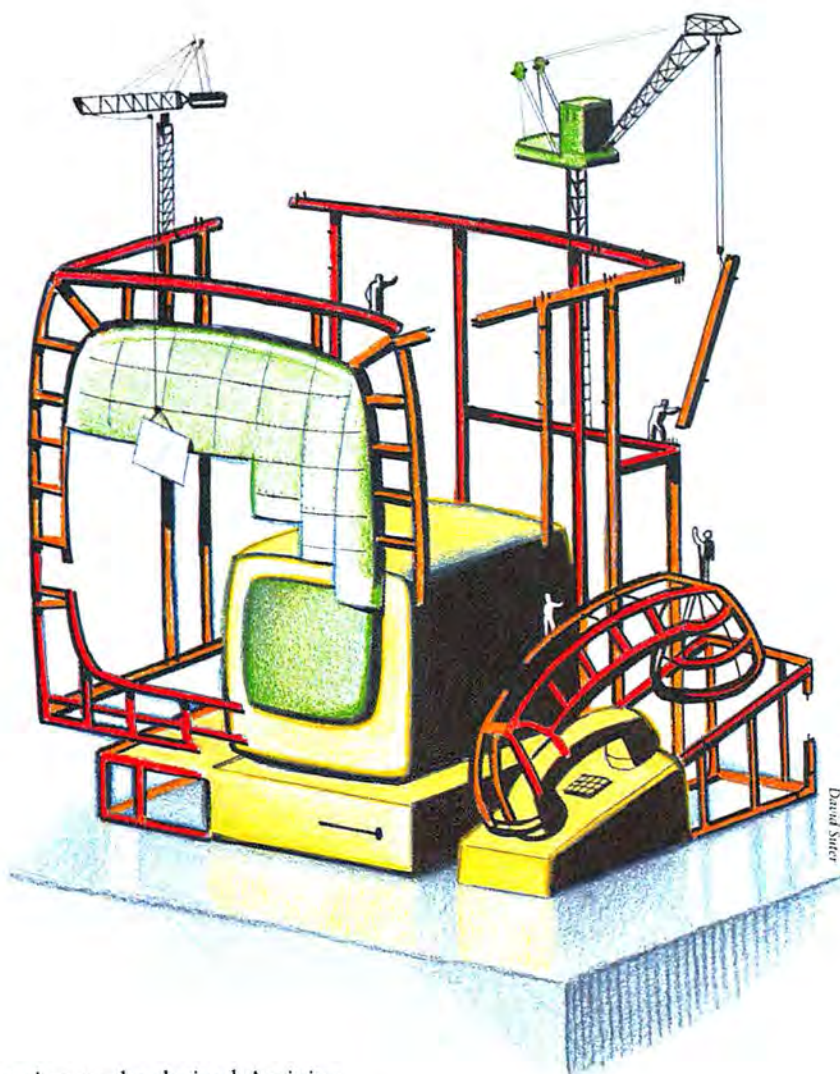
After entering the settings for both menu systems, you instruct the program to match the Con-

nection to the desired Activity. Whenever you want to dial a service, you initiate the session from the main menu, select an Activity from the table, and then select a Connection listed under that Activity.

Why this repetition of effort? The theory is that certain fundamental Activity profiles can be set up for a number of different Connections. For example, if you're accessing two identical mainframes, you need only create the Activity setting once and attach two sets of Connections. In practice, this two-step structure is confusing and too complicated for beginners. Even after repeated

use, it's never intuitively clear which menu to use to change a particular setting.

Smartcom III rescues you from some of this setup tedium by providing six preprogrammed log-on scripts for popular on-line services such as CompuServe, The Source, and Dow Jones News/Retrieval. The scripts not only automate log-ons but also help beginners navigate each service. Unfortunately,



David Sinter

the manual makes no mention of these scripts; if you don't scour the README file, you'll never realize their benefits.

Another vexatious stumbling block: Although *Smartcom III* lets you rename, delete, and copy parameter entries, you can't globally edit them. To reduce the speaker volume, for example, you must change that value in every Connection menu in the directory. Even modifying default values affects only the current entry.

Once you manage to link all the connections and activities and automate the process with scripts, the program is quite easy to use. But until you're set up, be prepared for some headaches.

On Line at Last






When you finally dial with *Smartcom III*, you can monitor the progress of the connection—setting up the modem, dialing, and connecting through a helpful window. Once you're on line, you can simultaneously capture data to disk and print or append text to an existing file. A handy new feature is the Peruse buffer, which automatically stores up to 100K of incoming data in a separate slice of RAM. You can print data from the buffer or store it to disk even after you've disconnected.

Smartcom III's workmanlike file transfer capabilities are broader than *Smartcom II*'s. Uploading an ASCII file, which is called *autotyping*, requires only a quick two keystrokes from the Session menu to send a disk file or data from the text editor's buffer. When autotyping to systems with finicky timing constraints, you can pace file transfers with character, line, and time delays and re-






PC World Evaluation

Smartcom III






Without protocol

		seconds
Smartcom III		13.2
HyperAccess		14.2
Crosstalk XVI		24.8
Crosstalk Mk.4		31.9
Relay Silver		38.4





With protocol

	Checksum XMODEM	seconds
HyperAccess		12.8
Crosstalk XVI		14.1
Crosstalk Mk.4		16.1
Relay Silver		16.4
Smartcom III		16.6

Kermit

		seconds
HyperAccess		11.5
Relay Silver		18.2
Crosstalk XVI		19.4
Smartcom III		20.0
Crosstalk Mk.4		24.4

With errors

	Checksum XMODEM	seconds
Crosstalk Mk.4		26.1
HyperAccess		35.3
Relay Silver		189.9
Smartcom III		254.6
Crosstalk XVI		*

Kermit

		seconds
HyperAccess		16.5
Smartcom III		21.7
Crosstalk Mk.4		44.7
Crosstalk XVI		*
Relay Silver		*

* Program did not complete test

With delay

	Checksum XMODEM	seconds
HyperAccess		88.9
Crosstalk XVI		90.4
Crosstalk Mk.4		93.6
Relay Silver		93.7
Smartcom III		95.4

Kermit

		seconds
Crosstalk Mk.4		30.9
HyperAccess		98.9
Smartcom III		104.6
Relay Silver		108.6
Crosstalk XVI		141.4

Smartcom III's file transfers without a protocol outrace all comers, but errors and time delays bog down transfers with Checksum XMODEM.

All tests were performed on a pair of IBM PC XT's connected by a null modem cable. Tests consisted of the transmission of a 10,000-byte test file at 9600 bps. Prior to testing, each hard disk was formatted and DOS 3.20 was installed in its own directory. A CONFIG.SYS file was then created in the root directory, specifying FILES = 20 and BUFFERS = 25. In tests using protocols, each program was run with Checksum XMODEM and Kermit. Although these protocols are not universal standards, most communications programs support them. Finally, the

communications program was installed in its own directory according to the manufacturer's instructions. The identical program and version number were used on each computer, but to maintain the integrity of our tests, the program serial numbers were different.

Without protocol The program was set to display each character as it was echoed from the host (remote echo).

With protocol The program transmitted a 10,000-byte text file at 9600 bps with Checksum XMODEM and Kermit.

With errors A 10,000-byte text file was transmitted, and errors were inserted into the transfer at the rate of 1 character dropout and 1 changed byte per 1500 characters.

With delay For this test, characters were delayed approximately 0.5 second between computers.

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

mote echo, as well as with pauses for host prompts.

Transferring files with protocols is similarly easy. Once you log on to the remote system, you simply pop open the Session menu, choose the protocol you selected while creating the Activity setting, type in the file name, and send the file.

During an on-line session you can switch to terminal mode and modify parameters, use the text editor, or run scripts. To its credit, *Smartcom III* doesn't imprison you during file transfers as *Mk.4* does; you can wander off to work in any area of the program.

Smartcom III offers a respectable array of error-checking protocols that can handle any type of file. The protocol lineup is much more comprehensive than *Smartcom II*'s and holds its own against *Mk.4*'s. Kermit, a common main-frame protocol, replaces the Hayes proprietary protocol for remote access. Other protocols include XMODEM, XMODEM CRC, and XMODEM 1K, which sends 1K blocks for faster transfers. And in addition to YMODEM, which supports the uploading of several files at a time, Hayes includes YMODEM G, a protocol designed to work with error-checking modems such as the V-series. Unlike *Mk.4*, *Smartcom III* doesn't support X-PC's multisession capabilities, but you can communicate through two modems simultaneously on separate COM lines.

In transferring nonprotocol ASCII files, *Smartcom III* was the speediest of the programs tested by the National Software Testing Laboratories (NSTL). In tests with protocols, *Smartcom III* was com-

Smartcom II, Smartcom III, and Crosstalk MK.4 Compared

Feature/Program	Smartcom II	Smartcom III	Crosstalk Mk.4
Text editor		★	★
Terminal emulation	TTY, VT 100/102/52, ANSI.SYS	TTY, VT 100/102/52, ANSI.SYS	ANSI, AT&T Model 513; Data General Dasher D210, D211; DEC VT 100/102/220; Datapoint Datastation 3601; Hazeltine Esprit II; IBM 3101 Models 10, 20; TTY; Tele- Video 912, 920 925, 950; ADDS Viewpoint
File-transfer options	XMODEM, Hayes	Kermit, XMODEM, XMODEM CRC, XMODEM 1K, YMODEM	Crosstalk, CompuServe B, Dart, XMODEM, XMODEM CRC, YMODEM
Autocapture buffer		★	★
Script language		★	★
Learn feature		★	★
Predefined scripts	0	6	10
Remote operation	★	★	★
Test macros	★	★	★
Command hot keys			★
Multiple sessions	0	2	15
X-PC support			★
RAM required	192K	512K	384K

parable in speed to other communications software but slower than high-end programs that use sliding window techniques, such as *Mk.4* and *Relay Silver*. In timing tests where errors were inserted during the transfer to simulate a poor telephone connection, *Smartcom III* with the XMODEM protocol was significantly slower. However, most protocols worked well during NSTL tests and were easy to invoke from either end of the link.

Getting Next to Kermit

Although *Smartcom III* implements Kermit's remote-access features, running remote applications becomes possible only by calling in to a sophisticated mainframe version of Kermit. Remote communications between two PCs using *Smartcom III* and Kermit are more limited: You can upload and download files; view

directories; and copy, rename, and delete files—but don't expect to run even the smallest applications.

Although support for Kermit and V-series modems may facilitate your micro-to-mainframe communications, note that *Smartcom III* emulates the same terminals as *Smartcom II*: TTY, VT 100/102, VT 52, and ANSI.SYS—a meager list compared to that of *Mk.4* or even *Crosstalk XVI*. With *Smartcom III* you can automatically take advantage of the V-series' error-checking and file-compression capabilities.

Moving Up to Scripts

Smartcom III's most powerful feature is its script language, SCOPE (simple communication programming environment). Although SCOPE is less powerful than *Mk.4*'s CASL, it's much easier to master. Instead of writing a script from scratch, you're likely to use *Smartcom III*'s excellent Learn mode, which records the log-on process and translates responses and wait periods into SCOPE commands. Next time you log on, you can run this ready-made script or edit it with the handy script editor.

You can also create scripts that automate print and disk captures and send and receive files. When you encounter conditional situations, switch to the script editor, where you can use SCOPE to insert the necessary conditional statements. *Smartcom* scripts enable you to bypass the Activity and Connection morass. With scripts that run automatically when you start *Smartcom III*, you can easily log on to a remote system and begin on-line activity.

■ A Distinguished Editor

Smartcom III's text editor is in a class by itself, outshining that of *Mk.4* and most communications packages. It works both on line and off and is just a keystroke away at any time. The editor features text reformatting and automatic word wrap. It also lets you skip through text by character, word, line, or screen and offers several ways to delete text.

Although the editor handles text adroitly, it has drawbacks. The search-and-replace feature lacks case sensitivity. Changing margin settings is a circuitous process that involves exiting the editor and hunting through the Program Settings menu. Despite these flaws, the ability to perform basic editing, reformat text, and handle files as large as 100K makes *Smartcom*'s text editor a workable and convenient alternative to a word processor.

■ File Management

The Disk Operations menu lists the program's capable and thorough file management features. In addition to displaying a file directory, *Smartcom III* enables you to access, create, and delete any directory on your system. The program also offers a TYPE command and a command that lists the directories that contain a specific file or set of files. The copy, rename, and delete commands offer wild-card operation with confirmation messages.

Smartcom III can also convert *Smartcom II* communications settings into Activities and Connections and translate *Smartcom II*

macro files into *Smartcom III* scripts. The conversion utility conveniently lists all applicable files in a table. *Smartcom II* communications settings that use variable time settings require some tinkering with the script editor to run properly as *Smartcom III* Activities. The Disk Operations menu also lists two of *Smartcom III*'s most unusual and valuable features: file compression and file

encryption. To encrypt a file, simply type in a password; if you don't, *Smartcom* will just compress the file.

The compression utility uses an algorithm similar to that used in V-series modems. Compression tests yielded a total decrease in transfer time of 30 to 35 percent—a considerable savings. As in any compression scheme, text files compress more and transmit faster than binary files. If you use *Smartcom*'s data compression in conjunction with a V-series modem, the results will be slightly better than with another modem.

Executive Summary

Smartcom III

1.0A

Communications software

Aimed at the intermediate-to-high end of the communications market, *Smartcom III* offers a noteworthy text editor, a sophisticated programming language, some support for Hayes V-series modems, and goodies such as file encryption and compression. Although the program's complex structure and lack of hot keys handicap it, buried under *Smartcom III*'s mud slide of menus you'll find a mother lode of well-implemented features.

Hayes Microcomputer
Products

705 Westech Dr.
Norcross, GA 30092
404/449-8791

List price: \$249; upgrades
\$60 if *Smartcom II* was
purchased in 1986, \$30 if
purchased in 1987, and \$75
if purchased in 1988; pro-
gram bundled free with pur-
chase of internal versions of
2400- and 9600-bps Hayes
V-series modems

Requirements: 512K, hard
disk, modem

Not copy protected

■ Striking a Balance

Smartcom III is the clear choice for intermediate to advanced users who want a more powerful communications package, although adjusting to *Smartcom*'s unusual interface will take time. However, advanced users should be forewarned that *Smartcom III* can't match all of *Crosstalk Mk.4*'s high-end capabilities. SCOPE doesn't have the programming power of *Mk.4*'s CASL, and *Mk.4*'s support for the X.PC protocol provides multiple-session capabilities far beyond what's possible with *Smartcom III*.

But because *Mk.4* is a nightmare to learn, *Smartcom III* is a better choice for most users. The complex setup procedures notwithstanding, once you automate the program with scripts, *Smartcom III* is an admirable communications ally. ☸

Eric Brown and Art Wilcox are
contributing editors for PC
World.

Making the E-Mail Choice

When you're shopping for an E-mail service, the bottom line isn't the only place to look. How much a service costs may be less important than who subscribes to it and how convenient it is to use.

*Ken Smith and
William Rodarmor*

Until fairly recently, sending a document quickly to another city or country meant using a telex machine that looked and sounded like a diesel-driven typewriter. Today electronic mail (E-mail) has made the process considerably faster, cheaper—and quieter. Five million Americans already use E-mail; that number should double and perhaps triple in the next five years. Clearly, if you're considering E-mail, you're not alone. With a raft of services available, though, it takes shrewd shopping to find the E-mail connection that's right for you.

Most people focus on money when they think about electronic mail, yet how easy a service is to use, what kinds of messages it can handle, and how many subscribers it reaches can be far more important than its price tag. Of the services that follow, the ever-popular MCI Mail offers cheap access to a large user base via an interface that you can live with. AT&T Mail, a relatively new E-mail service, offers such fancy features as auto-answer and voice mail and comes with a price to match. Western Union's EasyLink is as

clunky as they come, but it can put a message almost anywhere on earth.

Other E-mail services are available, but none so closely attuned to the needs of business users as the ones reviewed here. The Source and CompuServe both offer E-mail, for example, but SourceMail isn't particularly easy to use, and CompuServe limits messages to 10K (or 600 lines). Moreover, their users don't make much use of their E-mail privileges. CompuServe subscribers, for example, send an average of 3 messages a month, compared to AT&T's 20.

E-Mail User, Know Thyself Before you sign up for any E-mail service, ask yourself some questions. Do you expect to send out 30 memos a day, or just a few long reports every month? Annual subscriptions, per-message cost, connect charges, and special handling fees don't always add up the same way. MCI and AT&T, for



example, don't impose a connect charge; they bill based on the number of characters sent. Western Union charges only for the time you spend on line, which means you may be able to send a 20-page report more cheaply via EasyLink than MCI Mail, once you learn to upload files efficiently; EasyLink also cuts its rates substantially for late-night mailings. All the services offer volume subscriber discounts.

What type of data do you plan on sending? Naturally, the three services handle reports, letters, and other ASCII text files; except for MCI Mail, they also manage spreadsheets, graphics, and other binary files. (You can push MCI

Mail into the eighties with the aid of a program like Lotus's *Express*.) MCI Mail and AT&T Mail can even store expense reports, invoices, purchase orders, and other forms; you just fill in the blanks on line, then transmit the form and its information.

What about hard copy? All three services will print and deliver copies of your message on paper, some with a facsimile of your letterhead and signature. AT&T Mail will even guarantee same- or next-day delivery, though it can be expensive.

E-Mail Features and Charges Compared

	MCI Mail	EasyLink	AT&T Mail
Features			
Mailboxes (estimate)	100,000	170,000	20,000
Messages sent per month	1,900,000	9,000,000	400,000
Error-checking protocols supported	X.PC	XMODEM, Fast	XMODEM, Kermit
Binary files accepted	◆	◆	◆
On-line forms	◆	◆	◆
Length of message storage (days)	1 or 10	10	1
Paper mail			
Overnight delivery	◆	◆	◆
Same-day delivery	◆	◆	◆
Logo/signature	◆	◆	◆
Phone confirmation	◆	◆	◆
Charges			
Annual subscription	\$18	\$25	\$30
Monthly charges	\$10 ¹	\$25 ²	n/a
WATS charges per minute	\$.15	\$.65 to \$.80	n/a
Estimated costs			
50 words	\$.45	\$.25	\$.40
250 words	\$1	\$.25	\$.80
4 pages	\$2	\$.90	\$1.60
8 pages	\$4	\$1.80	\$3.20
Paper mail			
Overnight letter	\$9	\$8.75	\$7.50
Same-day delivery	n/a	n/a	\$27.50

¹Advanced service

²Telex service

press and *Get* to packages supplied by AT&T and Western Union, can automate the entire process, from log-on to sending and retrieving messages.

MCI Mail: Reliable Standby

MCI Mail retains its popularity for one good reason: Its only mission is to provide cheap and simple electronic mail service. Its subscriber base is ample, and the service lets you send telexes via Western Union, ITT, and RCA or ship personalized printed messages via first-class mail or next-day courier. The company also provides a direct link to an on-line news data base (Dow Jones News/Retrieval), a feature offered by only one competitor—Western Union. MCI's main drawbacks? It doesn't support error-checking protocols such as XMODEM or accept binary files without the aid of third-party programs.

Although there are important differences, MCI Mail's overall structure resembles that of most E-mail services. An electronic *in-box* holds recently received messages; an *out-box*, those just sent; a *draft* area stores your text while you compose it; a *desk* automatically holds previously read messages for one or ten days, depending on your level of subscriber service. To peruse the contents of, say, your in-box, type *scan* and then *inbox* at the system's prompts; a numbered list noting each message's posting date, sender, subject, and size in bytes pours onto the screen. Type *read* or *print*, followed by the appropriate message numbers, and your E-mail is displayed a screenful at a time or in one continuous stream.

Finally, do you need to reach the corporate multitudes here and abroad? If so, consider a service's audience—and don't be fooled by simple head counts. E-mail services sometimes blend individuals and companies when counting subscribers, and some services' users are more communicative than others. Note too that some services expand their reach by connecting with other E-mail systems. MCI Mail users can swap messages with CompuServe sub-

scribers, AT&T Mail with Canada's Envoy, and EasyLink with services in England and France.

Using an E-mail service is probably the least painful introduction to telecommunications, but if the very thought gives you hives, you can stop scratching. A new breed of dedicated E-mail communications packages, ranging from third-party entries such as *Ex-*

Sending a message is just as simple. Type *create* at the command line, and at the 'TO:' prompt supply the recipient's MCI handle (such as *bsmith*), ID number, or company name. Then either tap in your message on line or transmit a previously prepared ASCII or *WordStar* file. The latter approach is highly recommended, since editing a message composed on line means wandering the catacombs of MCI Mail's submenu system to display the message, identify the faulty lines by number, and laboriously enter corrections.

MCI Mail offers a typical assortment of useful features. The Basic service greets novices with a menu listing options such as Scan, Read, and Help; Advanced users (who pay \$10 extra per month for the privilege) can bypass menus and issue compound commands (such as *scan inbox* or simply *sc in*) at the command line. Any message can be easily forwarded to another subscriber, and you can send a single document to literally thousands once you have created a distribution list holding the electronic addresses of all recipients.

Of course, MCI Mail has its soft spots. On-line editing functions are largely limited to word and line delete, and on-line help is often exceedingly terse. And though the system's ability to use unvarnished *WordStar* files is a boon, the business world is largely dominated by *WordPerfect* and *Microsoft Word* users; their needs—and those of spreadsheet users—should be addressed.

6	Nov 26 02:16	Scott Spanbauer	Speak, MemoryMate	12569
7	Nov 26 16:51	Pat Soberanis	Re: AgriData Review	652
8	Nov 27 12:55	Stephen Blumenthal	OWE article	10832
9	Nov 27 17:25	Robert Luhn	RE: Online reviews	290
10	Nov 27 20:20	Robert Luhn	Snooping	1427
11	Nov 27 21:51	Patrick Marshall	Suggestion & question	1026
12	Nov 28 17:36	Dennis P. Dykstra	Program for QuickBASIC c	1551
13	Nov 28 17:54	Robert Luhn	RE: Snooping	793
14	Nov 28 20:04	Patrick Marshall	Reviews	1113
15	Nov 28 20:52	Robert Luhn	Sending tables	487
16	Nov 29 03:26	Robert Luhn	Questions on Email	1769
17	Nov 29 23:04	Robert Luhn	The sidebar	3186
18	Nov 30 03:47	Robert Luhn	Email and other things	6043
19	Nov 30 07:46	Alan Southerton	Alan Update	781
20	Nov 30 16:52	M. Melissa Short	AgriData Network	2394

Press RETURN for more; type NO to stop:

19 messages in DESK

No.	Posted	From	Subject	Size
21	Nov 30 17:20	John R. Houser	X.pc protocol	110

Command: pr 18

F1SAVE F2send F3print F4ff F5pilot F6enukeys F7hangup F9menu N 4:54

MCI Mail stores messages you have already read in a holding area called the desk. To reread an old message, you first scan the desk, then read or print the message by number.

```

Connected to EasyLink      00:04:53  Log OFF  Print OFF

NUM      Finds Name & Answerback when only number is known.
         To use Enter:  NUM NUMBER
         Ex for TLXI   : NUM 7314185
                   TLXII : NUM 910-221-2345
                   ESL   : NUM 62123456

ANS      Finds Name & Number when only Answerback is known.
         To use Enter:  ANS ANSWERBACK
         Ex: ANS JPCOMP

EXIT     Returns you to the EasyLink Service Menu so you can
         select another service.

QUIT     Disconnects you from the System

HELP     REPEATS THESE INSTRUCTIONS.

IF YOU NEED MORE HELP, REFER TO YOUR EASYLINK GUIDE OR CALL TOLL FREE
800-HELP-ESL (800-435-7375).
ENTER: NAME, NUM, ANS, HELP, EXIT OR QUIT

```

F1 Help 2 Set 2 3 UserID 4 PassWd 5 SnapSh 6 Recall 7 Log 8 Print 9 Edit 10 LangUp

It's a good thing EasyLink has decent on-line help, because system prompts aren't particularly user-friendly, and navigation is slow. If you want to write to a subscriber but don't know the name, you have to exit the mail creation area and move to a separate directory.

Executive Summary

MCI Mail

Electronic mail service

Clearly the E-mail standard, MCI Mail is reasonably cheap, reaches hundreds of thousands of users, and can swap messages with CompuServe. Paired with *Express*, MCI Mail is extremely powerful. It's the safe bet in the E-mail marketplace.

MCI Communications Corp.
P.O. Box 1001
1900 M St. NW
Washington, DC 20036
800/624-2255

Costs: annual fee \$18; Advanced option \$10/month; message rates 45 cents up to 500 characters, \$1 from 501 to 7500 characters, \$1 each additional 7500 characters

AT&T Mail

Electronic mail service

The Cadillac of E-mail services, AT&T Mail offers a first-class interface, a capable on-line editor, auto-answer, forms, and voice mail options. A front-end package, *Access Plus*, makes the service even more attractive.

AT&T Customer Assistance Center
P.O. Box 3505
New Brunswick, NJ 08903
800/367-7225 ext. 720,
800/624-5672

Costs: annual fee \$30; message rates 40 cents up to 400 characters, 80 cents from 401 to 7500 characters, 80 cents each additional 7500 characters

EasyLink: The Hard Route

You would expect more in the way of user friendliness and functionality from Western Union, the company that pioneered the field of electronic mail with its telex network. Alas, EasyLink belies its name. On-line help is minimal, account numbers and IDs are a jumble of numbers and letters that would defy a cryptographer (for example, WAU58-287306 SAN.FRAN), and outdated telex syntax and terminology are used for addressing, routing, and sending messages. The company even charges users a 50-cents-per-minute connect fee and \$25 a month for telex privileges. Nonetheless, don't write EasyLink off: Its 170,000-odd subscribers are among the world's busiest correspondents, sending a staggering 9 million messages a month.

A trip through EasyLinkland is fraught with detours and minor frustrations. Consider what's involved in sending a message. At Western Union's opening command line you must type */prompt* to display the main menu, which lists EasyLink; FYI, the company's news data base; and other Western Union services. Once into the EasyLink area, you can't query on line for an address as you can on MCI Mail. Instead, you must exit to the main menu, select the Directory of Information Services, and search for a subscriber by name, telex number, address, or company name. With the information in hand, you step back into EasyLink, address an electronic envelope, and compose your message. Just remember that EasyLink requires a different address format for E-mail, telex, and paper messages—and that there are no on-line editing tools.

If you're tempted to sign on for the sake of Western Union's vaunted telex network, think again. Although the company claims wider access to private E-mail systems than any other vendor, its telex network can be tapped by any of the services reviewed here at the same Western Union rate. Overseas, the service swaps E-mail with EasyLink (United Kingdom) and Missive (France).

AT&T Mail:

High-Priced Convenience

When a company like AT&T moves into the E-mail business, it's like Sherman setting out for Georgia. Though pricey, AT&T

Executive Summary

EasyLink

Electronic mail service

Unless you're a multinational corporation, think twice before signing on with EasyLink. An outdated interface and minimal on-line help make this service a poor choice for E-mail users, although Instant Mail Manager, the front-end package, greatly simplifies log-on and mail handling.

Western Union Telegraph
1 Lake St.
Upper Saddle River, NJ
07458
800/527-5184

Costs: annual fee \$25; telex charges \$25/month; message rates 50 cents per minute at 1200 bps; WATS line 80 cents per minute at 1200 bps

Mail offers as standard many of the features found in separate front-end programs. These include an auto-answer feature that automatically sends your personalized reply to anyone dropping a note in your box and an on-line editor with a nifty search-and-replace function. A Forms option lets you store canned forms for retrieval and reuse, a great time-saver for many businesses. You can even retrieve messages by phone: Dial AT&T's Mail Talk number, and a digitized voice will read your messages to you.

AT&T Mail's on-line features certainly make life easier. You press to erase a line, instead of laboriously backspacing over it. If you can't remember a subscriber's exact name, search the on-line directory with wild cards. If you delete a message and then change your mind, simply type *show wastebasket* to display the messages, and retrieve them with the Get command. Best of all, you can personalize AT&T Mail's prompts by customizing your "user profile."

AT&T Mail's documentation provides concise information without the technobabble found in most E-mail manuals. AT&T doesn't connect with MCI, although it does support a bridge to Envoy, a major player in the Canadian market.

When it comes to cost, however, let the buyer beware. AT&T Mail charges one of the highest annual fees, and its per-character-sent charge is neck and neck with MCI Mail's. Moreover, AT&T

```

===== Connected to Remote System          00:00:28  Log ON  Print OFF
Password:
** Welcome to the AT&T Mail Service.
Last logged in: Thu Oct 1 02:18 GMT 1987

HELP NEWS contains important information
regarding new AT&T Mail NEWS features.

For Customer Assistance send a free
message to !atthelp or call 1800MAIL672.

The following shared folder subscriptions have new messages:
!atthelp:news

CREATE a message.
DELETE one or more messages into the WASTEBASKET.
GET a message from the WASTEBASKET.
HELP - display all commands.
PROFILE - display or modify user profile.
QUIT - leave AT&T Mail, emptying the WASTEBASKET.
READ one or more messages.
SHOW what messages are in a folder.
Command:
F1 Help 2 Set 3 UserID 4 PassWd 5 SnapSh 6 Recall 7 Log 8 Print 9 Edit 10 HangUp

```

AT&T Mail's comprehensible menu includes some interesting options. Select Profile, and you can modify the system's prompts and on-line help to your liking. Delete a message by accident? Fear not—the Get option can retrieve anything you hastily toss out.

Mail is the only service reviewed that charges for the use of its on-line editor: 20 cents for the first 400 characters and 45 cents for the next 7100 characters. Finally, while AT&T's unique voice message system can't be beat, don't get carried away—the service runs you 45 cents a minute.

Down to the Wire

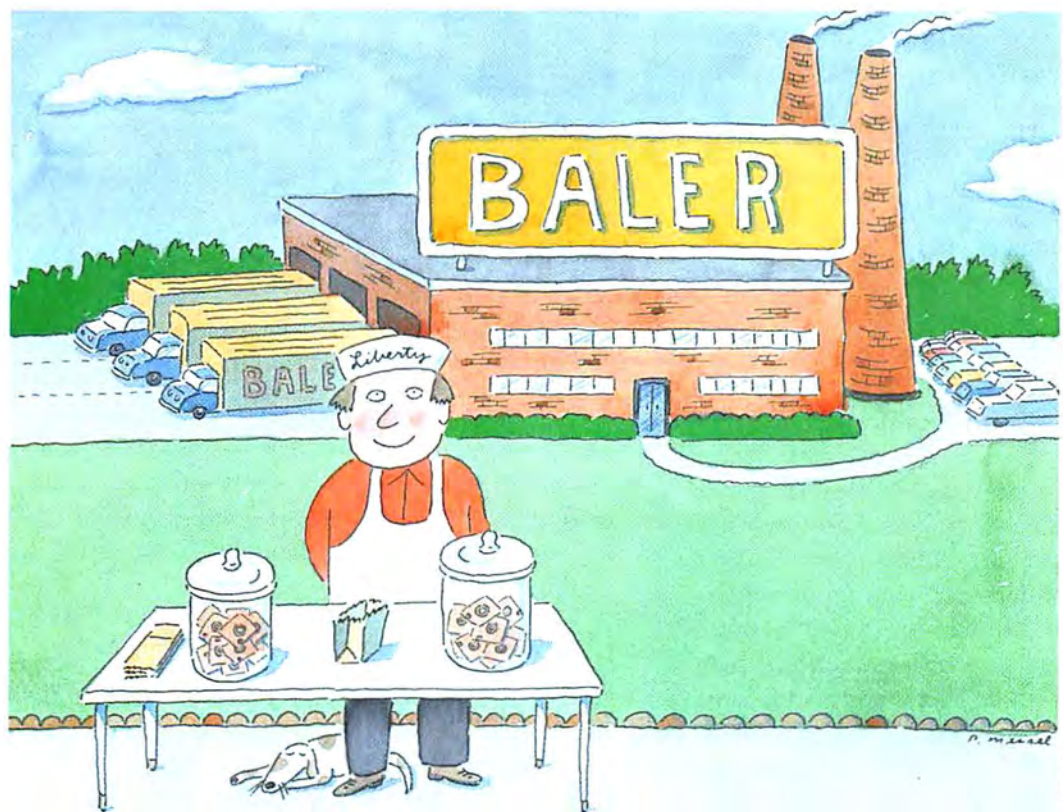
Considering EasyLink's limitations, the final choice in E-mail systems boils down to MCI Mail and AT&T Mail. MCI Mail is fast, manageable, and offers enough goods to satisfy anyone who needs to send a large number of text-only messages. AT&T Mail, on the other hand, has every bell and whistle, but it isn't cheap, and it's still the new kid on the

block, with fewer current subscribers than either of the other services.

Using MCI Mail is as different from using AT&T Mail as grabbing a fast sandwich is from sitting down to dinner—and most people tend to do both. So if you can't make up your mind, don't worry. Both services are good at what they do, and both will be around for the long haul. ●

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Worksheets Without 1-2-3



A new breed of “worksheet compilers” lets you turn 1-2-3 worksheets and templates into

applications that can be used without 1-2-3. There’s got to be a hitch.

Charles Seiter

||||| "Wait a second!" shouts SoftLogic Solutions' large-type ad for *@Liberty*. "You're saying I can create applications with 1-2-3, hand them out to, say, ten users...and they don't need 1-2-3 at their desks? I thought that was impossible—not to mention illegal." Brubaker Software's response calls and raises: "Don't mistake *The Baler* for the cheap competition. If you've tried their product, please don't be soured on 1-2-3 compilers; just return theirs and get the best."

Welcome to the battle of the worksheet compilers, a new kind of software that allows copies of a worksheet to be distributed and used independently of 1-2-3. These compilers convert worksheets into runnable applications complete with a 1-2-3-like interface and a subset of 1-2-3's commands. Formulas (and some macros) work but are hidden from end users, and labels can be defined as read only, so the worksheet is protected from errant fingers and prying eyes.

The result is a degree of uniformity and control that harried businesspeople once only dreamed about. Managers can distribute cookie-cutter worksheets and standardize data-gathering for a multidepartment budget; developers can distribute commercial templates without revealing macros and formulas; temporary

workers needn't master a mass of 1-2-3 commands; and department heads don't have to buy additional copies of 1-2-3 for everyone who contributes to the monthly sales report.

■ 1-2-3 Without 1-2-3

Head-butting advertisements aside, *@Liberty* and *The Baler* have a lot in common. Both are easy to use, can compile worksheets created with 1-2-3, *Symphony*, *Multiplan*, or *SuperCalc 4*, and produce applications that users manipulate with familiar 1-2-3 commands. Neither lets users change a compiled worksheet by adding formulas or macros. And of course data gathered in a compiled worksheet can be brought back into 1-2-3 for analysis, either by saving the compiled worksheet in .WKS format and loading the entire file into 1-2-3 or by copying a preselected range. (Since *The Baler* supports 1-2-3's File Combine command, you can consolidate worksheets without using 1-2-3.)




Beyond those points of resemblance, however, *@Liberty* and *The Baler* differ markedly in the way they convert worksheets, the




power of the applications they produce, and their likely audience. *@Liberty* is like a Polaroid camera—it's cheap and fast, but it condemns you to a lifetime of buying film. *The Baler* is like a Nikon; it's expensive and somewhat old-fashioned but offers far more control over the results.




Selling for only \$99, *@Liberty* quickly turns worksheets into compact run-time applications and even lets users graph data. On the downside, *@Liberty* is copy protected and limited initially to generating ten copies of a worksheet. In addition, it has a hard time compiling macros and most financial and string functions. Nor does *@Liberty* truly compile worksheets; instead it generates intermediate files that must be run with a supplied interpreter. As you might expect, this means *@Liberty* worksheets aren't particularly swift.




At \$495, *The Baler* is pricier than *@Liberty* but far more versatile. The program creates BASIC source code that is automatically compiled into an executable file by Microsoft's QuickBASIC. Compilation is much slower than with *@Liberty*, but the resulting worksheet is faster than 1-2-3, and you can distribute as many copies as you want. *The Baler* provides nearly all of 1-2-3's commands

PC World Evaluation Worksheet Compilers

	Multiplication	seconds
1-2-3		8.0
The Baler		9.3
@Liberty		19.9

	Addition	seconds
The Baler		6.0
1-2-3		7.0
@Liberty		18.2

	Exponentiation	seconds
The Baler		75.6
1-2-3		97.1
@Liberty		137.1

	Division	seconds
The Baler		10.1
1-2-3		11.3
@Liberty		25.5

Worksheets compiled by The Baler not only recalculate faster than those produced by @Liberty, they almost always beat out the 1-2-3 originals.

All tests were conducted on a 640K IBM XT running at 4.77 MHz with a 10MB hard disk. For each recalculation test, a spreadsheet matrix was prepared by defining each of the 2500 cells. Timing for these tests began when the recalculation key was pressed and stopped when program control was returned to the user.

Recalculation speed—multiplication A new value was entered into A1 (row 1, column 1), replacing the previous value. The cells were defined using the following formulas: B1 = A1 * 1.01, C1 = B1 * 1.01, etc.

Recalculation speed—addition A new value was entered into A1 (row 1, column 1), replacing the previous value. The cells were defined using the following formulas: B1 = A1 + .01, C1 = B1 + .01, etc.

Recalculation speed—exponentiation A new value was entered into A1 (row 1, column 1), replacing the previous value. The cells were defined using the following formulas: B1 = A1 ^ 1.01, C1 = B1 ^ 1.01, etc.

Recalculation speed—division A new value was entered into A1 (row 1, column 1), replacing the previous value. The cells were defined using the following formulas: B1 = A1 / .99, C1 = B1 / .99, etc.

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

and can transform templates containing labels, macros, and most esoteric 1-2-3 functions without demur. It even has a nifty menu-generating feature that masks the command line and makes data entry and navigation easy for novice spreadsheet users.

The party isn't over yet. Waiting in the wings at press time is *LTS_2_C* from Resource Analysis International, which transforms worksheets into C source code that can be run through most popular C compilers. The result could be stand-alone worksheets with powers far greater than 1-2-3's (see the sidebar "LTS_2_C Chooses C").

Executive Summary

@Liberty Worksheet compiler

@Liberty is an easy-to-use package priced like a 1-2-3 utility. It's handy for generating worksheets for simple data entry but is marred by copy protection, restrictions on macro use, and license fees for more than ten compiled worksheets.

@Liberty version 1.0
SoftLogic Solutions, Inc.
1 Perimeter Rd.
Manchester, NH 03103-9981
617/437-1600
List price: \$99.95 for a license to develop ten copies of a compiled worksheet
Requirements: 256K, one disk drive, DOS 2.00 or later version
Copy protected

■ @Liberty: Quick, Simple, and Limited

@Liberty is essentially two programs: PREPARE translates simple 1-2-3 worksheets as big as 2048 rows by 256 columns into an intermediate file that can then run with the RUN interpreter. *@Liberty* comes with ten copies of RUN, and SoftLogic will cheerfully sell you more for \$10 each, with volume discounts available.

@Liberty is easy to install, even on a two-floppy system; a batch file automatically arranges the necessary files. PREPARE occupies 54K of disk space and requires at least 256K of RAM. RUN uses a hefty 118K of disk space and 128K of RAM.

To compile a 1-2-3 worksheet, for example, CHECKOUT.WKS, you simply type PREPARE CHECKOUT at the DOS prompt. (You must specify .WK1, .WR1, or .WRK extensions.) After a delay ranging from a couple of seconds to several minutes, depending on the size and complexity of the worksheet, *@Liberty* spits out a "skew" file called CHECKOUT.SKW. To view and use the .SKW file, type RUN CHECKOUT.SKW.

A worksheet compiled with *@Liberty* closely resembles its 1-2-3 counterpart, but the command line is limited to File, Quit, Recalc, Hardware, Print, Update, Read, Save, and Export. Only those cell ranges originally specified as unprotected or input with 1-2-3 can be modified or accept data, and formulas, though operative, are hidden. (Macros will also be concealed if 1-2-3's Hidden command was issued in the original worksheet.) As in 1-2-3, you

move through a compiled worksheet using the <PageUp>, <PageDown>, <Home>, <End>, and cursor keys; enter data; and see the results of calculations.

Compiled worksheets can be printed out and graphed, but what you get is dictated by what you did in the original worksheet. You can print an entire compiled

Executive Summary

The Baler Worksheet compiler

Although priced for serious developers, *The Baler* is easy enough for workaday 1-2-3 users to master. The program accommodates most macros and advanced functions, but its reliance on BASIC makes for slow compiles and immense files. However, the resulting executable files are speedy and trouble-free. *The Baler* includes outstanding facilities for auditing worksheets and creating menu-driven applications.

The Baler version 3.28
Brubaker Software
8825 North County Line
Rd. E
Lafayette, IN 47905
317/564-2584
List price: \$495 for unlimited worksheets
Requirements: 512K (640K recommended), two disk drives (hard disk recommended), DOS 2.00 or later version
Not copy protected

Worksheet Compiler Features Compared

	@Liberty 1.0	The Baler 3.28
Type	run-time interpreter	BASIC code generator
Requires run-time license	◆	
Formats supported .WKS, .WK1, .WRK, .WR1	◆	◆
Worksheet capacity (cells with values)	36,250	15,000
Produces .EXE files		◆
Hides formulas	◆	◆
Supports numeric coprocessor		◆
1-2-3 menu commands		
Worksheet	1	◆
Range		◆
Copy		◆
Move		◆
File		
Import		◆
Export	◆	◆
80/132 columns	◆	
by cell type	◆	
Print	◆	
headers/footers		◆
margins/page length		◆
80/132 columns	◆	
by cell type	◆	
Graph types		
line		
bar	◆	
x-y	◆	
stacked bar	◆	
pie	◆	
Macro support		
version 1.A macros	◆	◆
version 2.0 macros	2	◆
/X macros		◆
Hardware setting		
snow removal	◆	
foreground and background color	◆	◆
Extra features		
audit		◆
menu facility		◆

¹ Supports Auto/Manual recalc and Number format commands.

² Supports /Xcell.

worksheet with just a few commands. To print a range, however, you must have previously defined it in 1-2-3 with the Range Name command. (Creating an input range is much the same.) The same holds true for making graphs. @Liberty supports bar, x-y, stacked-bar, and pie-chart styles, but only if appropriate titles and ranges were specified in the original worksheet. Still more limiting, @Liberty lacks a Print-Graph function. Getting those pretty pictures onto paper means resorting to the PC's trusty but crude print screen function.

Minimal Macros

Compiling worksheets is what it's all about, and on this score @Liberty rates just a passing grade. Uncomplicated worksheets consisting mainly of data and labels glide right through the @Liberty maw, but don't expect your favorite macros and templates to survive the process. In informal tests, @Liberty failed to correctly compile 20 different templates, ranging from Tax:Help's *Executive Federal Tax Template* to Ilar Systems' *Bottomline-V*. @Liberty also rejects worksheets holding text files produced with Turner Hall's *4Word*, which is unfortunate because *4Word* is a nearly ideal template-documentation tool (see "Letters From Cell A17," PCW, September 1987).

Of course, you wouldn't expect the program to handle macros that refer to menu commands such as Copy and Move that aren't on the @Liberty command line. But @Liberty supports only a handful of Advanced Macro

commands and even then imposes a laundry list of restrictions on those it does support. For example, IF, used for branching in most complex worksheets, can't work with expressions; and FOR can't use cell names but demands actual numbers for initial, terminal, and increment values. LET also requires expressions, cells, and strings; only input cells can be targets of GET. As a result, *@Liberty* is useless for compiling any but the simplest worksheets. *@Liberty*'s competently written user manual does show you how to modify a template, but given *@Liberty*'s limitations, the effort hardly seems worthwhile. Soft-Logic claims that a forthcoming version of the product will overcome some of these constraints.

The Baler:

Pricey and Powerful

Baling may be more familiar to residents of Indiana than, say, Manhattan, but anybody can appreciate the way *The Baler* methodically turns 1-2-3 worksheets into true stand-alone, executable files. Compilation is pretty leisurely—in one test *The Baler* took 24 minutes to compile a worksheet that *@Liberty* translated in less than 2—but you wind up with files that can be copied without limit. If you need to hand out 20 or 30 worksheet-based forms and templates, *The Baler*'s \$495 price tag begins to look less forbidding.

Installing *The Baler* involves running a single batch file, but be prepared to clear out approximately 1.2MB of disk space to accommodate the program and the

B11 (Output) 136.500000 MENU

Quit Recalc Hardware Print Update

Read Save Export a WKS file Directory

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	3.4	15	15	45																
2	4.4	14.7	15.1	56																
3	5.4	14.4	15.2 A	D1																
4	6.4	14.1	15.3 B	D2																
5	7.4	13.8	15.4 C	D3																
6	8.4	13.5	15.5 ITSA	A1..A10																
7	9.4	13.2	15.6 ITSB	B1..B10																
8	10.4	12.9	15.7 ITSC	C1..C10																
9	11.4	12.6	15.8																	
10	12.4	12.3	15.9																	
11	79	136.5	154.5																	
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				

FILE:BITSY

No, it's not 1-2-3—just *@Liberty*'s simulation.

Note, however, that the number of options is rather limited. For simple data entry, *@Liberty* may be a perfect fit. But if you need more muscle, *The Baler* is the answer.

Command: Worksheet Range Copy Move File Print Quit
Format, Label, Erase, Input, Name, Just, Val, Trans, Prot, Unpr, Mod, Over, Set

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

Sample Worksheet File SAMPLE.WKS

Name: Brubaker Software

Add: First # 1 Multiply: First # 5.60
Second # 2 Second # 9.95 <---This is a
Result 3 Result 55.72 constant

Divide: First # \$5.00
Second # \$1.00
Result: \$5.00 <---This formula makes certain
no divide by zero error can occur.

Brubaker Software <---This is a label formula

READY

The Baler works hard at reproducing 1-2-3's look—and its functions. For example, note the flexibility in Range manipulation allowed in this compiled worksheet.

LTS_2_C Chooses C

Still under development at press time, *LTS_2_C* from Resource Analysis International (RAI) is an ambitious program that follows *The Baler's* lead, translating 1-2-3 worksheets into a high-level language, in this case C. Thanks to C's portability and extensive graphics hardware support, users should be able to produce worksheet source code that can be compiled for target machines ranging from Macintoshes to VAX minicomputers to IBM mainframes.

RAI's translator produces C source code with a clear correspondence between worksheet cell values and labels, and an array that represents the data structure in the source worksheet. This means that the source code can easily be read and modified before compilation and that other C facilities, notably graphics, can be invoked.

RAI plans to support seven popular C compilers including Turbo C, Quick C, and Microsoft C, and will bundle

LTS_2_C with Data-light's C compiler. A prerelease version of *LTS_2_C* tested by *PC World* compiled worksheets quickly and could accommodate most 1-2-3 commands. RAI is also rumored to be developing an add-in version of this product, so worksheet authors can invoke compilation within 1-2-3 for convenience. —C. S.

LTS_2_C
Resource Analysis Int'l
12581 Venice Blvd.
#204
Los Angeles, CA 90066
213/390-7661
List price: \$150 for 25
worksheets
Requirements: 512K,
two disk drives (hard
disk strongly recom-
mended), DOS 2.00
or later version
Not copy protected

```

C:\Nts2e\LOOKC.TXT      Line 1  Col 51  Insert  Indent
[Note: these definitions are
found in a file called
SAMPLE10.C, generated from
SAMPLE.WKS]
C[8] = 1.0;
F[8] = 5.6;
C[9] = 2.0;
F[9] = 9.95;
C[13] = 5.0;
C[14] = 1.0;

[Lots_2_C generates recognizable formulas from Sample.WKS 1]

#include "fnc.h"
#include "sampb.h"
calc0()
{
    /*Level 1*/
    C[10] = (C[8]*C[9]);
    F[10] = (F[8]*F[9]);
    C[15] = IF((C[14]==0.0),0.0,(C[13]/C[14]));
}
recalc()
{
    calc0();
}

F1-help F2-save F3-new file F4-import data F5-expand F10-contract Esc-exit

```

Lotus_2_C produces source code in C from spreadsheets. This code can then be compiled with nearly any standard C system for the PC or, with tinkering, for another type of computer. This pasted-together screen shows output from two different sections of the program. Note the outstanding readability.

full-blown QuickBASIC (currently version 3.0) that comes with it. On a 640K machine, *The Baler* can handle worksheets as big as 256 rows by 128 columns. That's nowhere near as large as *@Liberty's* capacity, but it's ample for most uses.

With *The Baler*, compilation is practically automatic. To convert a worksheet, simply type `BALE filename` at the DOS prompt and go get a cup of coffee (or brew it, for large worksheets). *The Baler* churns out the BASIC source code file, an .OBJ file, plus batch files that automatically load QuickBASIC, which finishes the job.

Though powerful, *The Baler* is also lenient. You don't need to know anything about QuickBASIC, since you don't operate the compiler yourself. Nor do you have to fuss with the worksheet beforehand, because *The Baler* supports the lion's share of 1-2-3 commands, functions, and macros, including all relevant Advanced Macro Commands such as {WINDOW} and {QUERY}.

The Baler omits a few of 1-2-3's Worksheet Global commands, as well as those used mostly to edit formulas and worksheet structure—which you'd want to exclude anyway. Developers must avoid using macros that refer to cells no longer present in the "baled" version, but aside from that reasonable restriction, *The Baler* is remarkably hospitable to immigrant worksheets and templates. In the same informal tests run with *@Liberty*, *The Baler* easily

compiled every template without error. And as tests conducted by the National Software Testing Laboratories show, worksheets compiled with *The Baler* work faster than 1-2-3 originals. Don't, however, expect *The Baler* to save disk space. A 7K worksheet can easily balloon into a 50K compiled file, largely because the BASIC code must also include a simulation of 1-2-3's interface and functions.

If price and disk space are of small concern, *The Baler* might be the dream worksheet compiler. The program lacks 1-2-3's Graph function, but Brubaker Software is including it in versions of *The Baler* shipped after November 1987. A C version of *The Baler* is also forthcoming. That means we can look forward to structured, more discernible source code that can be supercharged with commercial C libraries.

The Baler Beyond 1-2-3

Besides offering most of 1-2-3's bells and whistles, *The Baler* includes two unique features office gurus will find invaluable. First, a built-in AUDIT123 utility produces a table showing how cells are linked via formulas and also generates a "problem report" that highlights errors in the source worksheet. The report lists every function used, by cell, and includes a table detailing references to other cells, cells not referenced by a formula, circular references, and—most important—cells referenced in formulas that contain the wrong value or variable.

Second, the unique menu-making facility lets you develop entirely menu-driven applications for novice users by means of a special

.MNU file that taps macros embedded in the worksheet. This makes it possible, for example, to create a data entry form that validates data, asks users what category of expense they want to record, displays the appropriate section of the worksheet, and then lets them toggle back to the main menu when finished to save the file. Developing a similar front end from scratch in BASIC or C would take hours of coding and debugging; with the 1-2-3/*Baler* combination, such jobs can be done in a trice.

A Choice, Not an Echo

While their ads make *@Liberty* and *The Baler* sound like competitors, the products will actually appeal to different kinds of users. If you want to distribute fairly simple data entry forms and data collection templates to a limited audience, *@Liberty* is an economical solution. But if you prefer a program that generates an unlimited number of worksheets that rival the power of 1-2-3's, *The Baler* is clearly the better buy. In any case, these two products are mere forerunners. As C-based worksheet compilers enter the market, we may see programs that compile as fast as *@Liberty*, offer more features than *The Baler*, and give new scope and reach to 1-2-3. ●

Charles Seiter is a Northern California writer and consultant on scientific programming and computer languages.

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-------------------------------------	------

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---------------------------------------	------

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-----------------------------	------

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3 1/2" DS/DD Diskettes (720k)

Sony (10 disks per box) 18.
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THE HARDWARE SHELF

Edited by Michael Goodwin

This Month

THE HARDWARE SHELF

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Amstrad PC1640

XT-compatible 8086 system

Pros: Improved display, GEM software, compact footprint

Cons: Inflexible configuration

Amstrad Inc.

1915 Westridge Dr.

Irving, TX 75038

214/518-0668

List price: with 5¼-inch floppy disk drive, monochrome display, GEM Desktop, GEM Paint, Locomotive BASIC, DOS 3.20 \$899; dual-floppy version \$999; with 20MB hard disk \$1499; with color display, 20MB hard disk \$1699; with enhanced color display, 20MB hard disk \$1899

A year ago, Amstrad made a splashy debut in America and the United Kingdom with the smart-looking PC1512, an 8086-based computer that bundled Digital Research's GEM software with clever engineering and a low price. Riding on this machine's success, the plucky British firm rapidly became the largest PC manufacturer in Europe. But success seems to have spoiled Amstrad a bit. Its latest offering, the PC1640, is merely a slightly modified version of last year's hit.



Amstrad's PC1640 features an 8-MHz 8086 CPU plus three expansion slots and EGA capability. Mouse-driven GEM software is part of the package.

Straddling the line between home and office, the PC1640 attempts to entice buyers with a wealth of standard features rather than processing brawn. Like its predecessor, the PC1640 is powered by an 8-MHz 8086 processor and arrives with a mouse and a full complement of GEM software. New features include an optional enhanced color (EGA-

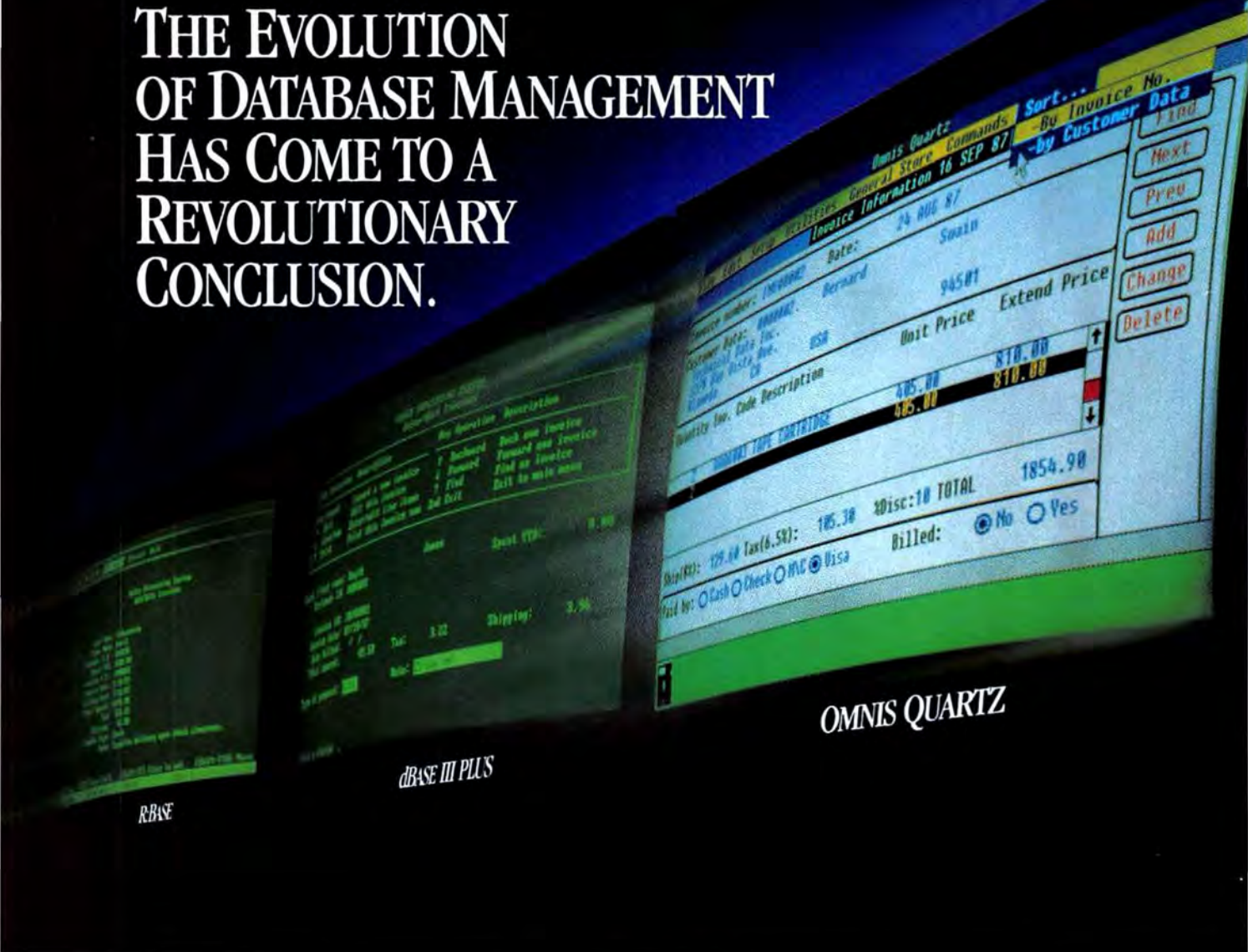
compatible) display, three expansion slots (up from two), and a full 640K of RAM. A few other minor changes, such as a fan in the monitor and some updated software, round out the offering.

The basic PC1640's \$899 price tag (which includes a paper-white monochrome monitor and a single 360K floppy disk drive) ranks average among today's 8088/8086-based machines. But adding a 20MB hard disk and an enhanced color display jacks the PC1640's cost up to \$1899, well into the

realm of AT clones. As NSTL's performance figures show, AT-class performance isn't part of this bargain.

The PC1640's all-plastic system unit is almost identical to that of its predecessor. A ventilation grille runs across the bottom of the 15-inch-square box, and a set of display DIP switches resides in the back panel. The 90-watt power supply is still housed (oddly enough) in the monitor.

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Circle 279 on reader service card

PC World Evaluation

Amstrad PC1640

	WordStar Professional	seconds
Amstrad PC1640		256
Compaq Deskpro Model 4		270
IBM PC XT		497

	dBASE III Plus	seconds
Amstrad PC1640		367
Compaq Deskpro Model 4		401
IBM PC XT		528

	1-2-3	seconds
Amstrad PC1640		94
Compaq Deskpro Model 4		103
IBM PC XT		205

	Lattice C Compiler	seconds
Amstrad PC1640		235
Compaq Deskpro Model 4		235
IBM PC XT		412

Amstrad's PC1640 leaves IBM's 8088 PC XT in the dust and even aces Compaq's 8086 Deskpro Model 4.

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.

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.

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 type 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.

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 **LOGITECH**

Circle 1 on reader service card

The PC1640's mouse and keyboard plugs lie conveniently along the right side of the system unit, as does a handy volume control for the internal loudspeaker. Four easily replaceable AA batteries, which power the Amstrad's real-time clock/calendar, lie under the monitor's tilt-and-swivel base, which fits into a recess on the system unit. Finally, a removable panel on the top snaps open to reveal three full-size 8-bit expansion slots and a socket for an 8087 coprocessor.

It's hard to see the rest of the PC1640's interior, since a metal plate covers virtually every inch of the motherboard. Amstrad says this barrier keeps radio frequency signals within FCC standards, but

With the exception of the nameplate, the PC1640's keyboard resembles the PC1512's. It still has stubby little legs, a rather plastic feel, and a joystick/light pen plug in the rear. Forward and reverse keys sit where you'd expect to find <Backspace>. The <Alt> key remains to the left of <Ctrl>, and the backslash is wedged between <Shift> and Z.

But the keyboard may not get much use, thanks to Digital Research's largely mouse-driven GEM environment. *GEM Desktop* and *GEM Paint* come standard with the PC1640, as do DOS 3.20, GEM-based Locomotive BASIC, and a variety of handy utilities. The company's warranty covers one year for parts and 90

The PC1640's keyboard may not get much use, thanks to Digital Research's largely mouse-driven GEM environment.

it may make it difficult to place skirted expansion boards in the machine. The single-chip graphics adapter (from Paradise Systems), RAM, and the combination floppy/hard drive controller are all on the motherboard, leaving three slots free.

The PC1640's single biggest improvement is its graphics capability. Last year's product featured a CGA-compatible board and monitor; the PC1640 offers EGA capability as well. The PC1640's graphics adapter emulates MDA, Hercules, CGA, and EGA modes.

days for labor, and there are 200 service centers across the United States.

The PC1640 is a neat entry-level machine, but several aspects of the Amstrad package are particularly annoying. By housing the system's power supply in the monitor, Amstrad locks you into using its displays; likewise, the hermetically sealed hard disk controller, RAM, and graphics adapter hinder expandability. Amstrad remains vehemently silent about 3½-inch drives, 80286-based machines, or more RAM. Serious shoppers will do well to look for an AT clone in the same price range as a fully loaded PC1640. —Paul Meyers

Wang PC 380

80386 system

Pros: Solid construction, keyboard dedicated to Wang software

Cons: Mediocre performance, high price

Wang Laboratories, Inc.
One Industrial Ave.
Lowell, MA 01851
617/459-5000

List price: PC 380-1 with 2.5MB RAM, one 1.2MB floppy disk drive, MEGA graphics board \$6495; PC 380-2 with 42MB hard disk \$7695; PC 380-3 with 68MB drive \$8495; 20MB hard disk \$630; 34MB drive \$1195; 42MB \$1395; 68MB \$2395; Wang monochrome monitor \$250; Wang Professional Color (CGA/EGA/PGA) monitor \$950; monitor arm \$200; CPU floor stand \$75

Wang's recent TV campaign centers on "a total office solution," the ability to link Wang PCs, Wang minicomputers, and third-party PCs into a coherent whole. The ads conclude, "Wang works for you."

If TV verité suddenly came into vogue, the spots might go, "Wang has broken new ground! It's come out with an 80386 computer! For even more money, you get software designed to connect the machine to Wang minis, but guess what—it'll run on *any* 386!"

Integral to Wang's "total office solution" though it may be, the pricey PC 380 is basically a plain-vanilla 80386 machine built



The computer world is humming about two new Samsung Semiconductor & Telecommunications (SST) brilliant performers — the S500 and S300.

Fully AT compatible, the S500 is the right PC to turn your one-man show into a symphony. Easily switchable from 8 to 10 MHz, the S500 offers 8 expansion slots to support video displays, modems, expanded memory and more. A 1.2 MB 5 1/4" floppy disk drive comes standard and a hard disk can be added for ample memory capacity.

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Circle 309 on reader service card

around Intel's pedestrian motherboard. The basic configuration, the PC 380-1, costs \$6495 for a switchable 8/16-MHz CPU, 2.5MB of RAM, one parallel and one serial port, an EGA-clone graphics board, and one 1.2MB floppy disk—but neither a hard disk nor a monitor. The PC 380-2 adds a 42MB hard disk and lists for \$7695. The largest available factory drive, 68MB, raises the PC 380-3's price tag to a whopping \$8495. You can get a comparable IBM PS/2 Model 80 for only a few hundred dollars more.

All three incarnations come with 2.5MB of 32-bit RAM. Adding a Wang 2MB 32-bit expansion board tops the PC 380 out at a measly 4.5MB of 32-bit RAM—compared to the 8MB to 16MB supported by most other 80386 PCs.

The PC 380 is housed in a bullet-gray, AT-style box offering most of the requisite keylock and indicator lights (except for one indicating the 16-MHz mode), plus a sizable button that functions as both a reset and a power switch. The machine looks solidly built, and you'll find no sign of quick fixes or patch wires under the hood.

The PC 380 uses an early Intel motherboard, which supports only the 80287 math coprocessor, not the more powerful 80387. Worse, the Intel approach to system architecture and memory handling doesn't yield optimum performance. The PC 380 shies away from memory caching, two-way memory interleaving, or static-column RAM. Instead, it uses standard, 150ns dynamic RAM, which is accommodated by taking

the path of least resistance: adding a speed-crippling wait state to the CPU cycle. In NSTL tests, such conservative design yielded predictably modest performance results.

The PC 380's eight-slot bus provides two 32-bit, four 8/16-bit, and two 8-bit slots. One of each type of slot is occupied—the first

a Wang multiscan color monitor for \$950. The monochrome monitor's antiglare screen and optional \$200 monitor arm lessen eyestrain while increasing your desk space. The monochrome monitor has a keyboard socket on the back—very handy if you prefer to move your CPU to the floor and have a short keyboard cable. The multiscan

The pricey PC 380 is basically a plain-vanilla 80386 machine built around Intel's pedestrian motherboard.

by the 2MB 32-bit RAM board, another by the graphics adapter, and the third by the hard/floppy disk controller. Three half-height drive bays and one full-height bay are available, and the 229-watt power supply is more than adequate. No factory tape-backup drive is offered.

The only aspect of this computer that's nonstandard is the keyboard layout. That may delight Wang users, but it will drive PC regulars crazy. Wang has added a number of its own software-specific keys; three keyboard overlays point out other special Wang software functions. The keyboard's tactile feel echoes that of the original dedicated Wang word processors—fine for keyboard pounders but not for typists with a light touch.

Wang offers two monitors for the 380: an in-house, 12-inch, black-and-white job for \$250, and

monitor supports CGA, EGA, and PGA modes and comes with a tilt-and-swivel base. The MEGA board is designed to drive both monitors in all modes (except PGA), and it automatically selects the proper mode for your software.

In addition to DOS 3.20 and *Windows 1.03*, Wang includes a menu-driven setup utility and full diagnostics. Documentation fills six volumes and covers not only DOS and BASIC but Wang's expanded memory manager and hard disk partitioning utility. The machine comes with a one-year warranty.

The PC 380's collection of optional software—designed to provide the office systems integration promised in the TV ads—enables the PC 380 to act as a terminal for Wang's Alliance, OIS, or VS mini-computers. Once they're connected, translating data formatted for mini-based applications into a PC format is a snap; there's even a multitasking/windowing utility (IS Multistation) that permits the PC

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PC World Evaluation

Wang PC 380

WordStar Professional

seconds

Compaq Deskpro 386		72
Wang PC 380		95


dBASE III Plus

seconds

Compaq Deskpro 386		54
Wang PC 380		140

1-2-3

seconds

Compaq Deskpro 386		22
Wang PC 380		25

AutoCAD

seconds

Compaq Deskpro 386		87
Wang PC 380		150

Lattice C Compiler

seconds

Compaq Deskpro 386		54
Wang PC 380		78

Wang's PC 380 runs a distant second in a speed run against Compaq's Deskpro 386. The Compaq uses disk caching to improve performance.

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.

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.

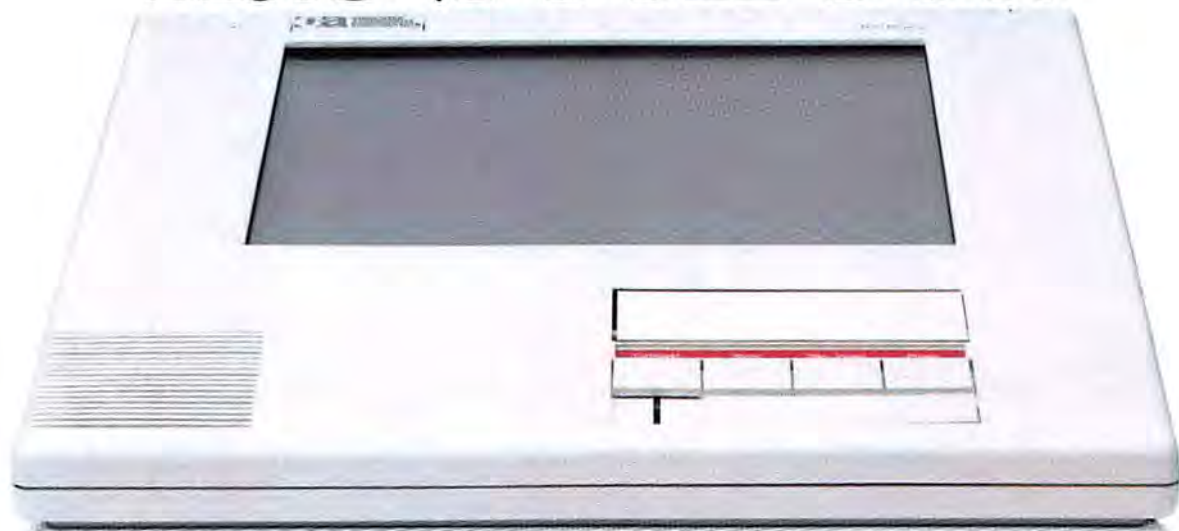
1-2-3 Because no disk access is required, the 1-2-3 benchmark depends almost entirely on the processing and memory access speeds of the systems. In this benchmark, a 1-2-3 macro executes a series of recalculations within a 50-by-50-cell matrix.

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. 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.

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 type 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.

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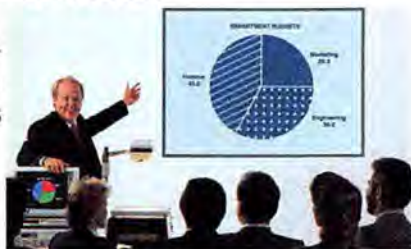
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Data Display™	✓	✓	✓	✓	✓	✓	✓
Kodak's Datashow™	No	No	No	✓	✓	No	No
Sharp's QA-25	✓	No	No	No	No	✓	No

Buyer's Guide for PC Projection Panels
As of December 31, 1987

Built-in RGB and composite video ports allow Data Display to work with these computers. With plug and play ease. No additional hardware or software is needed.

For the dealer located nearest you call 1 (800) 582-2580. Within California, call 1 (800) 582-0852. Ask for extension 601.

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380 to run a Wang mini application in one window while it runs a standard PC application in another. Good stuff, no doubt, but Wang's publicity fails to mention that this software is PC compatible; any vendor's 80386 machine will give you comparable connectivity, and at a much lower price.

For companies that can't imagine buying anything but Wang—especially those using Wang's dedicated word processing package—the PC 380 with its Wang-dedicated keyboard may be attractive. Nonetheless, considering that Compaq and IBM offer far more technical flash for only a few dollars more, and that even low-end 386s like the PC's Limited or Value PC can outperform this slowpoke, it's hard to imagine who else will want this ho-hum machine. —Art Wilcox

Toshiba T1000

80C88 laptop computer

Pros: Light weight, DOS 2.11 in ROM, built-in clock/calendar

Cons: Slow, room for only one drive

Toshiba America, Inc.
Information Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
800/457-7777

List price: T1000 with 512K, 3½-inch floppy disk drive, serial and parallel ports, DOS 2.11 in ROM \$1199; memory expansion card \$549; 1200-bps Hayes-compatible modem \$399; 5¼-inch external floppy disk drive \$499



Michelle Clement

People who travel a lot—and actually take a laptop computer with them—know that small size and light weight are the most underrated virtues of an itinerant computer. At 6.4 pounds and with a tiny paw print of 12 by 11 by 2 inches, Toshiba's T1000 is clearly for those who travel light.

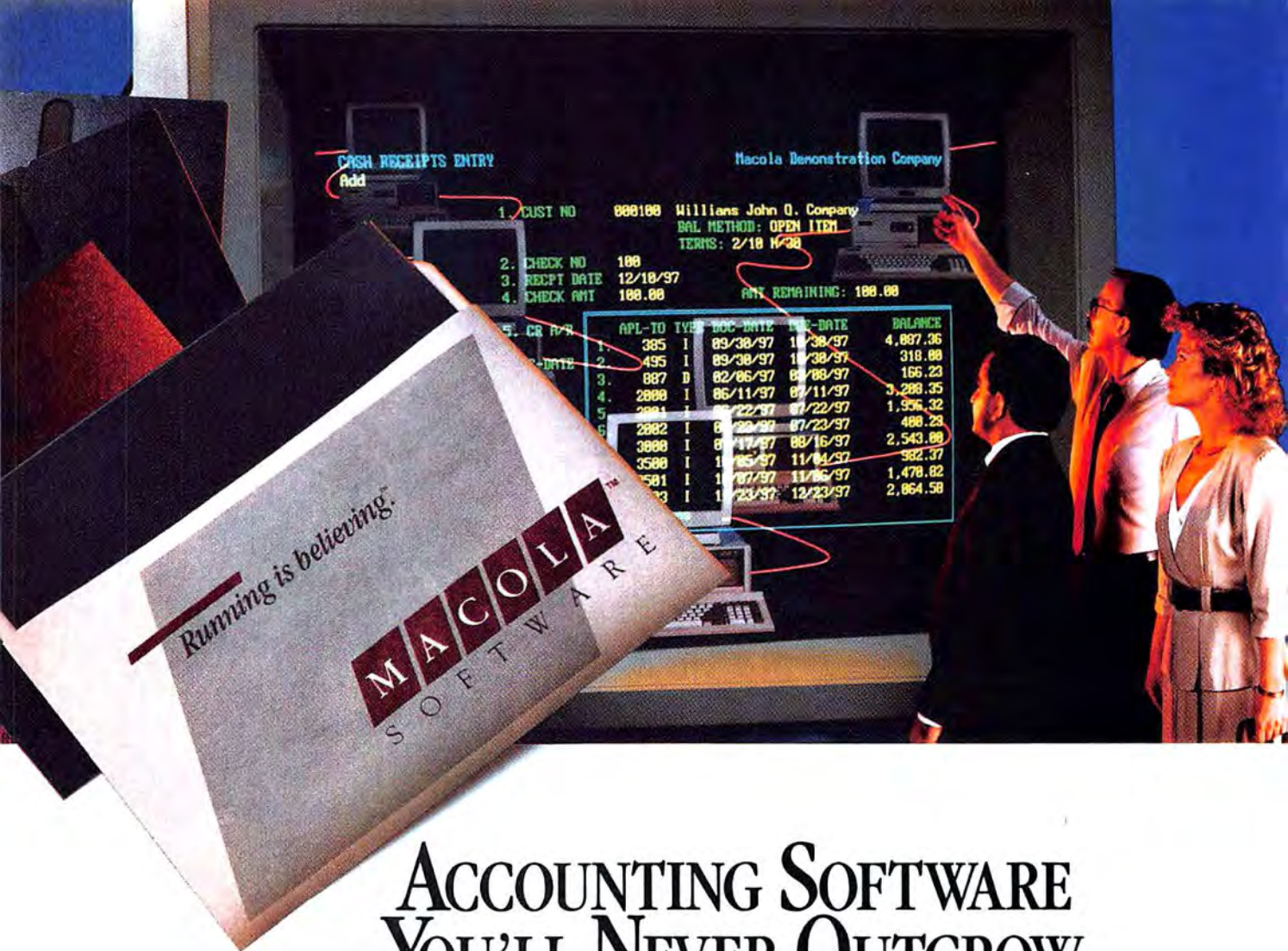
The \$1199 T1000, Toshiba's most portable and least expensive laptop, is a scaled-down version of Toshiba's feature-laden T1100+, complete with Supertwist LCD. What features will you miss that the T1000 doesn't have? Speed, for one. With its 80C88 CPU running at a slow 4.77 MHz (compared to the T1100's 7.16-MHz clock speed), this machine barely crawls to the finish line.

Another missing feature is a second disk drive. The single 720K 3½-inch drive (sorry, there's no room for another one) makes it difficult to run programs with large files. Using *dBASE III Plus*,

Toshiba's tiny T1000 has only one floppy—but DOS is in ROM, and an optional memory board can become a battery-backed RAM disk.

for example, is virtually impossible on this single-drive system. Toshiba provides a port for an add-on external floppy disk drive (\$499), but that's not a great solution for a small, traveling laptop.

Several nifty innovations, however, help balance the frustrations of the T1000's missing features. The most prominent is a "ROM drive" that contains DOS 2.11 and all attendant utilities. A setup program enables you to choose either the ROM drive or the floppy



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disk as the boot drive. If you choose the ROM, the boot occurs quickly and returns a C> prompt.

While the T1000's 512K of RAM provides enough elbow-room to accommodate most programs, Toshiba also offers a 768K memory expansion board for \$549. The added memory can be used three different ways: to bring base memory to 640K; as expanded memory (an EMS driver comes with the computer); or as a battery-backed, nonvolatile RAM disk (that Toshiba calls *hard RAM*). Hard RAM acts like a

very fast hard disk (it even has to be formatted) and retains its data when the computer is shut off.

Obviously, a 640K hard RAM disk makes a dandy substitute for the missing second floppy drive. But beware of battery backstabbing; if you let the battery run down, all the contents of hard RAM evaporate!

Under the circumstances, the T1000's battery life becomes a very serious matter—especially if you plan to use the memory expansion board and the optional modem. In a best-case situation (no modem, no added memory),

the nonremovable battery pack is rated for 5 hours of operation—just enough for a transcontinental plane flight. If you use the expansion board, battery life drops to 4 hours; if the modem is used as well, power failure will occur even sooner.

The compact, 82-key keyboard is responsive and well designed. A special <Fn> key works like another <Ctrl> or <Alt> to allow selected alphanumeric keys to perform special functions. For example, some alpha keys become

PC World Evaluation

Toshiba T1000

WordStar Professional		seconds
Hewlett-Packard Vectra Portable CS		141
IBM Model 25		145
Toshiba T1000		161

1-2-3		seconds
Hewlett-Packard Vectra Portable CS		81
IBM Model 25		90
Toshiba T1000		214

Toshiba's lightweight T1000 laptop is no speed demon. It comes in last—not only behind IBM's Model 25 (as might be expected) but behind the HP Vectra laptop as well.

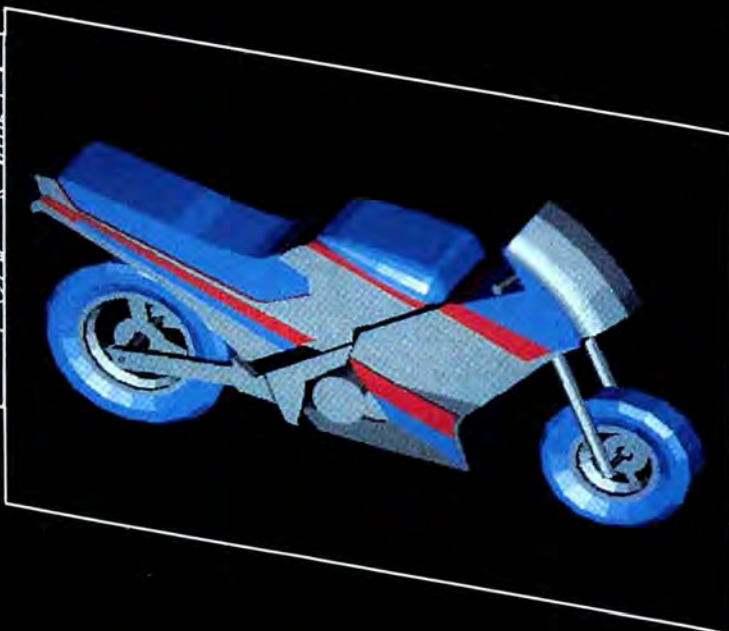
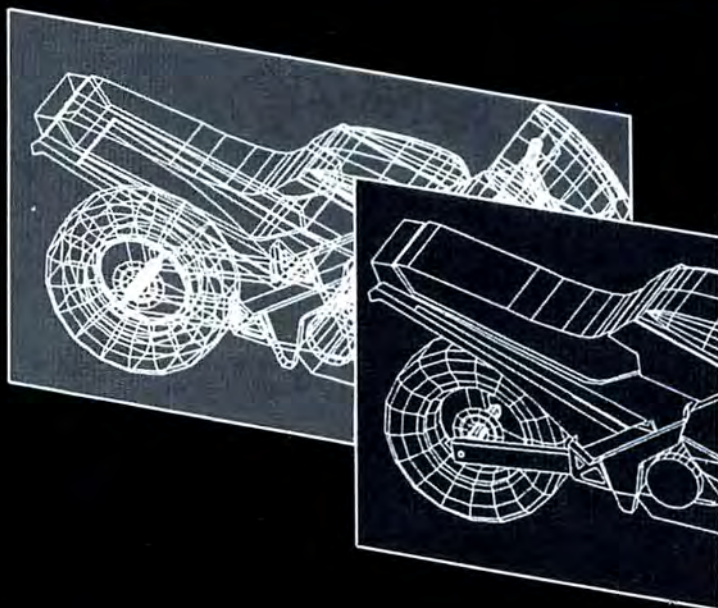
WordStar Professional This benchmark is run from a single floppy disk. Once *WordStar Professional* version 3.31 is loaded and the benchmark file is opened, a global search and replace is performed replacing all occurrences of the word *tomorrow* with *today*. Then the cursor is returned to the beginning of the document.

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 system. In this benchmark, a 1-2-3 macro executes a series of recalculations within a 50-by-50-cell matrix.

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

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3-D CAD You Can Afford



DesignCAD 3-D is a complete 3-Dimensional CAD system. It compares favorably with systems costing more than \$3000! But, in the great American tradition, we said "Aw... What the Heck! Let's see the other guys beat this!" DesignCAD 3-D is \$299. Complete.

Once again, American Small Business Computers has proved that you don't always have to spend a lot of money to get quality software. DesignCAD 3-D provides features such as Shading, Hidden Line Removal, Printer and Plotter support, and extensive file transfer capability, all for \$299! No other 3-Dimensional CAD system can come close to providing the price/performance of DesignCAD 3-D.

There is a very important reason to buy DesignCAD 3-D other than price: **PERFORMANCE.** DesignCAD 3-D provides complete 3-Dimensional drawing capabilities. It's not a "warmed-over" 2-D program. DesignCAD 3-D allows you to draw any entity in 3-D space. This means, for example, that you can draw a curve in the shape of a spring. You can draw a circle or arc at ANY angle on ANY plane.

DesignCAD 3-D allows up to 4 simultaneous views - any angle or perspective - on the screen. DesignCAD 3-D also provides complex extrusions - linear, scalar, and circular. Extensive 3-D text capabilities and auto dimensioning are provided - at no extra charge, of course.

DesignCAD 3-D provides the capability to read drawings from most other CAD systems (DesignCAD/ProDesign II, AutoCAD's DXF, and IGES file formats). You can also send a view of a 3-D drawing to other CAD systems. These features are included at no extra charge, of course.

DesignCAD 3-D almost certainly is compatible with the computer system you now own. DesignCAD 3-D supports more than 200 dot matrix printers, at high resolution. DesignCAD 3-D supports more than 80 plotters, and most digitizers and graphics adapters available for "PC Compatible" systems. Shaded and wireframe models can be output to the printer or plotter YOU own.

DesignCAD 3-D does not require expensive graphics adapters and monitors - even shading can be done on ordinary displays such as the Enhanced Graphics Adapter (EGA), Color Graphics Adapter, or Hercules monochrome adapter.

However, the best reason to buy DesignCAD 3-D is not the low price. It's not the outstanding performance. It's not the extensive hardware compatibility. The best reason to buy DesignCAD 3-D is for its amazing ease of use!

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What else do you need to know about DesignCAD 3-D? Only this: "Included at No Extra Charge." What is included at no extra charge? **EVERYTHING! \$299 BUYS IT ALL!**

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(918) 825-4844
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numeric keys when used with <Fn>. Number crunchers who are used to a numeric keypad may have trouble with this, but with practice it becomes a useful option.

Toshiba's LCD Supertwist screen is readable in a reasonably well-lit environment, but after an hour or two your eyes may strain. The compact 25-line screen is adjustable to 180 degrees and folds flat, so an external monitor hooked into the RGB or composite video port can sit on top of the computer. The T1000 is equipped with a color/graphics adapter designed to drive an external monitor, but it can display only two different intensities on the LCD.

Despite a few shortcomings, the T1000 is a welcome entry in a market where most laptops are still too large and too heavy for most laps. Its value lies not in state-of-the-art technology (although putting DOS in ROM is a clever touch) but in convenience. It's nice to have the latest technology, but not when it weighs 20 pounds and you have to lug it down a crowded airplane aisle. The T1000 is a reminder that sometimes simple creature comforts count more than raw computing power. —Jonathan Maslow

Polaroid PalettePlus

PC film recorder

Pros: Low cost, EGA support

Cons: Mediocre resolution

Polaroid Corp.

Electronic Imaging Dept.

575 Technology Sq. 2S

Cambridge, MA 02139

800/343-5000



List price: \$2999 (includes power processor, slide mounter, software, 35mm and 3¼-by-4¼-inch Instant Print camera backs, and video and RS-232C cables); 3-by-4-inch integral film-type 339 camera back \$300; overhead transparency adapter \$100
Requirements: 16K, serial port, EGA- or CGA-compatible graphics adapter

The slide show has evolved into the business world's preeminent medium for persuasion. Nowadays, rather than farm out sensitive data to expensive (and slow) graphic arts services, many PC

Polaroid's updated PalettePlus turns on-screen color graphics into slides and prints—featuring EGA compatibility.

users find it cheaper, faster, and more secure to create graphics on a PC and turn them into slides on the spot with a film recorder.

In 1984, Polaroid created the first popular desktop film recorder, the Polaroid Palette. This device redirects a CGA image to a camera and processor that convert the screen image into color slides and prints. Polaroid's invention provided the seed for half a dozen other film recorders that improved on the original (see "Pictures for

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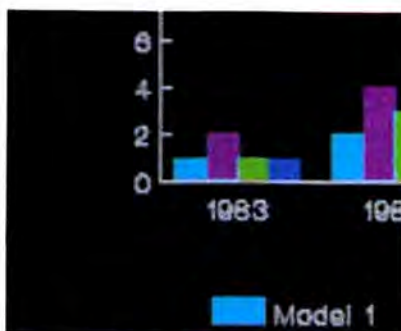
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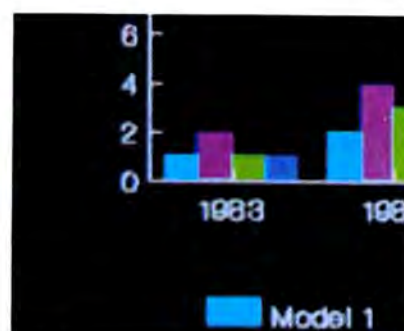
Clock Board Standalone 35.00

an Exhibition," PCW, February 1987).

Now Polaroid has introduced the PalettePlus. It's nearly identical to the original but adds EGA compatibility, streamlined software, an improved slide mounter, and an automatic slide processor. The most important enhancement is EGA compatibility, which—with the aid of a special PalettePlus driver—provides a 72-color palette and a vertical resolution of 640 by 700 pixels. Although this resolution isn't in the same league with the unit's 2000-to-8000-line competitors, the \$2999 price is several thousand dollars cheaper, and the device offers compatibility with more graphics packages. In addition, the PalettePlus software is



Though it offers EGA compatibility, the new PalettePlus (right) is not appreciably different from the old Palette (left).



Hooking up the system is fairly simple. The heart of the PalettePlus is a box the size of a tape backup unit, which connects to your PC's serial port via an RS-232C cable. You also have to

for type 339 integral film, which can be developed in normal room light. Also optional is a new overhead transparency adapter that enables you to display slides on a standard overhead projector.

Two methods of sending screen images to the PalettePlus are supported. You can save images to disk files and photograph them later (Polaroid calls this the OneStep method), or you can send images directly from your display adapter to the PalettePlus—if your graphics software includes a PalettePlus driver.

The OneStep method is faster, and since it requires no special driver, it can be used with a wider range of software. You can even save up disk files and photograph them in a batch. However, this method limits resolution to the EGA standard of 640 by 350 pixels—half the resolution of the direct method. At press time 30 packages, including all the major graphics programs, contained the PalettePlus driver. If your software includes only the old Palette driver, you are stuck with the lower-resolution OneStep method.

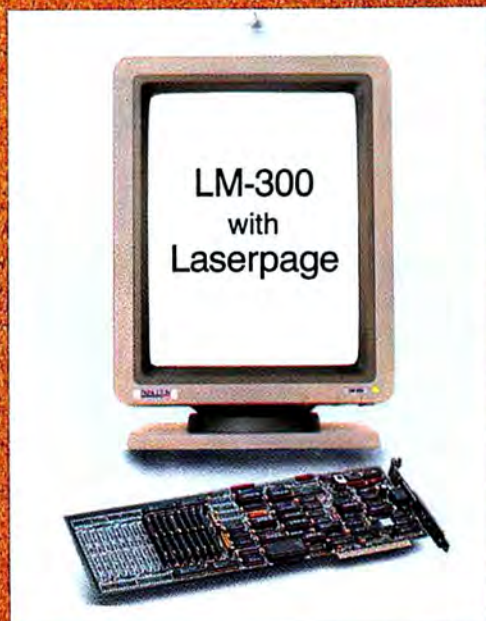
You can send images directly from your display adapter to the PalettePlus—if your graphics software includes a PalettePlus driver.

menu driven and allows the user to choose from a number of CGA- or EGA-compatible graphics boards.

Inside the unit is a red, blue, and green color wheel and a 3-inch black-and-white monitor. The PC image is redirected to the internal monitor, where it's separated into red, blue, and green components. A 35mm camera attached to one end of the unit photographs these color separations onto a slide through appropriate color filters, one separation at a time.

disconnect the monitor end of the video cable (which normally runs between your computer's graphics board and monitor) and hook it to the PalettePlus instead. A video-out cable from the PalettePlus keeps your monitor running.

For proofing purposes, the PalettePlus comes with a second camera back for creating instant prints in either color or black and white. At additional cost, Polaroid offers a motorized camera back



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Although the software has been overhauled to make it easier to use, NSTL tests with *Microsoft Chart* reveal few discernible improvements in image quality. Pie charts continue to show jagged edges, and color differentiation between objects of like hue is minimal. However, new EGA compatibility does offer a larger color palette and improved text quality in both modes.

The PalettePlus film processor has also been upgraded. Users no longer have to insert the film and crank a lever; development is now entirely electronic.

Although most of Polaroid's competitors offer film recorders with more impressive resolution and features, such units are quite expensive and support a limited number of graphics packages. If your budget is flush and only the highest resolution will do for your slide shows, check out the competitors—or a custom slide service. Otherwise, stick with Polaroid. For film recorders it's still the best deal in town. —Yeta and Pauli Corsan

FastTrap

Trackball pointing device

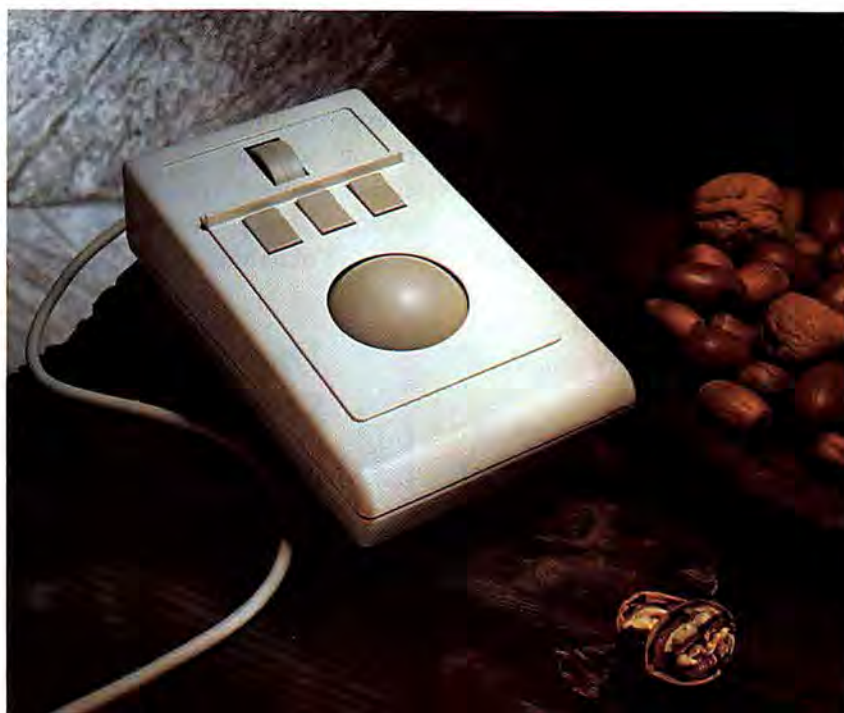
Pros: Stationary operation, 3-axis pointer, Microsoft Mouse emulation

Cons: Awkward cursor drag techniques

MicroSpeed, Inc.
5307 Randall Pl.
Fremont, CA 94538
800/232-7888, 415/490-1403

List price: \$149

Requirements: 256K (16K available memory), serial port



Michelle Clement

To most computer users, the word *trackball* conjures up images of noisy arcades filled with feverish adolescents zapping their way toward alien spaceships. Yet the trackball came close to being the standard PC pointing device.

Back in the mid-1970s in the fabled halls of Xerox/PARC, a bitter dispute raged over the pointing device of the future—mouse or trackball? The mouse won (by a narrow margin), and the Xerox Star, the model for the mouse-happy Macintosh, was born.

If MicroSpeed has its way, its \$149 FastTrap pointing device will put the trackball back in the mainstream of PC peripherals. The FastTrap is a stationary pointing device that combines a 2-inch-wide trackball, three input buttons (two of which emulate the Microsoft Mouse), and a track-

Mice begone! The FastTrap trackball/trackwheel emulates Microsoft's mouse and adds third-dimensional capability.

wheel. The trackball, which dominates the lower half of the unit, controls traditional x-y movements. The trackwheel, located above the input buttons, moves through the third-dimensional z-axis, allowing CAD/CAM users to zip around a 3-D model with the greatest of ease, bypassing tedious menu selections for rotating and viewing images. (Hence, *Trap*, which stands for *tri-axial pointer*.) Currently, only *AutoCAD 3-D 2.6* users can take advantage of the FastTrap's three-axis capability, but MicroSpeed reports that most of the major CAD/CAM vendors are working on FastTrap drivers.

In the meantime, the FastTrap is a perfectly acceptable alternative to the Microsoft Mouse. Unlike a mouse, the FastTrap works happily on a cluttered desk, and you won't find yourself gliding off the tabletop. What's more, many users will find it easier—and more accurate—to use their fingers or palm to roll a trackball than to thrash about with their shoulders and arms.

On the other hand, unlike some trackballs now available for the Mac, which clip unobtrusively onto the edge of the keyboard, the FastTrap (which measures 7½ by 4¼ by 2⅔ inches) rises awkwardly above the plane of the keyboard, looking less like a mouse than the Giant Rat of Sumatra.

Oddly, despite its ample girth, the FastTrap seems to be designed for small users. Because the buttons reside so close to the trackball, palming the ball while tickling the buttons with the fingers is difficult for all but the tiniest hands.

Normally, you use the two left buttons and the trackball for clicking and cursor control in standard mouse-emulation mode. However, the trackwheel and the third button play roles as well. By rotating the trackwheel, you can adjust the trackball's screen velocity from 50 to 200 pulses per inch. The third button can be programmed to emulate the simultaneous pressing of the two Microsoft Mouse buttons.

You can also use the third button to simplify one of the trickiest trackball jobs: dragging the cursor. Although using your finger to hold down the first button while rolling the trackball with your

palm is technically possible, it's extremely awkward. When you enable the FastTrap's one-button alternative, pressing the middle button automatically drags the cursor forward from its present position until you press the button again. Unfortunately, this feature

port mice, you can design your own driver using the FastTrap's Keymap utility, a memory-resident program that lets you translate FastTrap clicks into keystroke sequences.

The FastTrap's full value will be realized only when programs oth-

The narrow-carriage LX-800 costs only \$299, but it offers many features of printers that cost twice as much.

is difficult to control, especially for precise tasks like drawing and framing.

If you're already set up for a serial version of a Microsoft Mouse, hooking up this replacement is a snap. Simply detach your mouse cable from the serial port and plug in the FastTrap cable. In our tests, the FastTrap was consistently able to con *Ventura Publisher*, *Microsoft Word*, and *VP Graphics* into believing that the device was the real Microsoft McCoy. If you're introducing your PC to the world of pointing devices for the first time, the FastTrap's slim documentation does an adequate job of hoisting you over the installation hurdle. Once you attach the FastTrap cable to the serial port (you can use either COM1 or COM2), you copy the contents of the FastTrap disk onto your hard disk and add a line to your CONFIG.SYS file.

If you want to use the FastTrap with a program that doesn't sup-

port its 3-D talents. Even so, the device provides a reasonable alternative to the mouse right now. Despite the FastTrap's difficulty with dragging the cursor, PC users with limited desk space (or limited patience with rodents) should give it a whirl, a click, and a spin. This reviewer will be leaving his mouse in the drawer. —Eric Brown

Epson LX-800

9-pin dot matrix printer

Pros: Low price, fast draft print-out, small, easy to use

Cons: NLQ printing slow and of poor quality, awkward paper path

Epson America
2780 Lomita Blvd.
Torrance, CA 90505
213/539-9140

List price: with 3K print buffer, built-in pull-tractor \$299; replacement ribbon \$14

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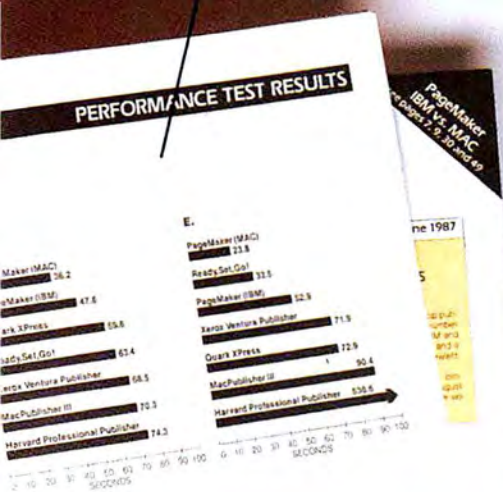
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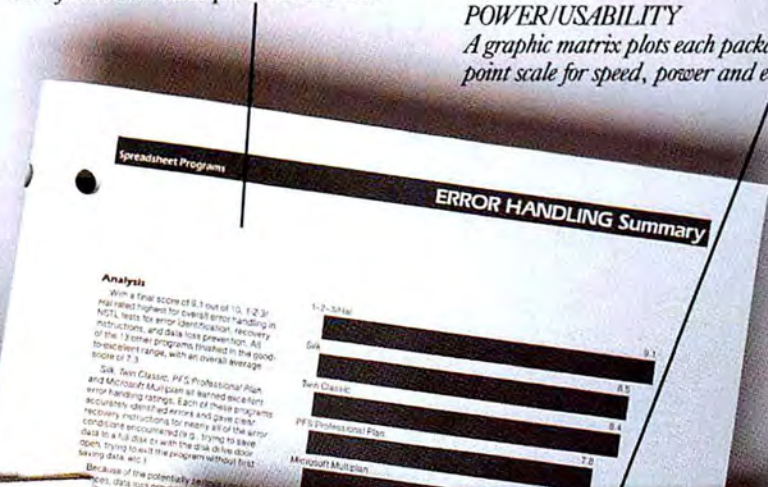
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PCW 3/88

How much printer performance do you have to sacrifice if you want a small, cheap 9-pin machine? If Epson's LX-800 is any indication, the answer is, much less than you think.

The narrow-carriage (80-column) LX-800 costs only \$299, including a tractor, but it offers many features of printers that cost twice as much. It handles both

Unfortunately, the LX-800's NLQ output is painfully slow—69 seconds per page in its high-quality, double-strike mode—and even at that sluglike speed, the print quality leaves a lot to be desired. Letters are patchy, and boldface text seems smudged. It's good enough for term papers, but if your business is going to be judged on the quality of your

way out of the machine and detach the tractor before you can load a single sheet. The automatic sheet-loading feature is easy to use—you just press one button, and the sheet rolls in; however, if the friction roller fails to grab the sheet the first time, you have to go through a flurry of button pushing to reenable the auto-loader. Formfeed, linefeed, and on-line/off-line buttons work smoothly.

The LX-800 is proof positive that the affordable 9-pin printer is not a thing of the past. While Epson's entry is no technological marvel, it makes an excellent utility draft printer or "best-buy" solution for the budget-minded executive looking for 20 machines to put on 20 desks. Best of all, the price is right; many veteran users spent twice as much on their first printers (which were probably Epsons) and got far less bang for the buck. —Michael Goodwin ●

The FastTrap is a stationary pointing device that combines a 2-inch-wide trackball, three input buttons, and a trackwheel.

fanfold and cut sheets and positions the cut sheets automatically. It prints smudgeless envelopes without breathing hard. Its draft output mode is fairly fast (21 seconds for a 250-word, 24-line page) and produces very readable printouts. It can print all the IBM symbols, including those above ASCII 127. You can even create six custom-designed characters of your own and load them into RAM.

The printer handles italic, boldface, and double-strike text. It prints 10-pitch, 12-pitch, double-width (5 characters per inch), and condensed (17 and 20 cpi). Best of all, it offers two styles of near letter quality (NLQ) output, roman and sans serif, easily selectable from the three-button control panel.

printer's output, the LX-800 represents an economy you can't afford; in this area you definitely get what you pay for.

The worst design feature of the LX-800 is its troublesome paper path. For some reason, letting printed pages exit over the front of the printer causes the paper to crease and tear. The only way for fanfold paper to exit successfully is to the rear, which means you can't pile the blank fanfold back there; you must place the printer on a stand and feed the paper from underneath. Worse yet, the power cord and input cables are mounted in back, directly in the path of paper feeding from underneath! Very delicate cable dressing (and taping) is required to avoid a fatal hang-up.

Switching between single sheets and fanfold paper is tedious. With no "paper-parking" capability, you have to roll the fanfold all the

Paul Meyers is a San Francisco-based video producer and freelance writer specializing in science and technology. Art Wilcox is a contributing editor for PC World. Jonathan Maslow is managing editor of Windows. Yeta and Pauli Corsan are graphics arts specialists living in Boston. Eric Brown is a contributing editor and Michael Goodwin an associate editor for PC World.

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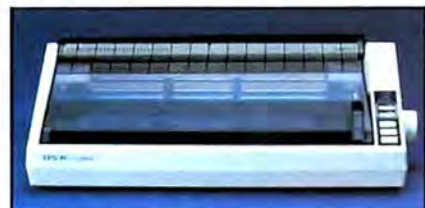


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THE SOFTWARE SHELF

Edited by William Rodarmor and Scott Spanbauer

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Microsoft Works

Integrated package

Pros: Massive, comprehensive tutorial; worksheets compatible with 1-2-3

Cons: Most modules use proprietary file formats

Microsoft Corp.
16011 N.E. 36th Way, Box 97017
Redmond, WA 98073-9717
206/882-8080

List price: \$195

Requirements: 384K, two disk drives (hard disk recommended), DOS 2.00 or later version

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When a piece of software becomes the leader in its field, it's usually because it offers solid functions unified by a simple, consistent command structure. Like its Macintosh sibling, *Microsoft Works* is an integrated package for home and basic business use that neatly combines word processing, spreadsheet, data base, and communications functions. While only the 1-2-3-compatible spreadsheet has the power of a stand-alone program, the modules have a common interface and command structure that makes it easy to transfer data (and skills) between



Mark Ulrich

them. *Works* even includes an environment-wide macro processor that can be used to automate many modules' operations.

Compared to other integrated packages, *Works* outdistances *pfs:first choice* in most departments but lacks both the ability to "hotlink" in different modules and the extensive file-import/export features offered by *Ability Plus* (see "Simply Integrated," *PCW*, May 1987, and *The Software Shelf*, *PCW*, November 1987).

Works can handle basic office chores, but it would be hard to integrate in an office where computer novices work alongside experts.

Besides, the package stores all files except worksheets in proprietary formats, and even text exported in *Works*' version of ASCII can cause trouble with other word processors. Microsoft's promise to release a document-conversion utility doesn't help someone who has a stack of *Word*-formatted reports to work on over the weekend.

Despite these shortcomings, *Works*' interface is a compelling one. Its use of pulldown menus, dialog boxes, and scroll bars suggests *Microsoft Windows* and foreshadows the Presentation Manager version of OS/2. If you've ever used a Macintosh, *Works* will feel quite familiar—and immediately accessible. Its mod-

ules all use the same function keys and menu commands for manipulating data; to select a block, for example, you always begin by pressing <F8>. So once you learn one module, you'll find you've mastered most operations in the others. For further integration, an electronic clipboard makes it easy to scoop data out of one module (such as a worksheet table) and paste it into another (such as a document).

For people hesitating at the threshold, Microsoft has laid out a large welcome mat: a tutorial that reprises the hands-on training

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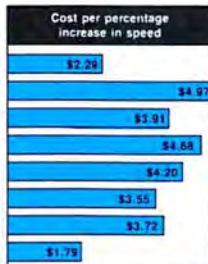
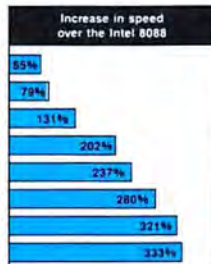
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Find last record	seconds
Microsoft Works	4.0
Ability Plus	12.0

Wild-card search

	seconds
Microsoft Works	6.2
Ability Plus	20.0

Word processing

Reformat document	seconds
Microsoft Works	1.1
Ability Plus	29.2

Maximum print speed

	seconds
Ability Plus	36.1
Microsoft Works	45.3

Global search and replace

	seconds
Microsoft Works	8.1
Ability Plus	63.1

Communications

Transmit file without protocol	seconds
Ability Plus	81.7
Microsoft Works	279.4

Transmit file with protocol (XMODEM)

	seconds
Ability Plus	96.6
Microsoft Works	114.5

Spreadsheet

Multiplication	seconds
Microsoft Works	6.3
Ability Plus	15.4

Exponentiation

	seconds
Ability Plus	30.5
Microsoft Works	115.3

Addition

	seconds
Microsoft Works	4.7
Ability Plus	15.4

Division

	seconds
Microsoft Works	6.9
Ability Plus	18.4

Compared to Ability Plus, Microsoft Works scores highest in word processing reformat, but drags in telecommunications.

Graphics This test measured how fast the programs displayed a pie chart, with text, on an Amdek Color II screen.

Data base management These 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.

Word processing These 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 used a device that simulates an infinitely fast printer, one not slowed down by paper or printhead movement. Search-and-replace performance was measured by replacing all instances (238) of aaaa with AAAA.

Communications The communications test measured the speed at which the programs transmit a 10,000-character file at 1200 bps with and without protocol.

Spreadsheet 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.

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



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Lotus Metro

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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style, great graphics—and occasional typos—of the *Microsoft Word* tutorial. If you've mastered word processing but are daunted by spreadsheets, for example, you'll find the tutorial especially helpful, but it isn't designed as an officewide training tool.

As befits *Works*' intended audience, installing the program is just a matter of following prompts; beginners need only decide whether to have the tutorial on line, for example. A hard disk is strongly recommended—*Works* will run on a two-floppy system, but you'll wind up flipping more disks than a Frisbee champion.

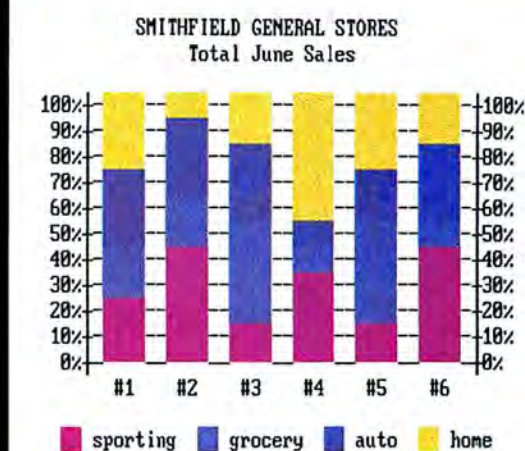
All *Works* sessions start the same way: Type WORKS at the DOS prompt, and a small dialog box pops up, asking you to pick a module. Whichever you select, you'll find the same friendly face. A row of menu choices (Edit, Format, and so on) runs along the top of all the screens, and a status line (with command descriptors) along the bottom.

Works' word processor won't put *Word* out of business, but you can add flash to a memo and gussy up a report with headers, footers, even charts and graphs. Formatting is also quick: Highlight a paragraph, press <Shift>-2, and the text is instantly double-spaced. Don't expect what-you-see formatting, however; on-screen text is displayed in character mode, and bold, italic, and underlined text is merely highlighted.

The word processor has such key features as search and replace, a decent 80,000-word spelling

Works also lets you:

- ♦ add titles
- ♦ add gridlines
- ♦ change colors
- ♦ add a second Y-axis
- ♦ label your X and Y axes



Speed Charting
Controls: Ctrl + PgUp (PgDn)

Microsoft *Works*' excellent tutorial teaches users how to create a wide variety of chart types. You can either let the program's "speed charting" build charts on its own, or you can define shading, legend font, and type of chart.

checker, and a nice assortment of block moves and layout and formatting options. Navigating requires a lot of keystrokes, though: You have to press <F8> eight times to select an entire file, for example.

The real plus, of course, is *Works*' ability to merge graphics created with its spreadsheet into a document, though it does it only at printout time. Place the cursor where you want the image to appear, choose Insert Chart from the Edit menu, and select the desired chart file from the dialog box; *Works* puts a placeholder tag at the insert point. You can put more than one chart on a page, and a scaling feature lets you dictate the size of each. The same technique can be used to merge a

worksheet or data base record into a document. *Works* supports nearly every commercially available dot matrix printer and many laser printers.

Works' word processor is adequate, but its spreadsheet approaches the power of a stand-alone product. It has a respectable charting facility and most of the functions found in 1-2-3 version 1A. It can be souped up with macros, though *Works* macros don't correspond directly to 1-2-3's. Since *Works* stores worksheets in WKS format, they can be used unchanged by 1-2-3, its clones, and *Microsoft Excel*.

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The *Works* spreadsheet user enjoys a relatively complete command set as well as the usual conveniences (column and row manipulation, range names, fill commands) and various numerical and date formats. The mix is a good one, adding three useful depreciation functions 1-2-3 lacks

insert blank lines, swap columns of names and dates, and sort and query the data base. A special report menu prompts you for fields to include in data summaries. Since the module allows you to perform arithmetic on fields, you can reproduce most of the functions (subtotal, average, statistics)

Helped by the profusion of menus, even beginners can quickly learn to write and use functions, insert blank lines, swap columns of names and dates, and sort and query the data base.

and avoiding advanced features such as regression and matrix arithmetic that few business users need.

Even charting worksheet numbers is remarkably simple. Users can select a variety of shadings, fonts, and colors. Eight chart types, from pie to stacked bar, are available, and each worksheet can have up to eight charts.

The *Works* data base is really a spreadsheet in disguise, where rows correspond to records and columns correspond to fields—a design choice that smooths the learning curve for users who have picked up a smidgen of spreadsheet lore. The data base is neither relational nor particularly memory efficient, but it's very easy to use. Helped by the profusion of menus, even beginners can quickly learn to write and use functions,

offered by full-featured report generators.

Data can be displayed in two ways: The Form screen shows one record at a time; the List screen displays a screenful of records in tabular format. If you want to create a data base, you can design a data entry form and arrange cells and labels to suit your fancy. When you're satisfied, switch to the Form screen to enter and display data one record at a time.

The data base's primary function, however, is to generate mailing labels and to mail merge documents. You design a mailing label or a form letter with the word processor, indicating where you want data base information to go by placing the appropriate fields in the document.

When it comes to telecommunications, *Works* takes a Father-knows-best approach that novices may well appreciate. When you first connect with an on-line service or another PC, the program

dynamically determines the required parameters. You don't have to fuss with parity or stop bits. *Works* supports the XMODEM protocol but, surprisingly, doesn't come with any log-on scripts for popular services like The Source and MCI Mail. However, you can create your own scripts with a learn mode that records your keystrokes. The telecommunications module worked like a charm in informal tests, successfully accessing nine different services and connecting with a direct-cabled PC. As the National Software Testing Laboratories file transfer tests show, though, *Works* is very slow.

Tacked on to *Works* is a powerful keyboard macro facility called MS-Key, which bears a striking resemblance to *ProKey*. MS-Key is a full-scale keyboard redefinition program that must be loaded before *Works* is invoked. MS-Key offers nested macros, macros that call other macros, and the ability to store different sets of named macro files. Although MS-Key looks like an afterthought (its documentation is at the tail end of the separate appendix manual), it's quite useful, particularly in the word processor module.

With *Works*, Microsoft has produced a nicely integrated package that needs to get around the problem of proprietary file formats before it will be taken seriously. *Works'* accessible interface and outstanding tutorial make it suitable for computer novices who want to expand their skills in a home or small-business setting. In an office where users of varying

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computer expertise need to share files regularly, however, *Works'* limitations will soon become apparent. —Charles Seiter

PageMaker Portfolio: Designs for Newsletters

Newsletter templates

Pros: Wide variety of styles; simple-to-use documentation

Cons: The manual doesn't clearly reproduce supplied templates

Aldus Corp.
411 First Ave. #200
Seattle, WA 98104
206/622-5500, 617/229-8900

List price: \$79

Requirements: 10-MHz 8086-based machine, 512K (640K recommended), hard disk, DOS 3.00 or later version, PageMaker, Microsoft Windows 1.03 or later version

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When a tree falls in the forest these days, it's probably because somebody is putting out a newsletter. Considering how ugly some of these do-it-yourself publications are, whole forests may have died in vain. Too many fonts, inconsistent spacing, wacky alignment, too little white space, and unbalanced design elements have made visual pollution out of freedom of the press.

Rushing to the rescue is Aldus's *PageMaker Portfolio: Designs for Newsletters*, a series of 21 newsletter templates that help rookie

designers with basic *PageMaker* skills turn out attractive publications. The easy-to-use package includes a 111-page guide offering sample newsletters, design and article preparation tips, and a template tutorial. At \$79, it's a cheap way to beautify America.

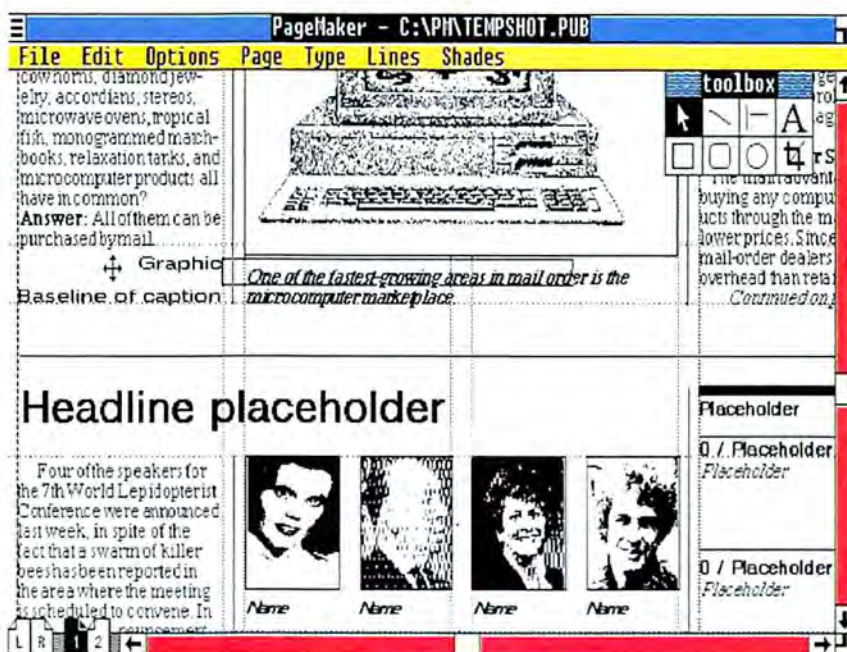
The *Designs for Newsletters* templates are variations on seven standard designs, ranging from simple two-column layouts to more complex five-column grids. Each page contains a basic layout that typically includes dummy placeholder headlines, kickers, bylines, captions, rules, boxes for graphics, and empty columns that indicate where to place articles correctly on the page.

For example, one template is a model for a general-purpose three-column newsletter that can accommodate long and short arti-

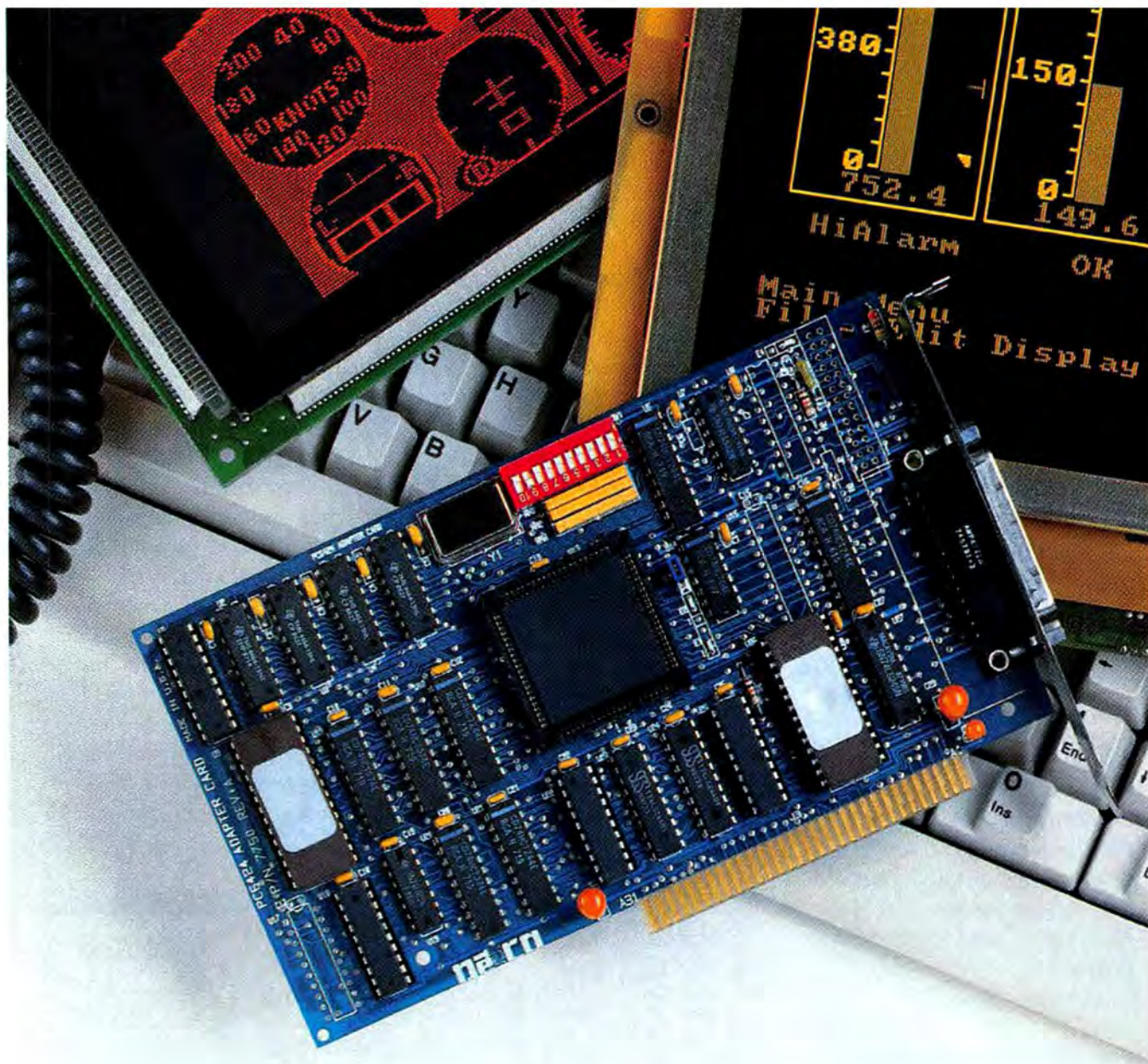
cles and a variety of typographic and graphic effects. Another includes additional text and graphic elements, such as dummy headlines and captions, rules, boxes for illustrations, and so on. A third, still more complex, contains a table of contents box, a news section banner, and several other design elements.

To bring up one of the templates, copy it onto your work disk and open it as you would any *PageMaker* document. (You can later save it under a new name, leaving the original file unchanged.) Each template includes an opening page and a first inside page that serves as the model for any additional pages.

Filling out the template is simply a matter of replacing its generic elements with your material. To



Designs for Newsletters puts dummy placeholder headlines on screen to show proper format, layout, and sizing. Replace the headline with your own, add body text and graphics, and you get a handsome, nearly instant newsletter.



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create a banner headline, for example, select *PageMaker*'s text tool, place the text cursor at the end of the "Headline placeholder" text, backspace over the dummy text, and type in the headline or import one created with a graphics program. You import body text as you would for any other

amine the blank forms on screen or, better yet, print them out. Aldus could have made life easier by printing thumbnail pictures of the blank templates for side-by-side comparison. Aside from this minor reservation, *Designs for Newsletters*' documentation is excellent. The workbook gives

List price: \$595

Requirements: 256K, two 3½-inch drives, DOS 2.00 or later version

Not copy protected

Professionals live life in transit—they work in hotel rooms, airport waiting lounges, and aboard red-eye flights. For these laptop computer junkies, packages like *OfficeWriter Express* and *WordPerfect Executive* were born.

At \$249, *WordPerfect Executive* combines a stripped-down version of *WordPerfect* with a spreadsheet, an appointment calendar, a phone directory, and a calculator—but no telecommunications module (see *The Software Shelf*, PCW, October 1987). By contrast, the \$595 you pay for *OfficeWriter Express* gets you just two things: a top-of-the-line word processor and a first-rate telecommunications program (the other disks in the package are strictly peripheral). But if your basic needs boil down to crafting and sending words when you're on the road, *OfficeWriter Express* is worth serious consideration.

Getting started is the only slow part of *OfficeWriter Express*. You must plow through menu after menu, setting up page lengths that take headers and footers into account, choosing a printer driver, establishing communications parameters, and so forth. You need do this only once, but it seems to take forever.

To paraphrase an old ad, the word processor in the *OfficeWriter Express* package isn't ju-

The *Designs for Newsletters* templates are variations on seven standard designs, ranging from simple two-column layouts to more complex five-column grids.

PageMaker document, by selecting the Place command from the File menu. You can also bring in graphics and place them inside the template's predrawn boxes or resize and relocate the boxes as necessary.

Designs for Newsletters also provides handy spacing guides—presized boxes—that help maintain consistent spacing between headlines and text or illustrations and captions. To use a spacing guide, move it onto the page and superimpose it on the elements you want to align. Guides can be modified easily or built from scratch with *PageMaker*'s toolbox.

Though *Designs for Newsletters* covers a lot of bases, it isn't perfect. The template samples reprinted in the manual are partially filled in with alluring yachting club graphics and Latin text, making it hard to pinpoint exactly which elements a given template includes. Instead of poring over the manual, you may prefer to ex-

amine the blank forms on screen or, better yet, print them out. Aldus could have made life easier by printing thumbnail pictures of the blank templates for side-by-side comparison. Aside from this minor reservation, *Designs for Newsletters*' documentation is excellent. The workbook gives

sound advice on design and advanced techniques for developing mastheads, creating special effects with type, using boxes and rules, making your own placeholders and spacing guides, and more. Besides *Designs for Newsletters*, the *PageMaker Portfolio* series now includes *Designs for Business Communications*. The series won't replace an art school diploma or displace professional designers, but it should help desktop publishers create more professional-looking publications—and save trees everywhere. —Richard Jantz

OfficeWriter Express

Laptop word processing and telecommunications package

Pros: Excellent document-organization and -retrieval features

Cons: Lengthy setup, expensive

Office Solutions, Inc.
2802 Coho St.

Madison, WI 53713
800/228-0747, 608/274-5047

The new standard for high performance STATISTICAL SOFTWARE

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COMPLETE STATISTICAL SYSTEM WITH DATA BASE MANAGEMENT AND GRAPHICS

- A powerful, comprehensive, elegant, and super-fast statistical package for IBM (PC, AT, PS/2) and compatible computers.
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- The flexibility of the CSS input/output is practically unlimited: CSS offers an intelligent interface (read/write) to all common file formats (Lotus, Symphony dBI, dBI+, DIF, SYLK,...) and special utilities to easily access data from incompatible programs; graphics can be saved in files compatible with desktop publishing programs (Aldus, Ventura).
- CSS data files can be as large as your operating system (DOS) allows.
- CSS precision exceeds the standards of all common precision benchmarks.
- *Technical note: The CSS user interface and all I/O were written in Assembler and bypass DOS; graphics and data management were written in Assembler and C; the computational algorithms were written in Assembler and optimized Fortran.*
- \$495 (plus \$5.00 sh/h); 14-day money back guarantee



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Circle 189 on reader service card

nior anything. It's a bona fide copy of *OfficeWriter 5.0*, one of the most powerful, versatile packages on the market. In addition to the usual mark, copy, and reformat functions, the *OfficeWriter* module has such niceties as a built-in thesaurus and an 80,000-word spelling checker. What makes *OfficeWriter* shine, though, is an approach to file management that makes categorizing and finding files a snap.

Nobody enjoys standing around a client's office desperately searching a disk for the right document, and *OfficeWriter* is particularly adept at finding files. When you first create a document, the program prompts you to fill in a short form that briefly summarizes the document.

A menu-driven Managing Libraries function then stores documents according to groups you define. A lawyer might store contracts in one library, complaints in another, interrogatories in a third, and so on. When you need to find a specific document, *OfficeWriter* lets you instantly examine the contents of individual libraries, either by looking at the summaries or by reading the raw text.

If a summary doesn't turn up what you're looking for, *OfficeWriter* can sift through groups of documents for any phrase you specify. The program locates text strings up to 35 characters long and searches for as many as four text blocks simultaneously if the search strings are separated by a comma.

Document Summary

Document ID	warfig
Description	analysis-of-george-warfig-D&B-repor
Author	Jesse-Livermore-----
Operator	(JL)-----
Comments	Considered-sensitive-not-to-be-cir- culated-beyond-AD,-KK,-and-EB-----
Created	12/02/87
Edited	12/02/87
Size	81 (characters)

Press GO to Continue, F10 to Exit

Filling out this short summary is the first step in using *OfficeWriter Express*'s remarkable file- and document-retrieval feature.

OfficeWriter Express's designers didn't forget that using E-mail and sending files by phone are what laptop computing is all about. *OfficeExpress*, the communications module, is a virtual clone of Hilgraeve's *HyperAccess 3.2*, a fast, powerful communications package with script and remote and unattended access capabilities (see *From the Software Shelf*, PCW, April 1987). *OfficeExpress* supports XMODEM, Kermit, and some 30 brands of modems and comes with an array of preset log-on scripts for services ranging from NewsNet and The Source to EasyLink. It's also completely menu driven and a cinch to use.

The main telecommunications menus are self-explanatory, if not always graceful. Say you wanted to log on to MCI Mail for the first

time: You would press <F1> to move from the main to the calling menu, then press <F1> to display the dialing directory, and finally pick MCI's number from the menu. *OfficeExpress*'s canned set-up script will get you connected, and its learn function will automatically record your user name and password for the next time. Sending and receiving files is easy enough, though it would be nice to be able to pick files from a menu instead of having to type their names. The *OfficeExpress* manual is generally well written, but it gets a bit murky when explaining the program's Pilot script language for automating sessions.

Paired with *OfficeExpress* is a remarkable utility that automatically converts telecommunicated

UNLEASH YOUR 80386!

Your 80386-based PC should run two to three times as fast as your old AT. This speed-up is primarily due to the doubling of the clock speed from 8 to 16 MHz. The new MicroWay products discussed below take advantage of the real power of your 80386, which is actually 4 to 16 times that of the old AT! These new products take advantage of the 32 bit registers and data bus of the 80386 and the Weitek 1167 numeric coprocessor chip set. They include a family of MicroWay

80386 compilers that run in protected mode and numeric coprocessor cards that utilize the Weitek technology.

The benefits of our new technologies include:

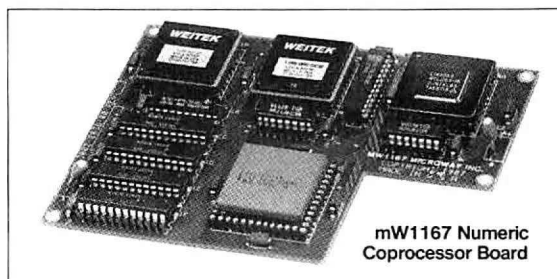
- An increase in addressable memory from 640K to 4 gigabytes using MS-DOS or Unix.
- A 12 fold increase in the speed of 32 bit integer arithmetic.
- A 4 to 16 fold increase in floating point

speed over the 80387/80287 numeric coprocessors.

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

617-746-7341

After July 1988 call 508-746-7341



mW1167 Numeric Coprocessor Board

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, Compaq 386/20, Hewlett Packard RS/20 and MicroWay Number Smasher 386. 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 2 to 4 times faster than an 80387.

mW1167 16 MHz\$1495
mW1167 20 MHz\$1995

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. Transputer language support from MicroWay includes Occam, C, Fortran, Pascal and Prolog.

Monoputer T414-20 with 2 meg¹ ...\$1495
Monoputer T800-20 with 2 meg¹ ...\$1995

Quadputer™ can be purchased with 2, 3 or 4 transputers each of which has 1 or 4 megabytes of memory. Quadputers can be cabled together to build arbitrarily fast parallel processing systems that are as fast or faster than today's mainframes. A single T800 is as fast as an 80386/mW1167 combination!

Biputer™ T800/T414 with 2 meg¹\$3495
Quadputer 4 T414-20 with 4 meg¹ ...\$6000

¹Includes Occam

80386 Multi-User Solutions

AT8™ - This intelligent serial controller series is designed to handle 4 to 16 users 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.

AT4 - 4 users\$795
AT8 - 8 users\$995
AT16 - 16 users\$1295

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\$495

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287TurboPlus-12 12 MHz\$629
FASTCACHE-286 9 MHz\$299
FASTCACHE-286 12 MHz\$399
SUPERCACHE-286\$499

MATH COPROCESSORS

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80387-16 16 MHz\$495
80287-10 10 MHz\$349
80287-8 8 MHz\$259
80287-6 6 MHz\$179
8087-2 8 MHz\$154
8087 5 MHz\$99

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St. Leonards, NSW, Australia 02-439-8400

files into your choice of format. You can use *OfficeWriter* on the road and send files to the boss in *WordStar*, Wang, *WordPerfect*, *Microsoft Word*, or *MultiMate* format. Naturally, the program can also transfer files in ASCII format.

Finally, the telecommunications package lets you use the office without even being there. If you have *OfficeExpress* at both ends (and remembered to leave the desktop on and the modem switched to answer mode before you left), you can dial up and tap the files on your office computer. With Hilgraeve's proprietary Hyperprotocol on both sides of the link, files can be transferred at 19,200 bps between extremely high-speed modems and even more rapidly between linked PCs without requiring a dedicated file transfer program. It's something to think about when you fly in with a laptop bulging with information to be shared at the office.

OfficeWriter Express is an extremely competent package, but it hardly warrants a price tag fatter than 1-2-3's. After all, you can buy *pfs:first choice* and get integrated word processing and telecommunications for a third the cost. But if you regularly exchange files in many different formats, *OfficeWriter Express*'s features make it a tempting choice. Before you dig deep to buy it, of course, you can always wait to see if the price comes down. —Stephen A. Blumenthal

Vu/Text

On-line newspaper text retrieval service

Pros: Excellent selection of major publications; off-line printouts available

Cons: Expensive for casual use; little on-line help

Vu/Text

325 Chestnut St. #1300
Philadelphia, PA 19106
800/258-8080, 215/574-4421

List price: \$10-per-month service charge, \$9-per-hour network fee, plus \$90-to-\$100-per-hour connect charge; connect charge 50 percent higher at 2400 bps; volume discounts available

Requirements: communications program

Newspapers are the bane of researchers' lives. Valuable as they are, they're often hard to find and indexed poorly, if at all. Short of plowing through reels of microfilm or stacks of crumbling clips, you often have no way to ferret out the information you're after.

Vu/Text Information Services, part of the giant Knight-Ridder newspaper and television conglomerate, is the high-tech on-line equivalent of a central newspaper morgue. It contains the full text of 48 major (and not-so-major) newspapers, magazines, and financial data bases, and it's available to any citizen equipped with a modem and a lively curiosity. While Vu/Text isn't cheap, it is easy to use and unmatched in its range and quality of publications.

ENTER QUERY (185)

MOVE and goode and bomb and rowhouses
YOUR SEARCH IS PROCEEDING.

RANK 1 OF 28, PAGE 1 OF 13, DOCUMENT NUMBER 30835

PHILADELPHIA INQUIRER

DATE: TUESDAY May 14, 1985

PAGE: A01 EDITION: FINAL

SECTION: LOCAL

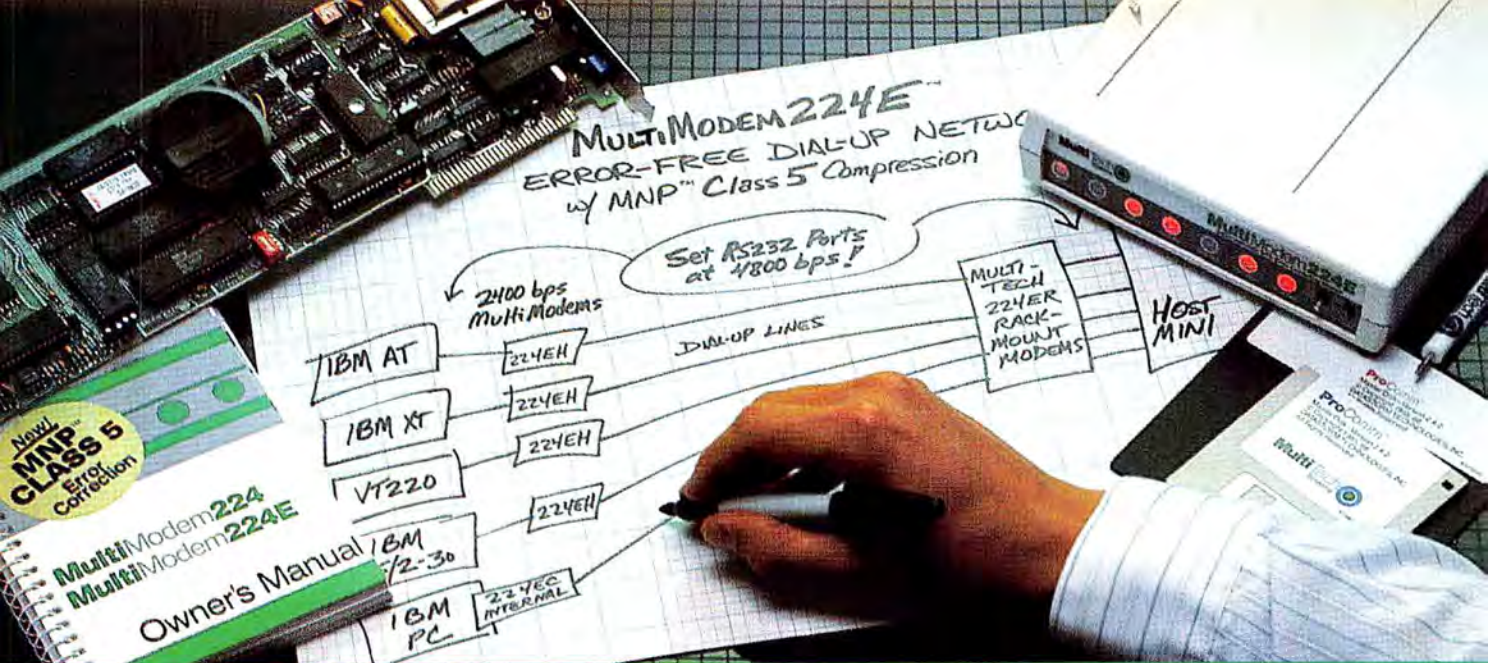
LENGTH: LONG

GRAPHICS: PHOTO

SOURCE: By Thomas J. Gibbons Jr., Russell Cooke and Michael B. Coakley, Inquirer Staff Writers
(Also contributing to this article were staff writers Doreen Carvajal, Bonnie L. Cook, Marguerite Del Giudice, L. Stuart Ditzen, Timothy Dwyer, Thomas Ferrick Jr., Mary Jane Fine, Susan FitzGerald, Henry Goldman, Howard Goodman, Eric Harrison, Rich Heidorn Jr., Tom Infield, Larry Lewis, Susan Levine, Steve Lopez, William K. Marinou, Andrew Maykuth, Janet McMillan, Ellen O'Brien, Maida Odom, Dick Pothier, David Lee Preston, Michael E. Ruane, William W. Sutton Jr., Vernon Loeb, Linda Herskowitz, Michael D. Schaffer, Sara Solovitch, Robert J. Terry, Carol Horner, Jane Von Bergen, Mark Wagenveld, Vanessa Williams, Martha Woodall and David Zucchini)

ALT-F10 HELP | ANSI-BBS | FDX | 1200 E71 | LOG CLOSED | PRT OFF | CR | CR

Vu/Text lets you comb the nation's newspapers and download the complete text of any story. Here, the search string at the top instructs Vu/Text to look for all Philadelphia Inquirer stories that refer to MOVE (the radical group), Goode (the mayor), a bomb, and rowhouses.



MNP™ Class 5 Data Compression Modems from Multi-Tech Systems: When it has to be as *fast* as it is good

- In the dial-up modem world, Class 3 MNP is the hands-down choice for hardware-based error correction. With its 100% error-free transmission, the MNP protocol is used in dozens of manufacturers' 1200 & 2400 bps modems, and our MultiModem224E modems have been recognized as the best of their kind (see box).
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- Multi-Tech Class 5 modems will communicate automatically with MNP Class 4 and Class 3

modems, as well as non-MNP modems. And if you wish, you can even upgrade your present Multi-Tech Class 3 & 4 modems to Class 5 (call us for details).



In the May 12, 1987 edition of PC Magazine where 87 modems were reviewed, only three were awarded *Editors Choice*: "For a high-performing 2,400-bps modem with a slew of extras, check out Multi-Tech Systems' MultiModem224E... with [its] high immunity to line noise and the extra advantage of MNP error correction, [this modem] should do a fine job of managing fast, error-free data communications."

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* The compression throughput of MNP Class 5 is, like all compression schemes, dependent on the type of data being sent. The more "compressible" the data, the greater the throughput. For example, a typical text file transfer at 2400 bps should yield a throughput of between 4400 and 4900 bps. And the MultiModem224E's speed conversion and flow control features let you set your modem's RS232C port at 4800 or even 9600 bps, to take full advantage of the Class 5 compression.

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2400/1200/300 BPS Error Correcting Modem



The newspapers include many of the nation's most important: the *Philadelphia Inquirer*, *Miami Herald*, *Detroit Free Press*, *Washington Post*, *Chicago Tribune*, *Boston Globe*, *Los Angeles Times*, and *Newsday*. Also included are *Time* and *Fortune* magazines, the Associated Press wire, Predicasts' trade magazine abstracts, *Facts on File*, the PR Newswire and Media-wire public relations services, the Knight-Ridder news and financial wires, ABI/Inform's journal abstracts, and the *Detroit Free Press*'s recipe data base.

Not that Vu/Text carries every major paper. To read the *Wall Street Journal* or *Barron's*, you would have to subscribe to the rival Dow Jones/News Retrieval service. To get the *New York Times* or the *Christian Science Monitor*, you'd have to join the folks over at Nexis.

Of course, saving time by going on line doesn't necessarily mean saving money. Even if you promise to do a minimum of \$60 worth of searching per month, most of the data bases cost either \$75 or \$85 an hour, plus \$9 an hour for access via Telenet or Tymnet. (One specialized service—Wall Street Transcript—goes for \$250 per hour.) If you can't promise regular usage, access can run between \$90 and \$100 per hour plus a \$10 monthly service charge. At 2400 bps, access fees jump by 50 percent. But when you consider how much time and money it would take to search through two years of AP wire copy by hand for the five stories you need, \$85 an hour starts to sound reasonable.



For now, you can generally search only one year of a publication at a time; for example, the 1981 *Philadelphia Inquirer* is in a different data base than the 1985 volume. Since you can transfer a search from one data base to another with a simple command, that restriction isn't much of a handicap; in some cases it even shortens search time by allowing you to focus your search. Vu/Text plans to consolidate some of the data bases and to allow users to search all years of all included newspapers with a single command.

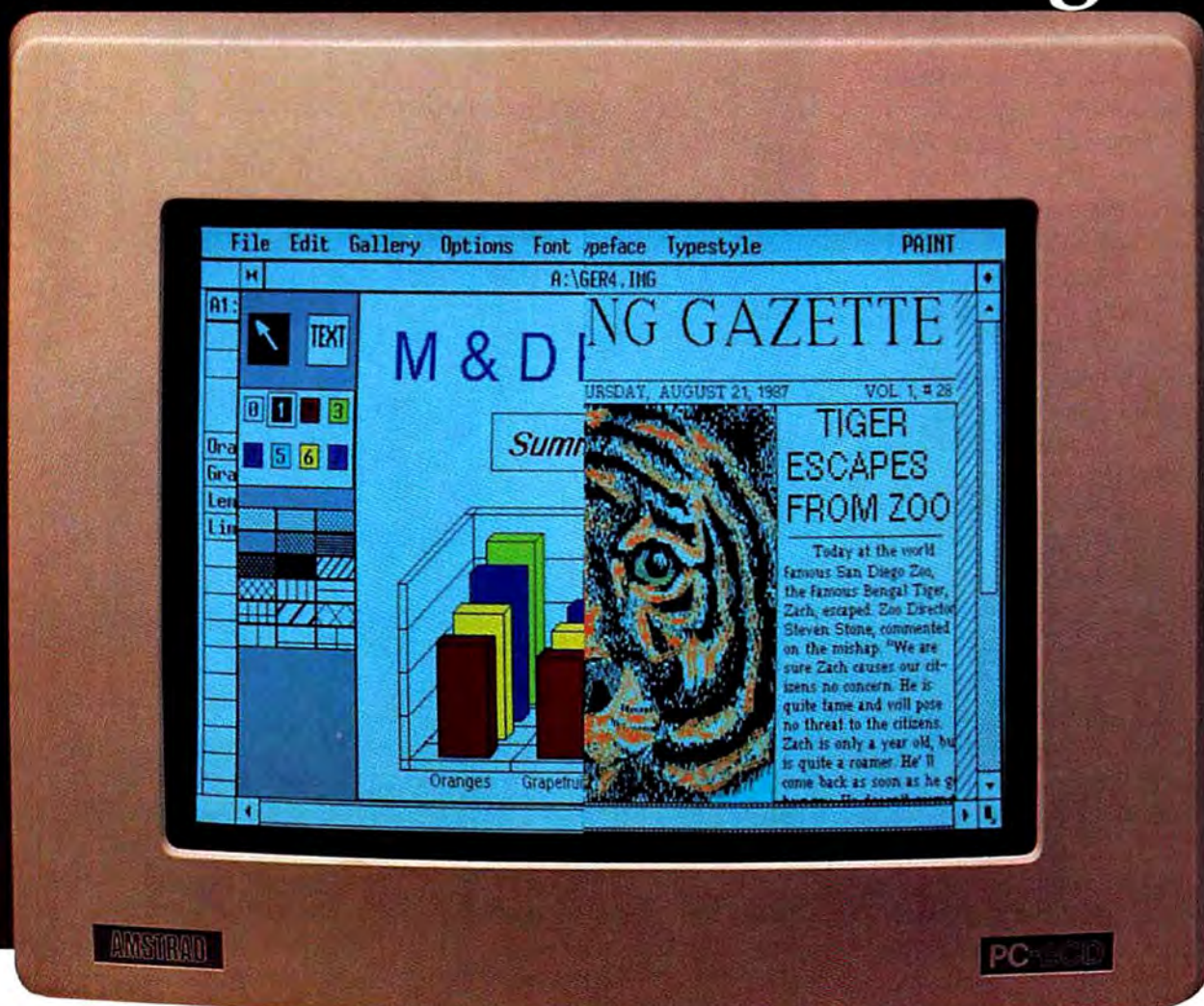
You access Vu/Text via the Telenet or Tymnet gateway. Logging on to the service is no more difficult than logging on to CompuServe or MCI Mail. Basically, you type 'vutext' at Tymnet's 'Please log in:' prompt (or '21540' at Telenet's '@' prompt) and enter your Vu/Text password. You can then enter a string of characters to help identify the search when the bill

arrives. Vu/Text's search syntax is simple and clearly outlined in a spiral-bound miniguide, in a cheat sheet, and in the manual, which also contains detailed information on each data base.

At upwards of \$75 per hour, you'll want to give some thought to a search before you start. Let's say you want to find the text of everything columnist Clark DeLeon published in the *Philadelphia Inquirer* in 1983. You log on to the *Inquirer*'s 1983 data base by typing 'db i83', then search field 3, where bylines are stored. When you enter '@3 DeLeon', you will be presented with his columns for that year. The columns are presented a screenful at a time. If you wish, you can issue a command to have the entire results of any search dumped to the screen, so

A computer for the left brain.

And the right.



Until now, choosing a computer typically meant choosing between capabilities. If you needed a computer primarily for serious business needs, then a computer with IBM compatibility was the only rational (left brain) choice, right?

But if you were looking for desktop publishing capabilities to display your creativity (right brain), then a computer designed for mouse-driven, windowing, graphics software was the way to go. Right?



*Source: International Data Corp.

Now there's a computer that offers incredible performance in both realms — the AMSTRAD PC 1640.

Our remarkable new computer runs virtually all IBM software, including CAD, which makes it ideally suited for business and engineering as well as for personal use.

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The PC 1640 also comes with the capabilities built in to run the mouse-driven, windowing software it takes to create spectacular desktop publishing. In fact, the PC 1640 is spectacular when it comes to expressing all kinds of creative ideas. We even include the mouse and the software you'll need.

Plus, the PC 1640 ingeniously incorporates monochrome (Hercules), CGA and EGA capabilities into a single motherboard. When you're ready to upgrade your graphics, all you do is merely pop on a more sophisticated AMSTRAD high quality monitor.

And now for the best feature of all: prices for a complete PC 1640 start as low as \$999. Like we said, it's a remarkable computer.

If you're about to make that all-important computer decision, choose the incredible PC 1640. After all, what's the point of limiting the output of your genius, when one computer can show off all of it!

To find out more about the complete line of remarkable products that has made AMSTRAD Europe's best seller*, write AMSTRAD, 1915 Westridge Dr., Irving, Texas 75038, or call 214/518-0795 for the dealer nearest you. You'll see for yourself, an AMSTRAD is the next best thing to having an I.Q. of 200!



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you can capture the text without having to press <Enter>.

Once you're familiar with Vu/Text conventions, searches can be done very quickly. Figure about a minute per search to find and see the first page of a given story. Listing full text, however, takes time. At 1200 bps, for example, a screenful of data takes 13 seconds to scroll by. At two to three screens per printed page and better than a-dollar-a-minute connect time, it's cheaper to have Vu/Text print the text off line and mail it to you.

Other than its high cost and slow output, Vu/Text's major drawback is a near total lack of on-line help. To compensate, Vu/Text operates a toll-free customer support number from 8 a.m. to 10 p.m. weekdays and 9 a.m. to 6 p.m. weekends. Beginners can also access a training data base free for the first month.

Maybe you have to be an information or newspaper junkie to really appreciate Vu/Text. But it's an irreplaceable research tool. If you need to comb the dailies, Vu/Text isn't a luxury—it's a necessity.
—Daniel J. Rosenbaum

MemoryMate

RAM-resident free-form text data base

Pros: Easy to enter text; copies text between notes and applications

Cons: NOT operator can't be used in note searches; cumbersome ASCII import function; may change screen colors of graphics applications

Version 2.00R
Brøderbund Software, Inc.
17 Paul Dr.
San Rafael, CA 94903
415/492-3500

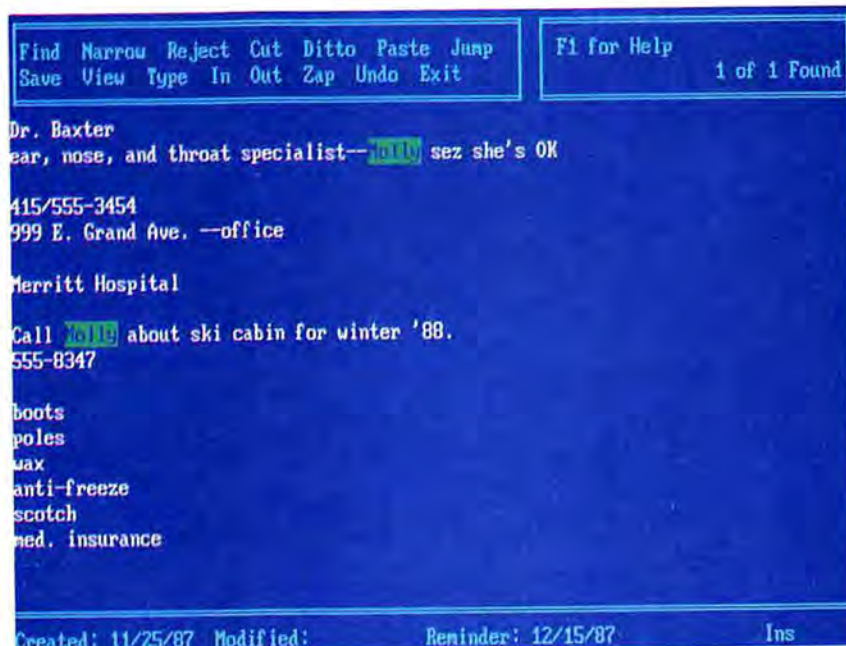
List price: \$69.95
Requirements: 84K, two disk drives, DOS 2.00 or later version
Not copy protected

The great thing about paper and pencil is that they let you jot things down whenever and however you like. No matter how messy or coffee stained your pile of notes, you'll eventually find that irreplaceable phone number—as long as you never toss anything out. A data base management system, on the other hand, stores information in an organized fashion but requires that you set up a matrix of records and always enter information the same way.

MemoryMate, Brøderbund's RAM-resident data manager, lies

somewhere in between, letting you jot down that thought and then find it again later, instantly. Unlike structured data base management programs, MemoryMate stores text in 60-line notes. You don't have to set up a data base or worry about how information is organized. Just pop up the program, type in whatever you want, and save it; MemoryMate instantly indexes every word. You can retrieve notes in a trice, then print out the results of your search.

MemoryMate notes are essentially documents—you can scroll through them with the cursor keys and add and delete text, but the note's contents can't be searched, sorted, or similarly manipulated for reporting purposes. No matter. MemoryMate still makes a dynamite all-in-one Rolodex, help file, note pad, and appointment calendar.



MemoryMate lets you enter information randomly, then find it again fast. A reminder feature jogs your memory on the day's appointments.

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SYSTEM REQUIREMENTS: IBM™ PC, XT, AT, PS/2, or compatible. Two disk drives, or hard disk. MS/DOS 2.0 or greater. 256K minimum.

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One Disk Does What All These Do. And More.*

TAKE CHARGE™! One of the last DOS utilities you'll ever need, a complete, integrated DOS environment and utility program -- with enhancements for the beginner and the experienced user -- in one PC, MS/DOS-based software package. A powerful workhorse anyone can use immediately. Once you use it, you'll never want to be without it.

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* File manager (Copy/delete, Rename, Menu Print, Etc), appointment book/calender, fully-automatic Rolodex-type card file system (with autodialer and label-maker), virtual memory text editor word processor (edit up to 10 files at once), ASCII table, alarm package and clock, five calculators, printer redirect, speed key, cut and paste, clipboard, notepad, screensaver, security keyboard lock, system reset, DOS command line editor, hex editor, directory editor, disk optimizer, graphic directory display, directory sort, tree directory, file locator, undelete, format recovery, and more.

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Sound familiar? *MemoryMate* is a lot like Micro Logic's *Tornado Notes* (see "The Calm After the Storm," PCW, July 1987), with one major difference. *Tornado Notes* can handle only 54K of text; with a hard disk, *MemoryMate* handles 2MB.

MemoryMate is a practical way to corral jottings that usually wind up on Post-its.

You direct *MemoryMate* operations with 15 simple commands, accessible via a menu or with mnemonic <Ctrl>-key combinations. To retrieve a note, pop up *MemoryMate* and select the Find command. Supply the word or words to be found, and within seconds *MemoryMate* tells you how many notes the search text appears in, displays the first note, and lets you skip through the rest using the <GrayPlus> and <GrayMinus> keys.

You can construct more complex searches using Boolean AND, OR, <, =, and > operators. For example, to locate that ear-nose-and-throat specialist you met last summer, you might instruct *MemoryMate* to find every note that contains *Dr.* and either *ear* or *nose*. Unfortunately, Brøderbund failed to include the useful NOT operator. Often, the easiest way to find what you want is to exclude what you don't. You can also search for notes by the date they were created or modified and thus retrieve all notes written between two specified dates. If a search turns up too many notes to browse through comfortably, the Narrow command lets you whittle

the stack by adding more criteria to the search. Notes can also be assigned a date (but not a time) so that you can jot down a meeting or appointment and be reminded about it later. When you load the program, that day's reminder note will pop onto the screen.

Once a note is retrieved, you can paste its contents into an underlying application, a particularly helpful feature if you use the program as an electronic Rolodex. The View command redisplay the application you were working in before you invoked *MemoryMate*.

You can also move text into *MemoryMate* by importing ASCII files. If you import a file that exceeds the program's 60-line limit, *MemoryMate* will split it into several notes. You can specify how incoming text should be broken up by inserting a special character of your choice (such as @ or &) in the text to act as a note terminator. Exported text will contain the character at locations corresponding to the end of a *MemoryMate* note file. All this is a convoluted way to make *MemoryMate* do something it wasn't designed for, namely handle large chunks of related data. It can be done, but it's a bit like hunting elephants with a flyswatter.

Because *MemoryMate* needn't be loaded last and its hot key can be reconfigured, it shouldn't collide with other memory-resident programs. (You can run *MemoryMate* as a nonresident stand-alone program, but this upstages its role as a handy desk accessory.) How-

ever, *MemoryMate*'s interaction with EGA screens may raise your hackles. Programs that run in graphics mode, like *Microsoft Word*, may display different colors after you exit *MemoryMate*. To avoid this, run the application in text mode—if it has one—or trick the program into redrawing the screen. For example, *Word* users can press <Ctrl>-<Shift>-\ to redraw the screen, or <Alt>-<F9> to switch modes.

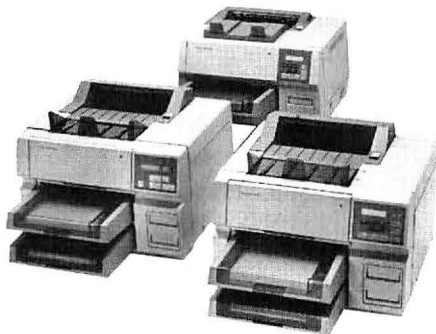
At \$69.95, *MemoryMate* is a practical way to corral jottings that usually wind up on Post-it notes and Rolodex cards, but it isn't cut out for tasks such as reporting and indexing. If you need that kind of data base management, turn to a capable file manager like ButtonWare's *PC-File +* (which costs the same)—and sharpen your pencil. —David Weinberger ●

Charles Seiter is a Northern California writer and consultant on scientific programming and computer languages. Richard Jantz is a desktop publishing consultant in Berkeley, California, and the author of Ventura Publisher for the IBM PC: Mastering Desktop Publishing (John Wiley & Sons, New York, 1987). Daniel J. Rosenbaum is a former UPI reporter who now writes about computers and communications; his most recent book is WordPerfect Advanced Techniques (Que, Indianapolis, 1987). Stephen A. Blumenthal is a contributing editor for PC World. David Weinberger is a staff writer for an electronic publishing software company.



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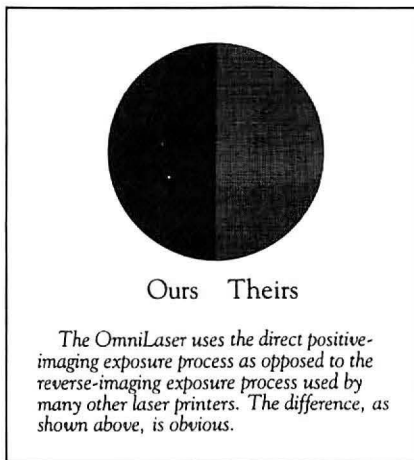


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tion in both text and graphics. Blacks are black, whites are white, and you control the shades of gray.



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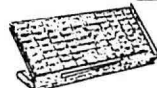
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1988 World Class PC Contest

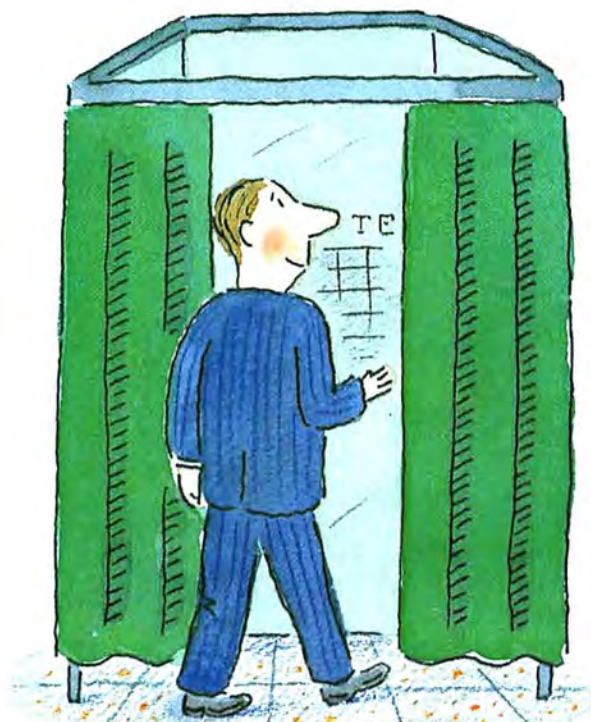
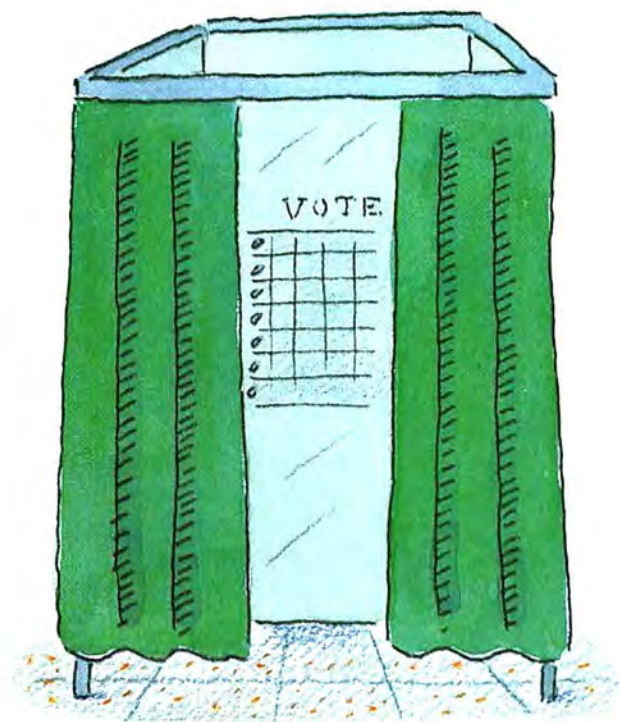
Grab a pen and make the PC industry take heed! Vote for your favorite hardware and software, and you may win prizes worth over \$40,000.

Dusty Roady Pedersen

|||| The pen can be mightier than the dollar. In our sixth annual World Class PC contest, you can spotlight the best software and hardware in the business and let vendors know loud and clear what plays—and what stays on the shelf. Simply write the names of your top-rated products on the enclosed entry form and return it to *PC World*. We will announce the results in our October issue.

The product receiving the most votes in each category will be designated a World Class winner; products that garner a significant number of votes will receive runner-up status. In short, you'll be picking the industry's champions and contenders.

When you cast your votes, you do more than voice an opinion—you're also instantly eligible for a host of prizes. And we're not talking small potatoes; prizes awarded last year totaled over \$40,000. First prize will be the entire World



Class PC system, consisting of the highest-rated desktop computer, plus the winning hardware and software products in 32 categories. Second prize will be the most popular transportable computer, and the third-prize winner will receive the heaviest hitter in a light-weight category: the winning laptop computer. Don't dawdle with that entry form—*PC World* is also giving away special prizes to the first 100 readers who send in their ballots.

So reach out and let the world know if the industry's leaders deserve their laurels, or if some new kids on the block merit a standing ovation. Remember: The ballot can be a powerful tool for change.

To help you cast your votes, we've supplied background in-

formation on those product categories that may not be self-explanatory.

Dot Matrix/NLQ Printer

Dot matrix printers that provide a draft quality print mode or combine dot matrix and near letter quality (NLQ) print modes.

Monitor VGA, EGA, color, monochrome, or "paper-white" displays.

Memory Expansion Board

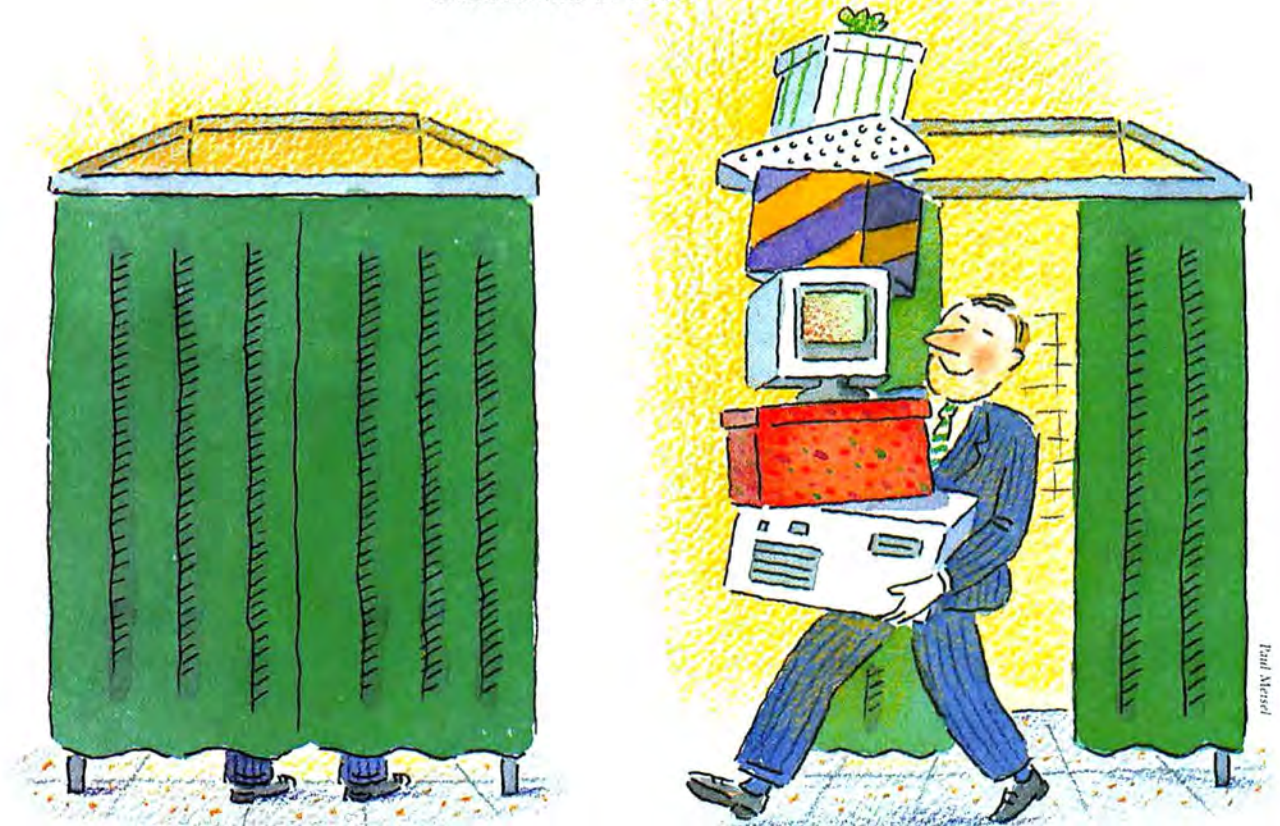
Boards that supply additional conventional or expanded (EMS) system memory. Boards in this category may also include a clock/calendar and parallel or serial ports.

Graphics Board Boards that offer VGA, EGA, CGA, or Hercules graphics standards. Please specify whether your nominee board is monochrome or color.

Mass Storage All forms of mass storage, such as hard disk drives, removable high-capacity drives, optical disk drives (WORM and CD ROM), and tape backup units.

Input Device Scanners, mice, keyboards, digitizing tablets, light pens, and so on.

Local Area Network—Network Board First-place products in the two local area network (LAN) categories are the only winners that will not be awarded as part of the World Class PC system. But we'd like to know which LAN you think merits attention. In this hardware category, we're looking for the names of expansion boards that link PCs in a LAN (not the network's server).



Word Processing Utility Outline processors, spelling checkers, grammar and style checkers, and thesauruses.

Desktop Publishing Programs used for page layout, font creation, editing, integration of text and graphics, and typesetting that support page formatting and laser printer fonts.

Desktop Publishing Utility Drawing and paint programs, image capture and manipulation programs, clip art collections, font generation programs, special printing utilities, downloadable font libraries, and more.

Financial Analysis Applications for creating and analyzing complex financial models, budgeting, forecasting, and statistical work.

Relational Data Base Powerful relational data management programs that feature large record capacity, sophisticated query systems, full-blown report writers, text import and export capabilities, and command languages.

Flat-File Data Base Flat-file management programs that operate on only one file at a time and are often used to maintain mailing lists, contact lists, and the like.

Utility Programs that perform functions not typically provided by the operating system, such as file recovery, file management, file conversion, macro and keyboard enhancement, disk emulation, and printer support.

Communications General and remote communications programs, packages dedicated to gathering electronic mail, and micro-to-mainframe communications packages (which are designed for terminal emulation and data conversion).

Desktop Organizer Products that replace such deskbound aids as a Rolodex, notepad, adding machine, appointment scheduler, phone directory, and others.

Integrated Programs that incorporate several applications—usually word processing, spreadsheet, graphics, and data management—and share an interface, a command structure, and data. The applications may be tightly integrated or in separate modules.

Operating Environment An operating system or an extension, often called a windowing environment, that allows you to run a number of off-the-shelf applications at once and easily share data among them.

Business Graphics Programs that produce several types of charts and are used for business presentations.

Computer-Aided Design Programs used for drafting and modeling by designers, engineers, and architects.

Personal Finance Programs that monitor personal finances, keep household records, or organize personal data. Also includes personal investment programs that perform portfolio management, technical analysis, fundamental analysis, and stock information retrieval.

Local Area Network—Network Operating System This product (along with the first-place LAN network board) will not be awarded, but we'd like to know which network operating system you think is at the top of the heap.

Most Promising Newcomer Vote for the recent software and hardware arrivals that you feel have made the most difference. *Recent* in this case means released since September 1987. You may vote for a product you've already cited in another category.

Contest Rules Each person may enter the contest only once. Type or print your choices on the entry form included in this issue of *PC World* or on a reasonable facsimile of that form. Employees of product manufacturers are eligible to vote for any products other than those sold by their company. Your entry must include your product votes and your name, address, and daytime telephone number. Entries must be postmarked no later than April 15, 1988. Employees of PC World Communications are not eligible. Please tape the form closed; do NOT staple the form. Thank you, and good luck! ●

|| *Dusty Roady Pedersen is the product review editor for PC World.*

1988 World Class PC Contest Entry Form

Dear Reader: Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you don't have to vote in all categories. Eligible products must be IBM PC compatible and commercially available as of March 1, 1987. Note: To ensure accuracy, a vote will not be counted unless the following three items are provided: (1) correct product name, (2) manufacturer's name, and (3) model number (for hardware only). Please print or type your entry and submit it by April 15, 1988.

Name _____

Company _____

Address _____

City _____ State _____

ZIP _____ Daytime phone _____

Hardware

	Manufacturer	Product	Model
Desktop Computer (first prize)	_____	_____	_____
Transportable Computer (second prize)	_____	_____	_____
Laptop Computer (third prize)	_____	_____	_____
Dot Matrix/NLQ Printer	_____	_____	_____
Laser Printer	_____	_____	_____
Monitor	_____	_____	_____
Modem	_____	_____	_____
Memory Expansion Board	_____	_____	_____
Graphics Board	_____	_____	_____
Mass Storage	_____	_____	_____
Input Device	_____	_____	_____
Local Area Network—Network Board	_____	_____	_____
Most Promising Newcomer—Hardware	_____	_____	_____

Software

	Manufacturer	Product
Word Processing	_____	_____
Word Processing Utility	_____	_____
Desktop Publishing	_____	_____
Desktop Publishing Utility	_____	_____
Spreadsheet	_____	_____
Financial Analysis	_____	_____
Relational Data Base	_____	_____
Flat-File Data Base	_____	_____
Utility	_____	_____
Communications	_____	_____
Desktop Organizer	_____	_____
Programming Language	_____	_____
Integrated	_____	_____
Operating Environment	_____	_____
Game	_____	_____
Business Graphics	_____	_____
Computer-Aided Design	_____	_____
Accounting	_____	_____
Tax Planning or Preparation	_____	_____
Personal Finance	_____	_____
Local Area Network—	_____	_____
Network Operating System	_____	_____
Most Promising Newcomer—Software	_____	_____

1988 World Class PC Contest Entry Form

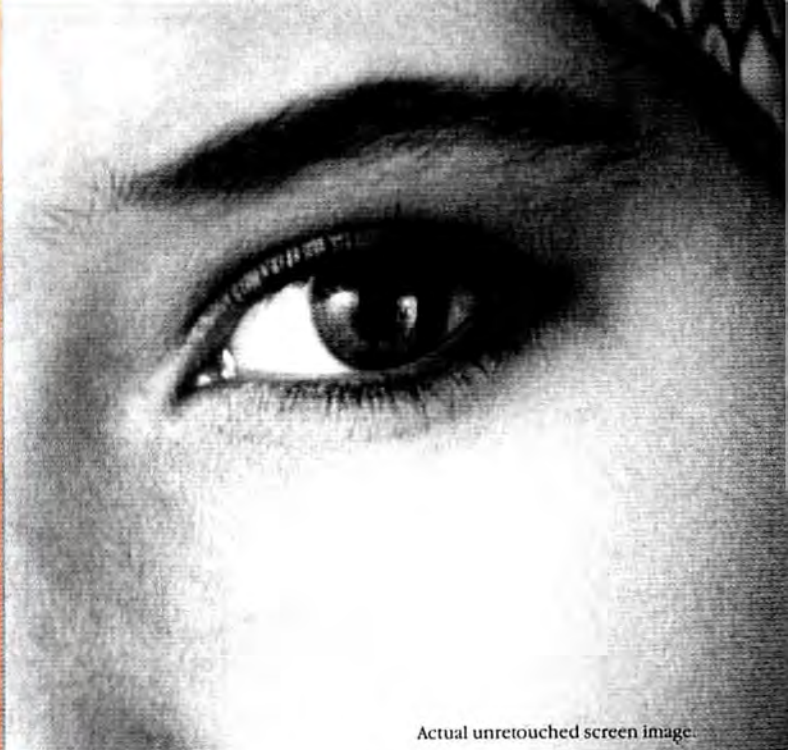
FOLD HERE

Place
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Actual unretouched screen image.



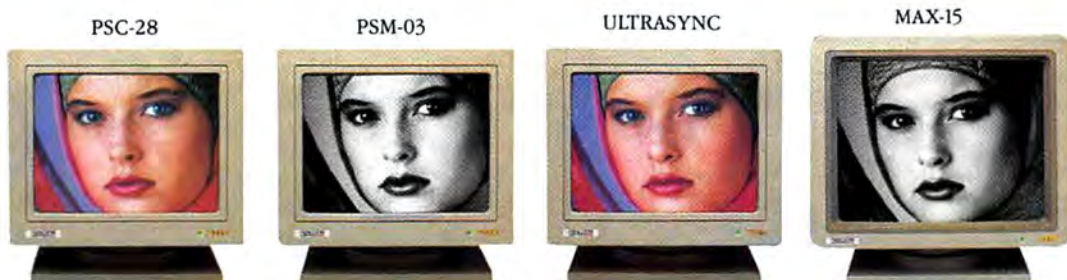
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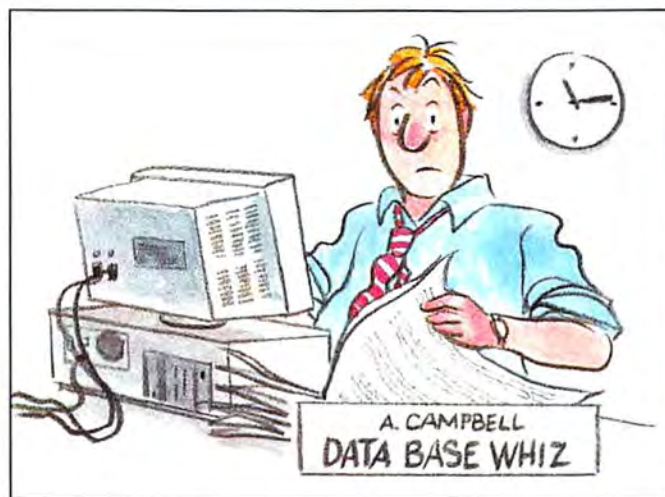
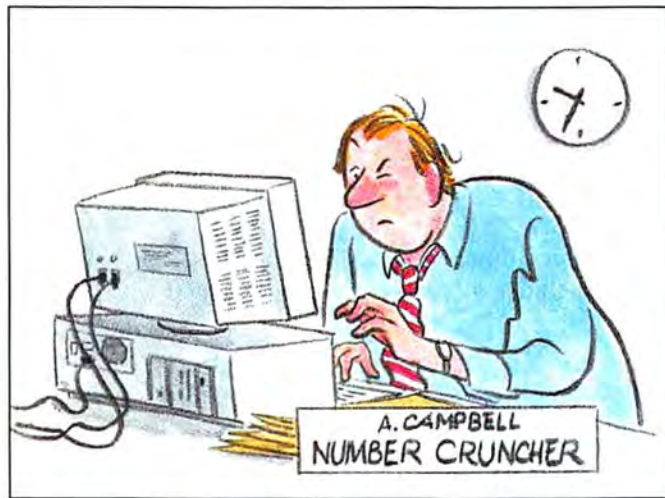
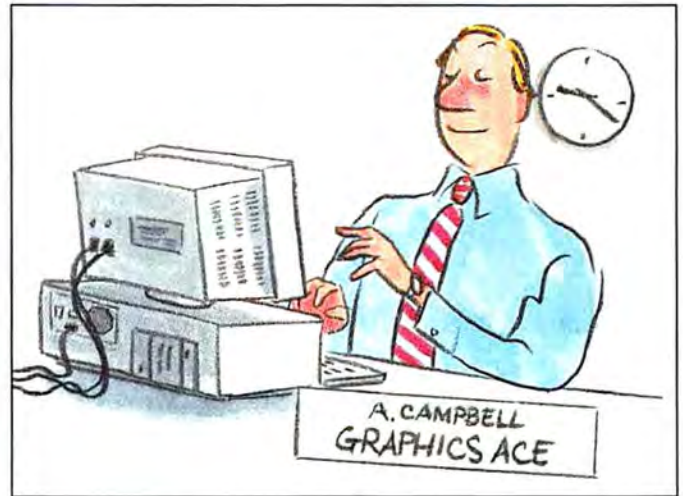
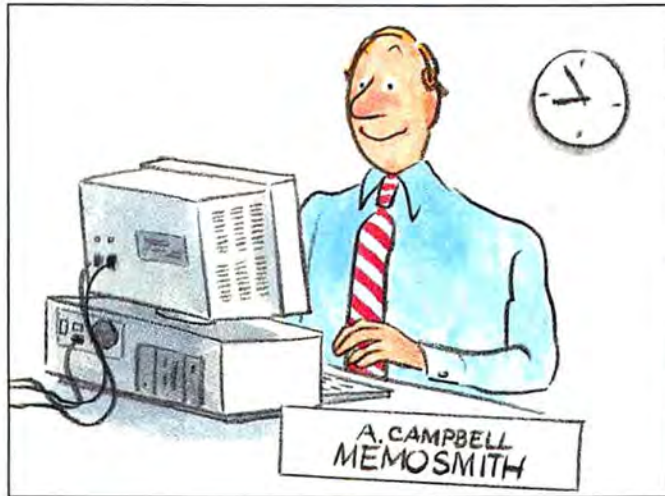
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Putting E-Mail to Work

Users find that electronic mail becomes a natural choice for many communications jobs—once implementation hurdles are overcome.

Sharon Efroymson First

Electronic mail not only saves business substantial time and money, it's evolving into the business equivalent of a microwave oven: When your schedule gets really tight, you wonder how you ever lived without it.

Take the case of Ron Lockhart and Jamie Osman, owners of a prospering New York real estate and land development company. When Osman married and moved to Boston, it might have spelled the end of Osman-Lockhart Properties, because the partners constantly collaborated on written work. But with New York and Boston offices linked by E-mail, the business continues to flourish.

"At the time we first looked at E-mail, we were running into problems putting together a \$5 million deal, the largest we had ever done," recalls Lockhart. "We needed to swap projections, statements, and business plans for potential investors."

The partners initially tried Federal Express, Lockhart says, and found it a good temporary approach. But their fledgling firm saw its profits being consumed by overnight mail costs. And overnight was not always fast enough.

Simply connecting their PCs by modem was a good first step into

electronic communications. But, says Lockhart, "We needed a service with a mailbox, so we could leave messages. If I could put them someplace so that Jamie would know where to check and get them later, I wouldn't have to wait till she'd be home to transmit."

They started out with The Source and found a number of drawbacks. The biggest problem was that they couldn't send their XyWrite or 1-2-3 files with formatting intact. Instead, they had to run the files through an ASCII conversion utility, store them under a new name, bring up Datastorm's *Procomm* communications software, and upload the files to The Source. "It was too convoluted, and no one wanted to do it," says Lockhart. "Our Federal Express bills crept up again."

They also found The Source expensive. "The Source charges you from the instant you connect," Lockhart points out. "I had to physically type the message into the Source while on line; it was more of a bulletin board than E-mail."

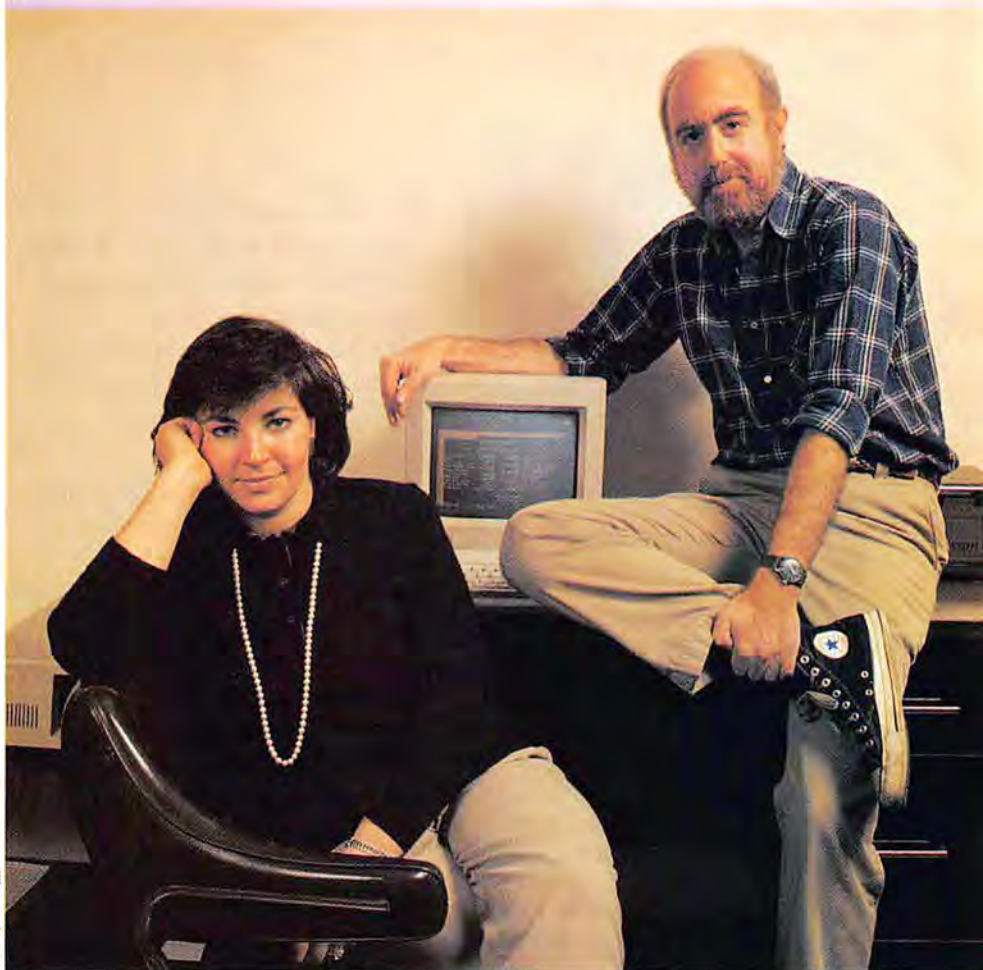
Lockhart and Osman next tackled MCI Mail and Lotus Ex-

press, a utility that automates access to MCI Mail. In theory, they could send a XyWrite letter or 1-2-3 spreadsheet without bothering to convert the file. Working in the background, *Lotus Express* would dial MCI Mail within a specified period, deliver the message, store any incoming mail, and sound an incoming mail alert.

This sounded terrific, but Lockhart and Osman could not get the package to work properly, and neither MCI nor Lotus was able to help. The two partners went back to *Procomm* and file conversions.

Months later they discovered that their problems had been caused by a not-quite-Hayes-compatible modem and by conflict between *Lotus Express* and Persoft's *Referee*, a background management program. Once these conflicts were overcome, Lockhart says, *Lotus Express* worked "flawlessly and transparently."

The company soon abandoned Federal Express for this job. The average MCI cost is a dollar a message, as opposed to \$11 to \$13 for Federal Express. And the partners liked the MCI policy of charging by length of document rather than by connect time.



Thomas Lanzetta

Jamie Osman (left) and Ron Lockhart found that by linking via *Lotus Express* and MCI Mail, they could share work between Boston and New York.

"When the length of transmission time is irrelevant, you can fumble and make mistakes and not be charged for it," Lockhart says.

Fast-Food Mail

E-mail's speed and cost advantages benefit not only small firms such as Osman-Lockhart Properties but also large companies like Wendy's International, a fast-food chain.

Using CompuServe's InfoPlex service over the last few years has paid off big for Wendy's, according to Nancy Johnson, supervisor of client support services. When Wendy's compared InfoPlex costs with those of Purolator Courier, it found E-mail was saving the chain more than \$100,000 a year.

Wendy's 150 U.S. field offices, which oversee the chain's franchises, swap reams of data with

the corporate headquarters in Dublin, Ohio. The local outfits send sales and payroll figures, insurance claims, and requests to change pricing or add or discontinue items. Headquarters transmits routine pricing information, such as the current price of tomatoes. In addition, Wendy's employs E-mail for marketing; before a big promotion, corporate marketing broadcasts ideas for displays or coupons.

E-mail also helps in time-critical situations—for instance, when corporate communications must check a field officer's speech. Revisions can be returned very quickly; uploading a few pages of text takes only a couple of minutes.



D. Gorman/INXY

InfoPlex aids marketing at Wendy's, notes Nancy Johnson.

To make InfoPlex easier to use, Wendy's built a friendly front end called WendMail. The effort took a programmer using a software editor provided by CompuServe the equivalent of a week, Johnson says. The menu-based WendMail performs access tasks automatically and enables users to access the system with minimal typing. To receive messages, for instance, a user just enters his or her password.

Despite the relatively smooth transition to the new system, Wendy's still employs Purolator. For instance, legal departments must transmit original documents for signature, and very large files are shipped more economically on disk. If sending the document takes more than half an hour on CompuServe at \$20 an hour, then shipping the disk for \$10 by Purolator is more economical.

Wendy's E-mail charges average about \$9000 per month. To reduce costs, Wendy's requires users

to create messages off line, logging on only to transmit. "I wish CompuServe had supplied an off-line editor," Johnson says. "Wendy's went through a lot of trouble finding one that would not throw garbage in at the end of the message."

Johnson also would like CompuServe to signal a user when a message has arrived. The only way users know if they've received mail is by logging on to CompuServe and checking their mailbox, she says. Because people tend to forget to check their mail regularly, senders often take the redundant step of calling recipients to remind them.

In the future, Johnson expects, more people will use E-mail for sending messages within corporate headquarters, because it saves time. "Right now, it's easier for them to walk down the hall or make an in-house call," Johnson says. "But if they phone instead of using E-mail, it takes twice as long, because they chitchat."

E-mail has dampened this tendency—but not completely. As Johnson notes, the Michigan office has been known to send "We beat Ohio State!" greetings to the Ohio office.

■ The Best Example

Some companies that begin using E-mail for internal needs later link up with customers and suppliers. Obviously, establishing these pathways is greatly simplified if everyone subscribes to the same E-mail service (for a listing of E-mail services, see "E-Mail to Anywhere" in this issue). Major services may offer ways to route traffic to and from one another, but that adds another level of complexity.

Attracted by the competitive advantage offered by instant communication with customers, a few firms are actually reselling E-mail services. One such pioneer is the A.M. Best Company of Oldwick, New Jersey, which joined forces with AT&T's E-mail service, AT&T Mail.

The century-old A.M. Best maintains a massive data base that includes annual ratings for approximately 3400 insurance establishments and sells this information to a large client base of primarily insurance and reinsurance firms. A.M. Best provides on-line access to this information through a service known as Bestlink; recently, the company decided to add AT&T Mail to the Bestlink package. "We thought, Why not have our clients talk to each other through us?" notes Werner Kruck, senior vice president for sales. Not only has this decision created a de facto E-mail standard among subscribers, but Bestlink's volume E-mail discounts are passed on to end users.

The insurance-information vendor also uses AT&T Mail for internal sales communications. For example, Kruck can stay in closer contact with his field sales staff. When he needs to reach all 15 salespeople, he can use AT&T Mail's broadcast feature to reach out and touch every one. "Have you ever tried to get in touch with 15 salespeople across the country?" asks Kruck. "This is a real improvement."

Kruck is especially fond of AT&T Mail's voice mail. If you're on the road, far from a PC, you

can still check your mail from any touch-tone phone. A voice synthesizer reads you the subject and sender, along with the number to press to hear the message. When you press that number, the voice synthesizer reads you the text.

Custom Choices

When A.M. Best put together its E-mail offering, some of the special features of AT&T's off-line editor, AT&T Mail Access, proved essential. In particular, the AT&T software offers a module that lets A.M. Best customize forms—a necessity in the insurance industry.

Users can summon any pre-designed form, fill in the blanks, and send it off. Since the entire form is sent, transmission takes from 1 to 3 minutes. Kruck wishes that AT&T Mail could transmit just the data being entered in the form and reassemble the form at the other end to conserve connect time.

Setting up the client E-mail system was a relatively simple pro-

cess. A.M. Best already provided Bestlink subscribers with custom telecommunications software, so an E-mail option was merely added to the main menu. A greater challenge was rewriting the AT&T manual for subscribers, which took a month and a half.

Kruck emphasizes that E-mail is most effective when all your correspondents use it. "If two of the three people I need to reach are on the AT&T Mail system, I can reach the third by having AT&T send my message to the post office," says Kruck, referring to AT&T's paper mail service. "But that takes as long as regular mail." And while E-mail costs only 40 cents for up to 400 characters, AT&T charges \$2 to collaborate with the post office on a short message. AT&T Mail also offers faster options, such as 4-hour faxing for \$27.50 and overnight mail for \$7.50 and up. (These are AT&T's standard charges; A.M. Best sets its own pricing for reselling the services to clients.)

A.M. Best plans to expand its services to help reinsurance companies in their negotiations, which inevitably generate reams of communication on phone and fax. Today, says Kruck, fax machines are a dead end. "You are expediting the movement of paper, but you still have to do the converting back to the computer," since all subsequent tasks such as accounting must be handled on the computer. Information that stays computer readable throughout means tremendous savings in time and effort.

While A.M. Best's visions of the future are a far cry from the simple way Osman and Lockhart use E-mail to edit each other's documents, both illustrate why E-mail is spreading so quickly. Users are still grappling with compatibility, training issues, and occasional service glitches, but they're also accruing substantial savings in time and money. ●

Sharon Efroymson First is a freelance writer and personal computer consultant at the Productivity Center in New York City.

"Why not have our clients talk to each other through us?" asks Werner Kruck of A.M. Best, which resells AT&T Mail services to its customers.



Joyce Rutland

*Lotus Express
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
800/345-1043
List price: \$100
Requirements: 256K (320K for
DOS 3.00 or later version),
Hayes-compatible modem,
MCI Mail (one-year
subscription included with
purchase, MCI usage fees
extra), DOS 2.00 or later
version
Not copy protected*

A License to Clone

As IBM's PS/2 line gains sales momentum, manufacturers of compatible systems prepare their designs for a summer launch into troubled waters.

Mike Hogan

||||| If you are considering buying into Personal System/2 technology but find IBM's brand name a little pricey, you may not have long to wait for alternatives. PS/2 clones should start trickling in this summer, semiconductor manufacturers say, and could become a raging flood by Christmas.

Major chip makers already have recreated the core logic and other components necessary to reproduce the PS/2 entry Models 25 and 30, and the Models 50 and 60, which are equipped with IBM's new proprietary Micro

Channel Architecture (MCA) bus. Equivalent chipsets for the 80386-based Model 80 should arrive by April.

That means, according to chip manufacturers, that by May at least five of their customers could show MCA-bus clone prototypes. Commercial machines could be hitting dealer shelves by late summer, and at least 30 more designs should be shipping by November.

"Could be" and "should be," but it isn't clear yet exactly whose product *will* be. The industry is holding its breath to see which companies will lead the others into the icy legal waters swirling around IBM's proprietary designs—and whether Big Blue lashes back.

IBM has vowed to use its PS/2 copyrights and patents to protect itself from the kind of compatible wave that swept away so much of its market share during the past two years.

Cloning the Models 25 and 30, which are built around the Intel 8086 chip, doesn't seem to be an issue. Although those machines offer new features, they are based on the well-established XT archi-

ture. Both Western Digital and Chips and Technologies (C&T) are selling chipsets for these systems, and several firms showed Model 25 and 30 work-alikes for sale to other manufacturers back in November.

But while clone makers may gain a little marketing cachet from association with the PS/2 name, copying these models yields precious few technical advantages, asserts Ed Juge, director of market planning for Tandy Corporation, the mauler of the midway for inexpensive PCs. "What's there to clone?" he asks. "We already have a product that sells for a third the money and runs the same software faster."

The real fight between the PS/2 and compatibles will be waged over IBM's Models 50, 60, 80, and future systems equipped with the advanced Micro Channel Architecture.

This January, nine months after IBM introduced Models 50 and 60, C&T released a 5-chip replacement for the 85 core-logic



'All this hoopla about IBM suing people [is] more of a hoax than anything else,' insists Chips and Technologies product manager Sikander Naqvi.

chips in these machines. A Model 80-equivalent chipset is due in April.

C&T could be considered the company most responsible for IBM's loss of AT market share two years ago. More than 60 percent of all manufacturers and

more than 1 million AT-compatible units employ C&T core logic.

That success attracted the attention of Western Digital Corporation, the premier designer of hard and floppy disk controllers for the PC market. The \$460 million giant recently acquired Faraday Electronics, developer of core logic and BIOS chips, and began delivering its own \$99, four-piece,

MCA-compatible chipset in January. Zymos Corporation, VLSI Logic, and Intel Corporation also are preparing designs scheduled for release sometime after midyear.

Silicon makers and PC suppliers alike insist there are no insurmountable technical hurdles to producing MCA alternatives that are both 100 percent compatible and functionally superior. But unlike the AT, which was built mostly by subcontractors using off-the-shelf parts, PS/2 MCA models are loaded with IBM's proprietary technology and are built almost entirely in-house. That increases the risk of infringing on IBM's intellectual property rights.

"The legal issue is the key issue, at least for the main players," concludes AST Research president Safi Qureshey. "Customers don't want to buy something with a cloud over it." Until that cloud disappears, says Qureshey, AST has no plans to release an MCA compatible.

Craig Moore

Building a "Clean" Compatible

System manufacturers who hope to have their PS/2 compatibles seen anywhere but in a courtroom should be ready to prove to IBM's lawyers that they didn't simply copy Big Blue's designs.

In the IBM PC/AT-compatibles market, about all they have to do is create a "clean" BIOS (basic input/output system). But that's just the first hurdle for PS/2 clone makers: Some estimate that IBM has included more than 100 patentable features in its Micro Channel Architecture Models 50, 60, and 80, and it has sworn to protect them against outright copying.

Developers have had to come up with additional double-blind procedures to prove design originality in core logic as well as BIOS, while still maintaining functional equivalency and 100 percent compatibility. Western Digital, for example, has found that it needs to take two different design approaches.

To make a compatible BIOS, Western Digital technicians reverse-engineer IBM's code, creating a group of design specifications that are then passed on to a separate

group of "forward engineers" through company lawyers and management. The second group creates a "clean" BIOS from the specs.

Hardware design, on the other hand, starts with forward engineers, who pore over the volumes of specs IBM provides for third-party developers. They create a paper design and then go back to the PS/2 and perform various electronic and software tests to validate their assumptions about the way it operates. From that process come the specifications used to create Western Digital's own original PS/2-compatible designs.

By comparison, the true clone maker simply buys an IBM and deprocesses its components by various chemical, mechanical, and electrical means. Core-logic dies are stripped away layer by layer, the circuits are extracted, and electron microscope photos are taken of input and output circuitry traces. In this way, the clone engineers work backward through IBM's original design, ending up with a schematic data base that a semiconductor manu-

facturer can use to produce a compatible chip.

Reverse engineering is not restricted to knock-off artists. Actually, it is done by "everyone in the industry to everyone else's parts with no exceptions," maintains Western Digital vice president Collier Buffington. It's used to check quality and assess competitiveness, and, he insists, is a must for anyone who hopes to design a 100 percent PS/2 compatible. To achieve complete compatibility, Western Digital's hardware reverse-engineering team determines register and buffer implementation, logic connections, and places where IBM may have implemented features in nonstandard ways.

"Never looking inside an IBM chip will not protect you from a patent infringement lawsuit anyway," notes Buffington. "Original creation is not a defense, so our belief is that you cannot make a PS/2 compatible without licensing from IBM."

Licensing, he emphasizes, is only possible after you've created your own original design, because IBM won't stand still for outright copying. —M. H.

On the other hand, PC's Limited president Michael Dell poohpoohs the idea that the PS/2 offers any more legal obstacles than did the AT. He admits to considering the PS/2 clone option but refuses to discuss the "whether" or "when" of any product introductions.

Sikander Naqvi, C&T's product marketing manager for systems logic, heartily supports Dell's sentiments: "All this hoopla about IBM suing people [is] more of a hoax than anything else." But even Naqvi admits that anxiety over legal questions is palpable.

Both C&T and Western Digital express confidence that IBM will extend utility-patent licenses to component and systems makers alike, in the interest of making the PS/2 an industry standard. Such a move would represent neither a

sharing of technology nor permission to copy technology, but it would grant permission to make functionally equivalent products in return for royalty payments.

"Our feeling, after several months of negotiations with [IBM], is that people who have gotten cross-licensing with IBM in the past will not have any trouble," says Naqvi. "We have good reason to believe that two or three systems manufacturers have already acquired broad licenses of the Micro Channel for Model 50 and 60 machines."

Naqvi doesn't think that semiconductor manufacturers will need utility patents. "But if we do require one, we won't have a problem getting one from IBM," he adds.

Big Blue Warning Signals

IBM's own statements have been less than reassuring. While Big Blue often cross-licenses technology with other companies, Entry Systems Division president William Lowe says flatly, "We don't intend to license the Micro Channel technology to other [system] manufacturers."

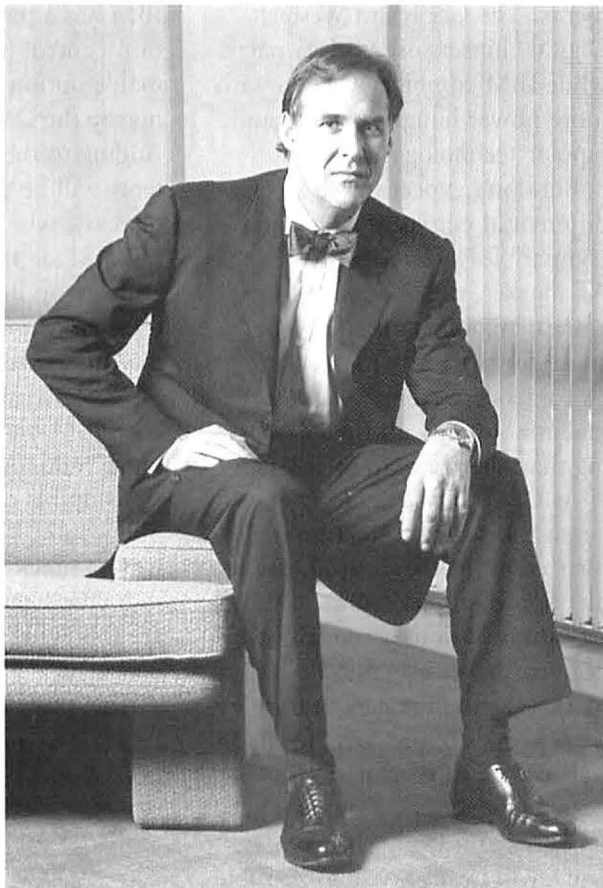
"We're not going to do anything we perceive to be to our disadvantage regarding the investments we've made, or the licensing of what we consider to be proprietary technology," he continues. "Where we feel we have legal protection, we're also going to make every effort to ensure that our products aren't being copied."

Lowe emphasizes that utility licenses don't give permission to clone and that they cover "a very small percentage of the overall Micro Channel design, maybe 10 to 15 percent." As for Naqvi's optimism that C&T could get a utility license, Lowe retorts, "I know of no intent to go into cross-licensing with [C&T]. If we ever did, it would be for reasons that were unassociated with intending to license the Micro Channel."

However, other senior IBM executives have commented that they never thought that the PS/2s would withstand all attempts at cloning.

Meanwhile, most system makers remain wary. "I keep reading statements from different parts of IBM that seem on the surface to contradict each other," says Stephen McKenzie, president of Acer Technology. A C&T customer, Acer is "looking" at MCA designs and could have a compatible out by August if the legal issues were cleared up. "If Lowe

No one can make a PS/2 compatible without licensing from IBM, insists Western Digital vice president Collier Buffington.



Long March

gave a clear-cut signal about IBM's intentions, people would get serious about an MCA compatible—which is probably why he doesn't give a clear-cut signal."

Compaq is working on an MCA compatible, but vice president of sales and marketing Michael Swavely says it won't be released until the market clears of IBM FUD (fear, uncertainty, and doubt). "FUD is one of IBM's strongest marketing tools," he declares. "They introduce something and say, 'No real benefits today, but we will deliver significant benefits in the future.' That leaves the customer with a fear of being left behind, uncertainty about [the product's] real value, and doubt about what they should do. Whenever uncertainty prevails, IBM has a good chance of being selected because of its prominence in the marketplace."

■ Chip Makers: Full Steam Ahead

But threats from IBM—real or imagined—haven't slowed silicon makers. Naqvi says C&T began preparing the foundations for a PS/2-compatible line more than a year ago, when it first recognized the limitations of the AT-compatible bus. C&T's solution was an AT-compatible dual bus that separates memory access from input/output (I/O) traffic in both its 80286 and 80386 chipsets. This forms the platform upon which C&T's PS/2-compatible designs are built. Naqvi claims that improvements in memory, I/O, and memory access let C&T's MCA compatibles run up to 50 percent faster overall than the IBM originals.

Western Digital also has developed a dual-bus system, reports Collier Buffington, general manager of Faraday Electronics and a Western Digital vice president. By his estimates, Western Digital has invested "tens of millions of dollars and probably a hundred man-years in developing MCA core logic."

Like C&T, Western Digital claims to have added functionality and flexibility. Enhancements include additional memory management logic, support for the Lotus/Intel/Microsoft 4.0 Expanded Memory Specification, and extra programmable options such as memory caching. Equally important, a reduced chip count means that both Western Digital and C&T customers can put together smaller computers with lower design and manufacturing costs and reduced power supply requirements. The C&T and Western Digital chipsets use CMOS parts, while IBM combines CMOS with more power-hungry NMOS and bipolar technology.

But don't expect to see a price differential between PS/2s and compatibles as large as that in the AT market, says Naqvi. IBM machines, he points out, "are not twice the price any more. Our customers are going to have a much more difficult time competing than they have in the past."

As C&T and Western Digital begin full-scale production of their chips, neither is at liberty to mention customer names. One exception is Memorex, which has been easing its way into the PC market during the past year or so with a series of products for its installed base of workstations. The next introduction, Memorex spokesperson Collin Bruce reveals, will be an MCA compatible based on the 80386 and C&T sili-

con, tentatively scheduled for shipment sometime after July.

In fact, most major system makers admit to working on MCA compatibles. Some, like Compaq and Wyse Technology, are even creating their own core-logic designs. No manufacturer wants to be pinned down on shipment dates; still, Naqvi expects to see as many as 10 MCA-bus clones by summer and up to 30 in the fall. Buffington predicts that virtually every major player in the AT market will offer an MCA compatible sooner or later.

As it has in the past, Western Digital will indemnify its customers against lawsuits arising from the use of its products, and Buffington remarks that they may need the insurance.

"The heart and soul of the Micro Channel is proprietary," he says. "We are pretty sure that IBM has a patent on its arbitration control point logic, programmable option select logic, and maybe the DMA controller too." Adding to the confusion, all patents will be pending for a couple of years, which leads Buffington to conclude that it just doesn't make good business sense to produce an MCA compatible without a utility license from IBM.

"Nobody wants to go to war with IBM on legal issues of any kind," adds Acer's McKenzie. He sums up his company's guiding philosophy, "Never first, but always a quick second." That seems to be the strategy most PC makers are following this year. ●

|| Mike Hogan is news editor of PC World.



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.

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E-Mail to Anywhere

Are you an MCI Mail user who needs to contact someone on CompuServe (or vice versa)? How about someone on AT&T Mail, The Source, Telemail, or even PeaceNet? Read on to find out how.

Ken Smith

It may seem odd, but electronic mail services don't share a common standard. Sending a message to someone who subscribes to a different network simply isn't as easy as contacting someone who has a mailbox on your own telecommunications service.

Still, it can be done. Both MCI Mail and CompuServe's EasyPlex have gateways that allow you to send messages between the two systems as well as to telex machines. Another company, DA Systems, has rolled out a service called DASnet, which provides a link to fax machines and to 19 other E-mail services that would otherwise be inaccessible to nonmembers.

MCI to CompuServe EasyPlex

If you're an MCI Mail user, you can send mail to someone on CompuServe's EasyPlex simply by using the EMS (electronic mail system) prompt. Once you've logged on to MCI, begin with the command **Create**, enter the name of the person to whom you're sending the message, then enter a blank space, **(EMS)**, and **<Enter>**.

MCI Mail will respond with the EMS prompt for the name of the service, so type **CompuServe** and press **<Enter>**. Next you'll receive an MBX (mailbox) prompt. Type in the recipient's CompuServe account number and press **<Enter>**. Bypass the second prompt for mailbox information by pressing **<Enter>** again, and type **Y** at the next prompt to confirm the information. Answer the remaining address prompts, then type in a message or upload a disk file as you normally would.

Unfortunately, there's not much room for error in this process. If you specify an ID that doesn't exist, the message will become a "dead letter" and you'll eventually be notified. But if you accidentally use the wrong ID, the message will be delivered to the wrong person at CompuServe. To keep track of your message, you can request a receipt (which costs 25 cents extra) at the Handling prompt.

MCI to Telex Machines

Sending a message from MCI Mail to a telex machine is just as easy. Simply enter the person's name followed by a blank space, and then type **(telex)**. MCI Mail will prompt you for a routing code. For U.S. destinations press **<Enter>**; you'll be

prompted with a menu of telex networks. Otherwise, enter the country code or name. (If you don't know the country code, type Help Telex at the Command prompt before you begin.)

Next, enter the recipient's telex number; you'll be prompted for the recipient's identifier, called an *answerback*. Although optional, providing the answerback will improve your chances of having the message delivered, especially to international destinations where telex numbers aren't standardized. When you send the telex, a "who are you?" query is transmitted to the receiving telex, which responds with an answerback. If that answerback doesn't match the one in your message's address line, the telex is canceled. If you don't specify an answerback, only the telex numbers can be compared.

After you respond to the answerback prompt, confirm that the information is correct. Answer the remaining prompts, type in or transmit the message, and then send it along. You'll be notified automatically once the telex is sent. If the message cannot be de-



livered within 2 hours, you'll receive a report and a reason. For more information, type Help Telex at MCI's Command prompt.

■ CompuServe to MCI

Connecting from EasyPlex to MCI is simple, too. However, EasyPlex cannot send files longer than 10,000 characters (about 6½ typical double-spaced pages).

To send a message, log on to CompuServe and enter **go mail**. When the EasyPlex menu appears, select **2** to compose a new message and press **<Enter>**. (If you're uploading a file, select **3** and respond to the prompts for protocol, type

of file, and file name. Note, however, that you can't send binary files to MCI.) After you're finished entering text, type **/EXIT** and press **<Enter>**.

You'll then be prompted with a menu of options. Choose **1** to send; then enter **> MCIMAIL:** followed by the recipient's MCI Mail account number. As with the MCI-to-CompuServe connection, messages addressed to a nonexistent user ID won't get delivered, but you will be notified. To make

DASnet Message Rates

Service	Cost per message	Cost per 1000 characters
AT&T Mail		
from AT&T	\$.10	\$.18
to AT&T	.77	.34
ARPANET	.10	.10
BITNET	.10	.10
DCMETA	.10	.10
Dialcom		
from any host	.10	.13
to U.S. host	.10	.13
to non-U.S. host	.10	.68
EasyLink		
from EasyLink	.10	.10
to EasyLink	.30	.22
EIES	.10	.10
Envoy 100 Canada		
from Envoy	.10	.24
to Envoy	.10	.55
GeoMail (U.S.)	.10	.10
MCI Mail		
from MCI	.10	.15
to MCI	.55	.28
NWI	.10	.17
PeaceNet/EcoNet	.10	.10
Portal	.10	.10
The Source	.10	.17
Telemail U.S.	.10	.24
Telemail Japan		
from Telemail Japan	.10	.24
to Telemail Japan	.10	1.32
TWICS Tokyo	.40	.45
UNISON	.10	.10
UUCP	.10	.10
The Well	.10	.10

To calculate the cost of each message sent on DASnet, remember to factor in the cost of sending a message from your own telecommunications service to DASnet, plus DASnet's per-message and character-count fees. A 1000-character message sent from MCI to Dialcom costs 48 cents: 10 cents from MCI to DASnet plus 15 cents per 1000 characters, and 10 cents from DASnet to Dialcom plus 13 cents per 1000 characters. In addition, you'll have to pay MCI \$1 for sending the message. Unless itemized otherwise, the charges in this table are the same for sending a message from a telecommunications service to DASnet and for sending a message from DASnet to a given telecommunications service.

sure your message is received, you can request a receipt; that service costs 25 cents extra, but you'll know for sure whether the message was received.

At the next prompt, type in the subject of the message and press **< Enter >**. To send the message to MCI, type **Y** at the confirmation prompt and press **< Enter >**.

CompuServe to Telex Machines

Messages from EasyPlex to telex addresses are handled in much the same manner. Once you're connected to EasyPlex, compose the text of the message (or upload the file) as though you were sending an E-mail message. At the 'Send to (name or user ID)' prompt, enter **> TLX**, a blank space, the number of the telex machine, a blank space, and the answerback.

For international delivery, preface the number of the telex machine with the 3-digit country code. You can access a complete list of numeric country codes by typing 'Help telex send country codes' or 'Help telex send' at any EasyPlex prompt. CompuServe will notify you automatically when the message is delivered.

DASnet for Access to More Services

If you use neither MCI Mail nor CompuServe EasyPlex, there's another alternative. For \$4.50 per month plus connect charges, you can subscribe to DASnet from DA Systems, which allows you to send messages to many other electronic mail systems, among them AT&T Mail, Dialcom, Western Union's EasyLink, MCI Mail, Telemail, The Source, and TWICS, a Tokyo-based E-mail service. Also supported are ARPANET, the De-

partment of Defense's system; BITNET, a network used by some universities; DCMETA, a conferencing system that provides services to the Federal Aviation Administration; the New Jersey Institute of Technology's EIES system; Envoy 100, a Canadian service; GeoMail, a service primarily for users of GeoNet E-mail software; NWI, a teleconferencing system operated by Networking and Information; PeaceNet/EcoNet, a network operated by the San Francisco-based Institute for Global Communications; Portal, a

the Send prompt. If you've specified a user ID or name that doesn't exist, you'll receive a note within 4 to 8 hours stating that the user is unknown, and the text of your message will be returned.

Message recipients needn't have DASnet accounts to respond. If their telecommunications service has a Reply prompt, they can use that to answer the message; otherwise, you must provide them with a special DASnet code.

Because of DASnet's recent relationship with GeoMail, DASnet subscribers can also send E-mail

mail services are expected to follow suit. But until a standard is widely implemented, gateways on MCI, CompuServe, and DASnet will be handy for reaching out across the services. ●

Ken Smith is head of technical support at a software company in San Rafael, California.

The beauty of DASnet is that you use it within the familiar environment of your own telecommunications service.

system used by members of the Sierra Club; UNISON, whose clients include the Pan American World Airways pilots union; UUCP, a UNIX-based network; and The Well, a general conferencing system and bulletin board.

DASnet maintains an account on each network it supports. Each account is polled approximately every 4 hours. If DASnet finds a message, the service sends it along to the recipient's network (the recipient need not be a DASnet subscriber).

The beauty of DASnet is that you use it within the familiar environment of your own telecommunications service. If you subscribe to both DASnet and MCI Mail, for example, you simply compose a message on MCI Mail and then specify a special DASnet code at

messages to group 3 and group 4 fax machines. (Your fax manual should state which type of fax machine you have.) From the DASnet end, a typical one-page letter sent to a fax costs about \$3.70 domestically or \$5.70 internationally. Of course, fax-to-fax charges are based solely on the cost of the "phone call" from one fax to another and could be considerably cheaper. But if you don't have a fax machine, DASnet's service is a convenient alternative.

Toward an E-Mail Standard

To date, several companies have adopted the proposed X.400 E-mail standard, which defines the way in which text, data, and images are transmitted. AT&T Mail, Telenet, DASnet, and UNISON already provide X.400 store-and-forward services to their users, and most other major electronic

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5000 Arlington Center Blvd.
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Consumer Watch

Advice and information for the computer consumer

Benchmarking is a subtle science; to do it right you have to test product performance in real-life work situations. Here are examples of what to look for in product testing.

Edited by Anita Amirrezvani

The Perils of Testing Data Bases
Since its beginning, National Software Testing Laboratories has benchmarked products with consumers' interests in mind. Instead of performing esoteric tests, like determining how fast a PC can generate prime numbers, NSTL makes sure its benchmarks are grounded in the reality of everyday work. Hardware, for example, is always tested for speed and compatibility using common workaday applications like *1-2-3* and *dBASE*. Software tests, too, center around routine operations, such as reformatting a document or recalculating a spreadsheet.

Tests that fail to report on everyday concerns fail to reflect true product performance. Some of *PC World's* flat-file data base benchmarks, published in June and July 1987, are a case in point. The first tests pitted *RapidFile* against *Q&A*, *pfs:file*, and *Alphathree*; in the second group of benchmarks, *Q&A* went head to head with *pfs:file*, *askSam*, and *Paradox*. The two groups of tests were similar.

Two of the seven benchmarks tested the program's indexing speed. But since you normally need to create an index only once, this test is simply not as meaningful as one that measures performance during common operations like sorting.

Benchmarks should also reflect the best approach to using a product. In the case of flat-file managers, our sort test measured the time it takes to save a sort to disk. In typical use, however, records are simply saved in whatever order they're entered; when the user issues a command to sort, the data base finds and displays the rec-

ords. If you want to see the same records later, you redo the sort; saving the sort to disk is much more time-consuming and not commonly done.

PC World asked NSTL to perform new benchmarks, comparing *Q&A* version 2.0 on a 1000-record file with *RapidFile* version 1.0 and *pfs:file* version 1.01, the latest releases available at press time. Naturally, NSTL's tests focused on generic data base operations: searching the data base, generating reports, and mass updating. The result? Although in some of the search tests the programs differed by just a fraction of a second, *RapidFile* performed the best overall, beating the other two programs on four out of six benchmarks.

Still, in the final analysis it's not sensible to make a buying decision based on performance alone. Performance can vary greatly in different circumstances; for example,

(continues)



Anthony Russo

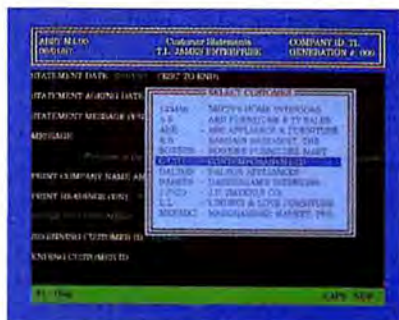
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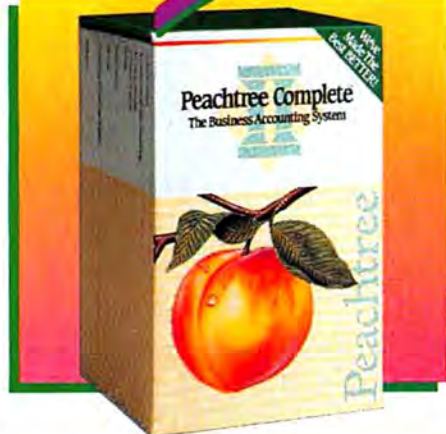
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And since MemoryMate is memory-resident, it's always there. You can access it while other programs are running. You can even cut and paste between MemoryMate and other programs. And vice versa.

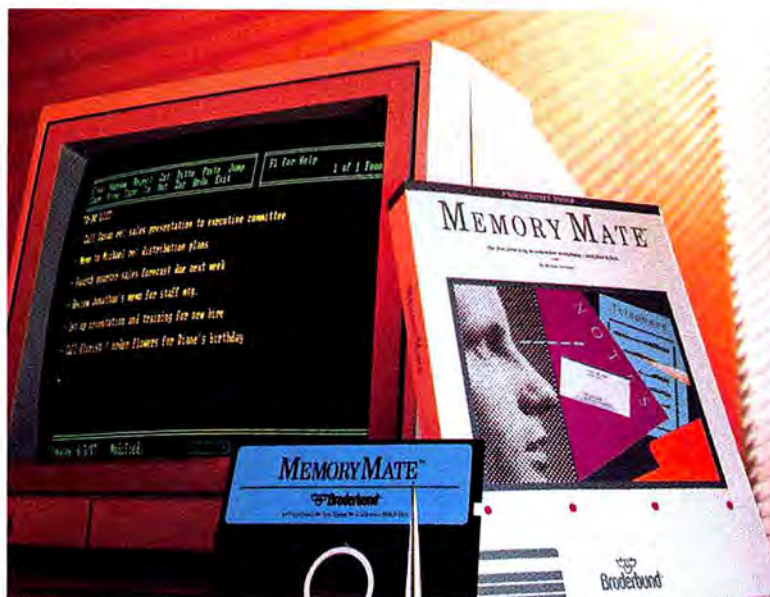
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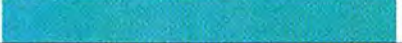


Flat-file managers

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Report generation with two-level sorting		seconds
RapidFile 1.0		54.3
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Report generation with selection and sorting		seconds
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Q&A 2.0		143.1

Mass update		seconds
RapidFile 1.0		13.5
Professional File 1.01		17.8
Q&A 2.0		57.3

Test results were mixed, but overall, RapidFile was fastest.

The tests were performed on an 8-MHz IBM PC AT Model 339 using a 1000-record file. All benchmarks involving searches were timed from the keystroke that initiated the search until the record appeared on the screen. Print and update benchmarks were timed from the starting keystroke until the process ended.

Best-case search The last record in the inventory file (part # AJ0100) was searched for. This field was indexed or sorted. The fastest type of search the program allowed was used.

Worst-case search The record in the inventory file that contained the description *large brown coat rack* was searched for. This was the last record in the data base. The field was not indexed.

Wild-card search The inventory file was searched for the last record that contained the character string *coat rack*. The field was not indexed.

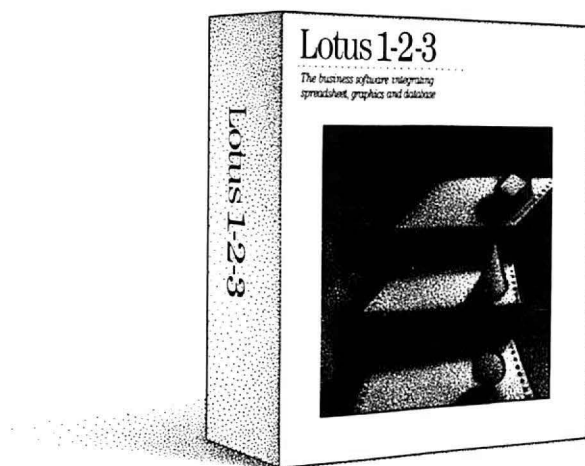
Report generation with two-level sorting The inventory file was sorted using the price field as the primary key and the part # as the secondary key. The report, consisting of the three fields (part #, description, and price), was then sent to a null printer.

Report generation with selection and sorting The inventory file was sorted on the price field, and 818 records with price > 150 were selected as part of the print process. The report, consisting of all six fields, was sent to a null printer.

Mass update This measured the time required to check values in one field against a specific criterion (ROQ > 150). Values meeting the criterion (856 records) were replaced with a new value of 150. The program had to accomplish the procedure automatically.

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

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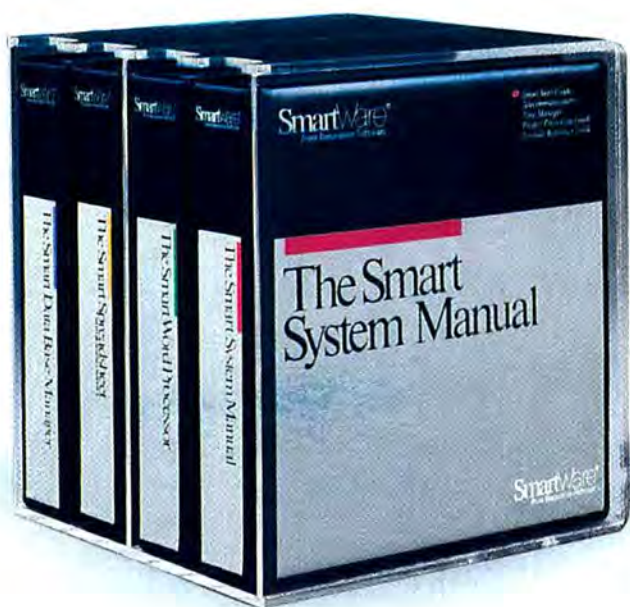
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PC World Evaluation

File transfer programs

Serial Transmission

Text files—hard disk to hard disk minutes:seconds

Fastwire II 1.2		0:37.15
Lap-Link 2.05		0:44.17
Brooklyn Bridge 1.41		0:58.33
File Shuttle 3.1		1:04.18
Duette 2.0		1:06.96
Direc-Link 2.0		1:14.42
Crosstalk XIV 3.61		6:25.00

Floppy to floppy

minutes:seconds

Fastwire II 1.2		1:21.35
Lap-Link 2.05		1:28.54
Brooklyn Bridge 1.41		2:23.93
File Shuttle 3.1		2:27.50
Duette 2.0		2:31.76
Direc-Link 2.0		2:41.76
Crosstalk XIV 3.61		8:46.85

Binary files—hard disk to hard disk minutes:seconds

Fastwire II 1.2		0:23.62
Lap-Link 2.05		0:31.65
Brooklyn Bridge 1.41		0:36.84
Duette 2.0		0:38.62
File Shuttle 3.1		0:47.49
Direc-Link 2.0		0:54.45
Crosstalk XIV 3.61		1:56.00

Floppy to floppy

minutes:seconds

Fastwire II 1.2		0:49.21
Lap-Link 2.05		1:00.20
Duette 2.0		1:21.09
Brooklyn Bridge 1.41		1:22.72
Direc-Link 2.0		1:37.35
File Shuttle 3.1		1:40.77
Crosstalk XIV 3.61		2:45.93



Parallel Transmission

Text files—hard disk to hard disk	minutes:seconds
Fastwire II 1.2	0:28.70
Paranet 2.1	0:31.60
File Shuttle 3.1	0:33.30
Direc-Link 2.0	0:45.67
IBM Data Migration 1.0	0:57.60

Floppy to floppy	minutes:seconds
Fastwire II 1.2	0:01.14
Paranet 2.1	1:36.29
Direc-Link 2.0	1:46.89
File Shuttle 3.1	1:47.64
IBM Data Migration 1.0	2:56.39

Binary files—hard disk to hard disk	minutes:seconds
Fastwire II 1.2	0:14.96
Paranet 2.1	0:18.48
File Shuttle 3.1	0:20.54
Direc-Link 2.0	0:29.35
IBM Data Migration 1.0	0:37.05

Floppy to floppy	minutes:seconds
Fastwire II 1.2	0:39.39
Paranet 2.1	1:03.56
Direc-Link 2.0	1:12.55
File Shuttle 3.1	1:16.96
IBM Data Migration 1.0	1:23.58

Fastwire II blew by all the other products in both serial and parallel transmissions from floppy to floppy disk and from hard to hard disk.

The benchmarks measure the speed at which the programs transfer files from a 1.2MB floppy on an IBM PC AT Model 339 to a 720K floppy on an IBM PS/2 Model 30 and from a 30MB hard disk to a 20MB hard disk. Both computers had 640K of memory.

File Type Tests were performed on two types of files, text and binary. The text files consisted of thirty 10,000-byte files; the binary files, three 100,000-byte files. The times shown are averages of three iterations.

As a control, the transfers were also made 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.



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— Depressed over dBASE

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Circle 25 on reader service card



benchmarking a file that contains five or ten times the number of records may produce a different winner. When benchmarks fall within a narrow range, a product's ease of use and features are as important as performance, if not more so. —A. A.

Battle of the Updates

For our article "Media Movers" (PCW, November 1987), we asked NSTL to speed-test a group of programs that transfer data from 5¼-inch to 3½-inch disks. In fact, NSTL tested the products using hard disks, so our caption describing the tests was inaccurate. And NSTL didn't test Traveling Soft-

ware's *Lap-Link 2.05* in its fast "turbo mode."

We decided to repeat and broaden the tests, adding floppy-to-floppy transfers and testing any new program versions that were available. The results were telling. Among serial transmission programs, *Lap-Link* indeed ran much faster in turbo mode but lost first place to *Fastwire II*'s speedy new version 1.2. In fact, *Fastwire II* made a clean sweep: Its new parallel mode swept that division as well. *Paranet* was also much improved; version 2.1 ran about 30 percent faster than the old one. Another upgrade, *File Shuttle 3.1*, showed no increase in speed.

To nobody's surprise, transfers between floppies were generally much slower than transfers between hard disks, but the product rankings were virtually the same. Clearly, in the battle among vendors, the most recently updated product may well be the one with the edge in speed. But not for long. —William Rodarmor

Shop Talk

PC Network Is Reborn

A new group purchased the assets of mail-order house PC Network and related companies Thompson, Harriman and Edwards, and Access Micro Centers on November 19, 1987. Like the old company,

New! 80286 Based Tandy 1000 TX



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Circle 9 on reader service card



the New Personal Computer Network is offering products at 8 percent over wholesale to consumers who pay \$8 for an annual membership.

"The bottom line is going to be a rebirth of product availability," says Burton Ruder, president and CEO of the New PC Network, and former owner of Cibcoa, a mail-order concern specializing in consumer electronics. Ruder promises 48-hour turnaround on products in stock, a larger selection, and improved service. "We also have a blanket policy: There will be no prebiling of credit cards, and any product can be re-

turned within 10 days as long as it's in new, salable condition."

As part of the acquisition, the New Personal Computer Network has agreed to honor the claims of customers who ordered products from PC Network between May 1987 (when the company filed for bankruptcy reorganization) and November. Those who have a claim against PC Network for products ordered before May 1987 remain creditors of that company.

"We've urged PC Network creditors who paid for products by credit card to contact their credit card companies and ask that the charges be removed," says Ruder. "In our acquisitions proposal, all creditors of PC Network

prior to May 1987 will share a 10 percent ownership in the New PC Network if they don't get their claims taken care of 100 percent."

"Our intent is to create a high level of confidence," says Ruder.

The Little Chip That Couldn't

After reading *The Upgrade Path* in the August 1987 issue of *PC World*, I ordered a \$35 ROM-BIOS kit from IBM to upgrade my PC to an XT. Unfortunately, I haven't received the chip. For almost a year I tried to get it in Germany, but IBM in Germany was

(continues)

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Everything You Ever Wanted to Know about Disks Disk Explorer

Disk Explorer shows you everything on a floppy or a hard disk. You can: • examine and change DOS files • search for text • compare sectors • look at non-DOS diskettes • See gimmicks used for copy-protection.

The manual explains everything, and gives many examples. It includes **The Story of Copy Protection**, giving the history of protection and describing many methods. Disk Explorer is the tool to figure out how disks are organized, or to repair your client's data after an accident.

Disk Explorer requires an IBM PC, XT, AT, PS/2 or compatible with 128k bytes of memory and a diskette drive. It is not copy protected.

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not willing to help, and the IBM dealers there sell a complete motherboard only, not the chip by itself.

Elmer J. Pacheco, MD
New York, NY

Editor's note: We goofed. According to IBM spokesperson Carey Ziter, the ordering address we published is actually an IBM factory in Boca Raton, Florida, which doesn't handle customer inquiries. But there's more to this story: Although IBM has repeatedly promised support for all its products, IBM stopped marketing the BIOS upgrade kit in June 1987, two months after discontinuing the XT. Granted, orphan

products are fairly common, but not in all companies. Compaq, for example, continues to sell a BIOS upgrade through dealers for its first machine, the 8088-based Portable, which came out in 1983.

If you need a BIOS upgrade, you can check with IBM dealers to see if it's still in stock. (Call 800/447-4700 for the names and numbers of local dealers.) Or you can buy a third-party BIOS from another company, such as Award Software. The Award PC/XT BIOS costs \$39.95 and provides support for 1.2MB and 720K floppy drives, hard drives, EGAs, and 286 turbo boards. Award's distributor for end users is DiagSoft, 6001 Butler Ln., Scotts Valley, CA 95066; 408/438-8247.

Not So Noble

I ordered a computer from PC Discount (now calling itself Nobel Corporation) in Houston in June 1987 and paid a \$743 deposit. Two months later the unit still had not been shipped. When I was unable to get a refund on my own, I called the Harris County [Texas] attorney general's office, the attorney general's office in Houston, and the Federal Trade Commission. I have been told my complaint is a familiar one and that the company is under civil and criminal investigation.

William B. Williams
Jenison, Michigan

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Editor's note: As part of our usual effort to resolve complaints, PC World sent a copy of Mr. Williams' letter to Morgan Carroll, president of Nobel, requesting a response. This letter was not answered, however, nor were numerous phone messages or a subsequent follow-up note.

The Better Business Bureau in Houston reports that "complaints [received from PC Discount customers] concern nondelivery of merchandise" and that "the company has not answered these complaints." A spokesperson for the attorney general's office in Houston confirmed that the company is under investigation.

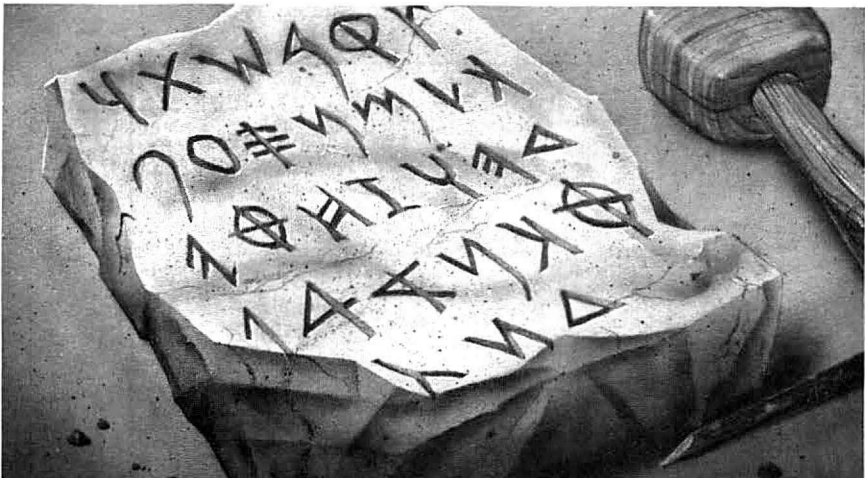
If you have a beef with PC Discount, write down the particulars (using black ink or a typewriter so your letter can be photocopied) and send it to Office of the Attorney General, 1001 Texas Ave. #700, Houston, TX 77002-3111; 713/223-5886.

A Changed MECA

Editor's note: Recently PC World received four complaints from users of Managing Your Money. The complaints covered everything from bugs in version 3.0 to warranty problems, and users all expressed frustration over MECA's failure to respond. PC World forwarded the letters to MECA, which answered each complaint and also made the following points:

When version 3.0 was initially released in the fall of 1986, it had

(continues)



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Circle 13 on reader service card

Memo 1

To: All persons interested in the future of the volume telecommunications market over the next decade.

Subject: GUIS

- Data: 1. **Scanner** Model 321
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- * TellerFax now has desktop file conv. cap.'y

.....Dist. + OEM appl' all welcome

Memo 2

To: All those of Memo 1, plus all others.

Subject: GUIS - New product

- Data: 1. **LaserFax** (9600 bps, G2/G3)
 2. Linkable with PC for max. flex.'y (incl. **DTP**)
 3. **Plain paper** laser printer.
 4. Retailing at under US\$4.5K.

Suggested Action: Contact GUIS below.

P.S.: CeBIT'88, Hannover, March 16-23, 1988:
 booth B45 (Hall 16)
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some minor bugs. We corrected them and sent an updated disk to customers who were affected. We may have missed a few individuals who moved or never sent us their warranty registration card.

Our technical support service is free to any registered user; it is not part of the warranty, which costs \$49.95. That warranty provides disk replacement, quarterly newsletters, and one annual update of the program. Recently, we've added a new phone system, hired and trained new employees, and split our service into two groups: The technical support department (203/222-9087) handles technical calls on the programs themselves; the nontechnical service department (203/222-9150) handles warranty questions and general product information.

Victor H. Lamberti
 Operations Manager

William Rodarmor is an assistant editor for PC World.


Got a gripe? Want to set the record straight? Write Consumer Watch, PC World, 501 Second St., San Francisco, CA 94107, or use MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908. Include your name, city, state, and daytime telephone number with all correspondence. Letters may be edited for length and style. Due to volume, we cannot acknowledge every letter. ●

Circle 118 on reader service card



The Help Screen

PC World offers answers and advice at every level



Capture printer output in a disk file, investigate the effects of an ion generator, allay fears of disk deterioration, port Apple IIe files to the PC, shut off the <Print Screen> key, and redraw Word's screen with a keystroke

Karl Koessel

Printing to Disk

Q. How can I redirect output destined for the printer into a floppy or hard disk file using a single DOS command? Printing a large document or data base (such as an inventory report) ties up the computer until the print job is completed. "Printing" to a file is much faster than actually printing the document, so control of the computer is quickly returned to the operator. Once in a disk file, the print job can be handled by a background print spooler, such as the DOS utility PRINT.COM, which allows concurrent use of the computer for other tasks. While some programs give you the option of printing to a file, many do not.

How do I get a program to "print" to disk when it prints only through LPT1?

Kent Lambert
Baltimore, Maryland

*A. PrintQ from Software Directions (see *The Software Shelf*, PCW, February 1988) not only captures printer output and quickly stores it in a disk file, it also automatically spools that file to the printer while you continue to work in the foreground. This memory-resident disk-based spooler is loaded with clever features. It enables you to prioritize print jobs in the queue, print multiple copies, or postpone printing any or all print jobs.*

PrintQ also can copy any print file in the queue to a normal ASCII file. This feature is extremely handy for users with programs that can send output to the printer but can't save that same output in a disk file. You can edit an ASCII file with a word processor, proof it with a spelling checker, and further embellish it with a

desktop publishing program. Even if you don't have a desktop publishing program, your word processor probably provides greater access and control over your printer's advanced features than the program that can't "print" to disk.

Ironically, the PrintQ manual barely mentions the program's ASCII file capability. I'd wager that the program's designers were unaware of the considerable value of this hidden jewel.

To capture the printer output for conversion to an ASCII file, install PrintQ as explained in the manual, type \PRINTQ <Enter> to load the program into memory, and issue <Ctrl>-<Alt>-P to bring up the status display. Press H for Hold, press Q and <Enter> for Queue, and press E for Exit. Until you specify otherwise, all output sent to the printer will be intercepted and held in PrintQ's queue.

When you are ready to copy the queue's files into ASCII files, press <Ctrl>-<Alt>-P. (If incompatibility between your current application program and PrintQ causes your PC to freeze at this point, reboot the computer, delete the file \PRINTQ\PRINTQ.Q, and start over. After printing the file, exit the application before pressing <Ctrl>-<Alt>-P.) The status display will appear. Press W for Write. Enter the ID number of the print job to be copied, and answer the prompt that asks for a file name. Take care that the file name you give is unique; PrintQ isn't smart enough to warn you that it's about to overwrite an existing file with the same name.

(continues)

That's it; you now have an ASCII file you can work with.

PrintQ 3.1

Software Directions, Inc.

1572 Sussex Tnpk.

Randolph, NJ 07869

201/584-8466

List price: \$89

*Requirements: 256K, DOS 2.00
or later version; hard disk
recommended*

Not copy protected

That Charged-Up Feeling

Q. I recently purchased a negative-ion generator for my home. I would like to know if using one in the office will have any adverse effects on my computer.

Gail Holman

Tehachapi, California

A. Having a negative-ion generator in the office won't directly affect your PC. However, you should know how it works and how it can affect your disks and work space. Negative-ion generators clean the air and, apparently, make people feel better. Falling water works just as well, but most of us can't afford a wall waterfall or Florentine fountain inside the office, so we settle for a negative-ion generator. (We have a few here at PCW Communications.)

The generators work by spitting electrons into the air to neutralize positively charged diatomic oxygen. (Those diatomic molecules become positive around heaters, computers, and other such equipment.) The positive charge of

those oxygen pairs attracts floating particles of dust, dirt, and other pollutants. The particles then adhere to the diatomic molecules (attached by the same force that sticks your hair to an electrostatically charged balloon or dust to your computer screen). When the negative-ion generator neutralizes a diatomic molecule, any accompanying dust or dirt is dropped, leaving the air cleaner.

However, you've probably already noticed that a growth of black, sooty dust has appeared on, around, and below the ion generator at home. Because that grime is composed of tiny, even microscopic, particles, cleaning this mess is difficult, especially on painted or porous surfaces.

Therefore, you should probably place the ion generator on top of an inexpensive towel or doily and a couple of feet from any wall. Definitely keep it away from your PC and monitor (simply because you won't be able to get the painted and plastic surfaces clean again). Be sure to keep your disks covered so they'll stay clean, and keep them away from the generator; its flying electrons can wipe out data.

Disk Decay

Q. In my four years as a PC user, I have filled and then stored hundreds of data disks. They all required a significant amount of time and effort to create. You can imagine my surprise when I recently heard that these floppy disks may degenerate to the point of uselessness because of their limited shelf life.

Delving deeper into this mystery, I found that vendors do not supply shelf-life data on disk packages and that most people don't know how long a disk can be trusted to last. I would appreciate any information you can share on this subject.

Paul T. Williams

Fairfield, California

A. As long as they're not subjected to direct sunlight, extremes of temperature, or, of course, magnetic fields, disks on the shelf will last for decades. Floppy disks are made from basically the same material as cassette tapes, but in a form much sturdier than tape, which grows more brittle with age.

Even though floppy disks don't decay as rapidly as tape, they do wear. As you close the drive door, the disk is centered on the drive's spindle, and then the edge of the disk's inner hole (the hub) is clamped to hold the disk firmly in place. At the same time, the read/write head (located above the oblong cutout in the disk jacket) comes down and presses against the disk. Because the read/write head actually touches the floppy disk, it slowly wears away the magnetic coating while the disk spins. When enough of the media wears away from an area of the disk, that area can no longer produce a magnetic field strong enough to be read, and the data that was there is lost.



When you first format a disk, DOS builds a table that tracks disk usage. This table is called the file allocation table, or FAT. Because DOS must read the FAT every time it writes to or reads from the disk, this is usually the first area to wear out. It can happen to any disk; better-quality disks just last longer. Without the FAT to refer to, DOS can't read the data files; sophisticated data recovery tools are needed to recover the files, even though none of the data in the files has been lost. Although one manufacturer offers a free "data" guarantee (it will recover data from a disk if you can't) and another sells super-tough Teflon-coated floppy disks, your only real insurance is the simple process of making copies of your files.

From Apple to PC

Q. My first home computer was the Osborne 1, a CP/M machine. I later acquired an Apple IIe, with Apple DOS 3.3 and ProDOS. And recently I adopted an AT&T PC 6300 running MS-DOS.

I have successfully transferred my WordStar and SuperCalc data files from the Osborne to the AT&T using Media Master, a format conversion utility. Media Master does not support the Apple DOS or ProDOS formats. Is there an easy way to convert my AppleWorks data files to the MS-DOS format?

*J. Lelan Callaway
Katy, Texas*

(continues)

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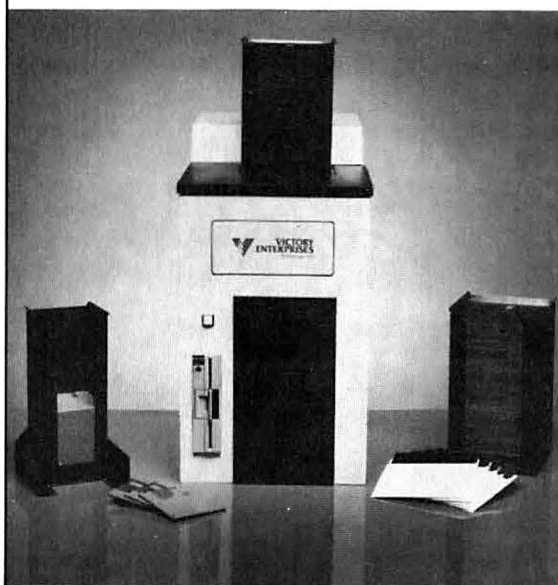
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Q. Thanks to Ronny Richardson of Chamblee, Georgia, who wrote to say that users of *Microsoft Word* can quickly redraw a display that has been adulterated by a memory-resident program (see "Perverved Palette," *The Help Screen*, PCW, November 1987) simply by pressing <Shift>-<Ctrl>-\.

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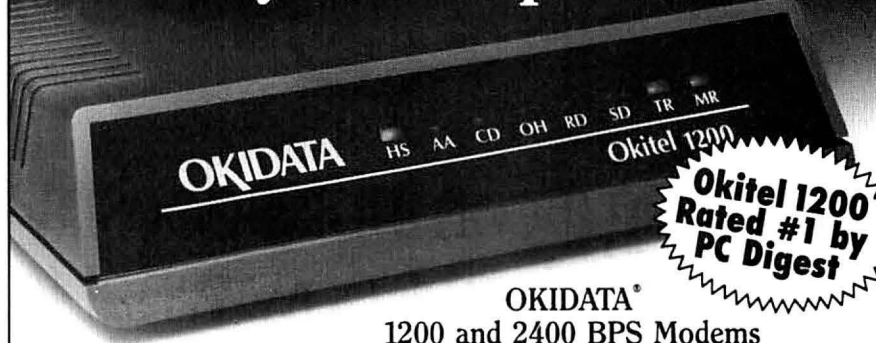
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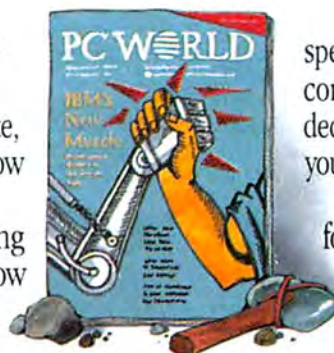
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Run a series of batch files, save a BASIC program without overwriting previous versions, highlight 1-2-3 prompts, print related dBASE files with one command, and teach WordStar commands to WordPerfect.

Edited by Tom Swan

A Batch of Batch Files

While programming I often need to run several batch files: for example, the one that changes sub-directories and starts my word processor, and the one that assembles a program. Sometimes I run my batch files individually; other times I run them together. Unfortunately, organizing them is difficult because DOS does not allow one batch file to run other batch files as subroutines.

I discovered by accident that I can use ANSI.SYS to define a function key that will run a series of batch files and programs. For example, I issue the DOS command `PROMPT $e[0;66;` "WPASM";13;"ASMCOM";13;"PROGRAM";13p to instruct `<F8>` to run the batch files WPASM.BAT and ASMCOM.BAT and then execute PROGRAM.COM.

The `PROMPT` command turns the `$e[` into Escape `[`, which summons the ANSI.SYS driver. The `0;66` is the scan code for function key `<F8>`. When you define this key for your system, substitute your own batch files, programs, and DOS commands for those shown within quotes. Each command is followed by a 13, the ASCII code for the `<Enter>` key. The `p` terminates the ANSI.SYS command and identifies the entire sequence as a key definition command.

After redefining the function key, simply press `<F8>` to run the two batch files and execute the program with one keystroke. This technique is simpler to set up than methods that start a second copy of COMMAND.COM to accomplish the same task.

*Fred R. Templeton
Antioch, California*

Editor's note: To demonstrate Mr. Templeton's idea, create the following batch file (WP.BAT) using a text editor or the ASCII mode of your word processor (or substitute your own batch file for starting WordPerfect):

```
ECHO OFF
C:
CD \WP
WP
```

Then create KEYS.BAT (Listing 1) and DELBAKS.BAT (Listing 2).

*All the batch files should be stored on drive C: in a directory called \BATCH (this directory must be listed in the AUTOEXEC.BAT file's PATH command). Make sure that ANSI.SYS has been copied from the DOS disk to the \DOS directory of drive C: and that the CONFIG.SYS file in the root directory includes the command `DEVICE = C:\DOS\ANSI.SYS`, and then reboot. Type **KEYS** to redefine function key `<F8>`. When you press `<F8>` subsequently, WP.BAT runs, starting WordPerfect. When you exit WordPerfect, the function key definition picks up where it left off, running DELBAKS.BAT to delete backup text files ending in .BK!. (WordStar aficionados should use *.BAK in place of *.BK! in DELBAKS.BAT.)*

This technique gives you the option of running batch files separately or, by pressing `<F8>`, running the same batch files in sequence. To program other function keys, replace the `0;66` in KEYS.BAT with `0;67` for `<F9>` or `0;68` for `<F10>`. You can also

(continues)



redefine <F1> through <F7> (scan codes 0;59 through 0;65), but you'll lose their default ability to edit DOS commands. The second PROMPT command in KEYS.BAT creates a DOS prompt consisting of the current path and the greater-than symbol. You can copy the lines from KEYS.BAT into your AUTOEXEC.BAT file to reprogram your function keys every time you boot, but ECHO must be on when those lines execute for them to be effective.

If You've Got the Time, We've Got the Save

"BASIC File Saver" [*,*, PCW, July 1987] prompted me to share a similar routine that I have found useful.

Douglas Kingsley's method for saving BASIC programs saves only the most recent version on disk. The technique outlined here produces a new file whenever you save a program, using the time of day to generate a unique file name.

Enter the lines shown in PROG.BAS [Listing 3] and save them in ASCII. Each time you begin to develop a program, merge in PROG.BAS and replace the letters PROG in line 3 with a 4-character name for the new program. You can run the program normally whenever you want by issuing the RUN command; the GOTO in line 1 causes execution to jump over the merged lines.

Sometimes you'll want to save the program before testing it. In those cases, enter RUN 2, and execution will begin at line 2. Line 2 sets TS with the current time and

```
PROMPT $e[0;66;"WP";13;"DELBAKS";13p
PROMPT $p$g
```

Listing 1: KEYS.BAT redefines function key <F8> to issue the commands to run the sample batch files WP.BAT (see text) and DELBAKS.BAT (Listing 2) in series.

```
ECHO OFF
DIR *.BK!
ECHO.
ECHO Press Enter to delete the above backup files.
ECHO Or, press Ctrl-C to cancel the deletions.
ECHO.
PAUSE
DEL *.BK!
```

Listing 2: DELBAKS.BAT lists the .BK! files in the current directory and asks if they should be deleted.

```
1 GOTO 5
2 TS=TIME$;HOURS$=MID$(TS,1,2);MINUTES$=MID$(TS,4,2)
3 FILENAME$="PROG"+HOURS$+MINUTES$
4 SAVE FILENAME$
5 REM
6 REM Start program here
```

Listing 3: Save these lines in ASCII as PROG.BAS to facilitate saving the current version of a developing program without overwriting versions saved earlier that day.

then extracts the hour and minute into strings HOUR\$ and MINUTES\$; line 3 concatenates both of these strings to the 4-character program name to create FILENAME\$ (for example, saving a program at 2:53 p.m. would cre-

ate the file PROG1453.BAS). Line 4 then saves the current version. (Use the command SAVE FILENAME\$,A if you want the versions saved in ASCII.) Versions saved earlier that day remain intact.

Gene Winfree
Bastrop, Louisiana

(continues)

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Editor's note: This method works best if you set your clock when you boot or if you have a hardware clock that sets the time automatically. Remember to copy your saved files to other disks or another directory at the end of the day; because the program doesn't take the day into account, PROG.BAS might use the same file names again another day.

Prompting With 1-2-3 Menus

1-2-3's /XMmessage ~location~ menu macro command is handy for more than just making menus. With a menu macro that has only one choice, you can create a prompt that presents a message and offers a choice of aborting or continuing an action. I prefer /XM over /XL or /XN because /XM highlights the first message line and does not require a cell to hold an input character.

I use a /XM menu to remind people to check the printer before printing a worksheet range. The <Alt>-P macro in SAMPLE.WKS [Figure 1] demonstrates the technique. For the purposes of this example, cell A6 holds the macro's range name as the label \P. (Remember to type an apostrophe before entering labels that begin with a slash or backslash.)

The macro itself begins in the cell to the right, B6, with a /XM command that specifies the cell containing the message to be highlighted, in this case, cell B8. The cell below the /XM command must be blank so that you can

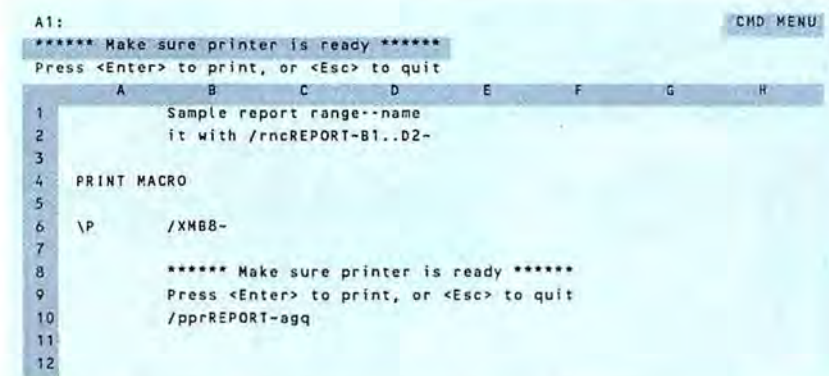


Figure 1: SAMPLE.WKS holds a 1-2-3 macro that demonstrates the /XM command's ability to display a highlighted prompt.

press <Esc> to abort the macro. When the macro is invoked, the content of the cell under the message is displayed on the control panel beneath the message, although it is not highlighted.

After 1-2-3 displays the message, the macro pauses. Pressing <Esc> cancels printing because macro execution falls to the cell below the /XM command, which, because it is empty, halts the macro. Pressing <Enter> continues execution at the cell below the second message line, cell B10, which contains the commands to print a previously defined range named REPORT.

Don Nummi, Jr.
Superior, Wisconsin

Editor's note: To create SAMPLE.WKS and demonstrate its use of /XM, enter the information in columns A and B as shown. Then, place the pointer on cell A6, and issue /Range Name Labels Right <Enter> to name the macro. Because <Alt>-P prints a range named REPORT, issue /Range

Name Create **REPORT** <Enter> **B1.D2** <Enter> before using the macro to name and specify the range of cells to print. Finally, press <Alt> -P to run the macro and <Enter> to print the report.

Let's DO LIST

I create a LIST.PRG file [see Listing 4] to print the programs in my dBASE III applications. LIST.PRG issues the commands SET PRINT ON and SET MARGIN TO 10 before sending escape codes to switch my Epson LQ printer to condensed-print mode.

Each program I want to print has its own two-line entry in LIST.PRG. First, I TYPE the program TO PRINT. Then I EJECT the paper between printouts.

I use Borland's SideKick to edit all of my dBASE III programs and to create a LIST.PRG file for printing them in the order I prefer. A simple DO LIST command then

(continues)

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CUSTOMER.NO

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Revelation
Prompt Options

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4 Reorder Prompts

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6 Edit Help Record

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```

** Program:      LIST.PRG
** Purpose:      Print all PRGs related to this application
**
SET PRINT ON
?? CHR(27) + "!" + CHR(5) **(Condensed elite for Epson LQ)
SET MARGIN TO 10
**
TYPE MENU1.PRG TO PRINT
EJECT
TYPE MENU2.PRG TO PRINT
EJECT
TYPE MAIN.PRG TO PRINT
EJECT
SET MARGIN TO 0
SET PRINT OFF
**
** End of LIST.PRG
**

```

Listing 4: LIST.PRG is a sample dBASE program
that demonstrates how to print out a set of
program files without leaving dBASE.

prints the entire application's pro-
gram set without my having to
leave dBASE.

Helen F. Hilley

Los Angeles, California

WordPerfect Does WordStar

In "Up From WordStar" [PCW, September 1987], George Beinhorn laments being unable to translate WordStar's <Ctrl>-key commands such as <Ctrl>-KR into WordPerfect macros. With the help of a third-party macro utility program, however, this feat is easy. I use Alpha Software's *Keywords* version 2.0, but most other macro editors should work similarly.

First, I construct a menu of two-key commands for each <Ctrl>-key category. One menu is for <Ctrl>-K (block) commands. Another is for <Ctrl>-J

(help) commands, and so on. Then I build a macro for each editing command. For example, the <Ctrl>-K macro menu in WPMAC.KW [Listing 5] includes {Define} commands for keys D, Q, and R (you can add definitions for the other WordStar block menu command keys that you want to use). The macro displays a corresponding menu and, after executing the command, uses {Delete} commands to return the redefined command keys (D, Q, and R) to their normal functions.

WPMAC.KW lists the <Ctrl>-K macro and is easily appended to Mr. Beinhorn's other WordStar commands. Because Beinhorn uses <Ctrl>-K for "move cursor to beginning of line," reassign that macro to a different key before using WPMAC.KW.


```

((CtlK)<Block functions      >(Define)d<D---Save file>(F7)(Enter)
(Pause)(Enter)(Define)(Define)q<Q---Abandon file>(F7)n(Define)
(Define)r<R---Read file>(CapF10)(Define)(AltM)(Delete)d(Delete)
q(Delete)r

((AltM)<
                                >(Menu){1,1}{Title}File Functio
ns\{Footer}Type letter to select task.\{IdOff}{Color}{14,1}
(Style){0}{Select}drq(Menu)

((CtlD)<Cursor right 1 space>(Rght)
((CtlS)<Cursor left 1 space>(Lft)
((CtlE)<Cursor up 1 line   >(Up)
((CtlX)<Cursor down 1 line >(Dn)
((CtlF)<Cursor right 1 word>(CtlRght)
((CtlA)<Cursor left 1 word >(CtlLft)
((CtlO)<Move to end of line>(End)
((CtlT)<Deletes word right >(AltF4){CtlRght}{Del}y
((CtlL)<Deletes word left  >(AltF4){CtlLft}{Del}y
((CtlQ)<Deletes to line end>(CtlEnd)
((CtlY)<Deletes entire line>(Home){Lft}{CtlEnd}
((CtlG)<Deletes this charac.>(Del)
((CtlH)<Deletes char.on left>(BkSp)
((CtlC)<Cursor to bottomline>(Pass){Pls}
((CtlR)<Move to top of scree>(Min)

```

Listing 5: WPMAC.KW is a Keyworks macro that effects WordStar <Ctrl>-K commands in WordPerfect.

My macros operate similarly to WordStar's help level 2, where menus appear only when you activate a <Ctrl>-key function. On my XT compatible, if I type quickly enough, the menus never even appear.

Kerry T. Givens
Los Angeles, California

<NumLock> Macro

Correction and Corollary

A. E. Foote dropped in to point out that the published instructions for setting up the 1-2-3 release 2 macro presented in "Knocking <NumLock>" (*,*, PCW, December 1987) are missing a character—one tilde—the absence

of which unfortunately renders the macro inoperable. The last paragraph on page 420 should have read: "Now press <F5>, the Goto key. Then type ~ <Enter>. Issue..." PC World regrets any inconvenience this omission may have caused.

Mr. Foote also mentioned that he showed the macro to his wife, who informed him that the macro, although quite handy, prevented her from entering negative numbers because it interprets the minus sign as <PgUp>. Perusing the PC keyboard (not the original

(continues)

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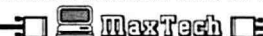
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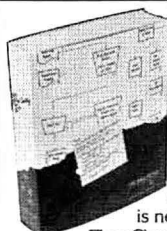
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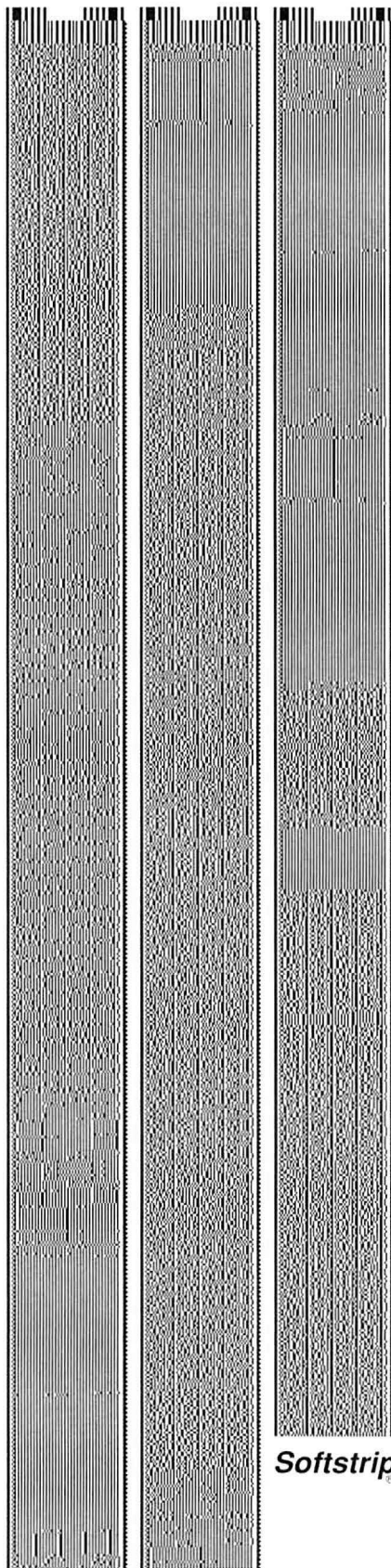
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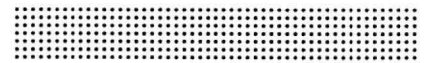
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These Softstrips contain *.*'s March program listings. They can be read by Cauzin's Softstrip System Reader.



Softstrip



AT keyboard pictured in December's column) doesn't suggest another key to substitute for <PgUp>. Therefore, it's probably best to erase the contents of cells A18 (' -) and B18 ({pgup} {branch getkey}) in December's listing and then reissue the command /Range Labels Right **A1.A43 <Enter>** and resave the worksheet. Then the minus sign will work as a minus sign, and you can issue <PgUp> while NumLock is on by using the <Shift> key.

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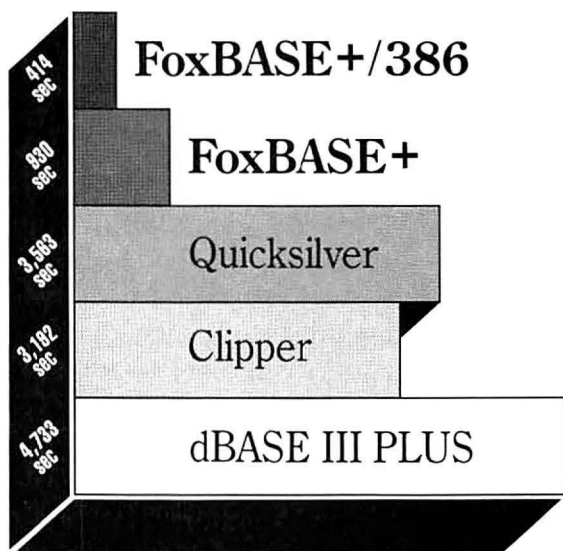
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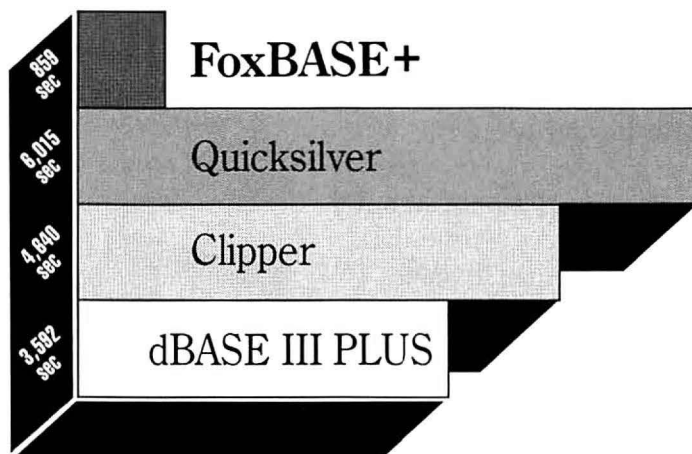
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*Using the benchmark timings published in BYTE, September 1987.

**Using the suite of benchmarks published in Data Based Advisor, March 1987.

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Robert M. Carr

Tech Notes: How Fast? How Far? How Soon?

Decisions, decisions:
286 or 386? OS/2 or
386 control software?
What's the wise thing
to do?

Of all the issues that threaten to add commotion to your computing life, the most vexing address the almost mystical matter of Moving Up.

Should you step up to OS/2—and if so, when? Should you upgrade to an 80386-based system, or will the 80286 suffice? Might a 386 control program such as *Windows/386* meet your once and future needs by offering a smoother evolutionary path than OS/2?

Any choice you make comes with its own suite of trade-offs; when you think about it, the mere existence of such options is unprecedented. Ever since DOS became synonymous with 16-bit personal computing, users simply haven't had to choose an operating system.

This year, you will—even if your choice is simply to hang on to DOS 3.xx. While the sudden need to make an informed decision may give you pause, everyone should be celebrating the existence of these options as evidence of the industry's coming of age.

As seductive as the promise of unbridled speed or virtually unlimited RAM may be, you owe it

to yourself to approach the new and the untried skeptically. Fortunately, you can select from an array of system strategies, any of which will help you chart a sensible hardware and operating system course.

You can begin to cut through the thicket by distilling the scores of issues raised by today's innovative technology to three key questions: Do you need the multitasking that new-generation hardware and software deliver? How much muscle do you need to run a single program? Must you remain within the operating system mainstream? In short, what do you want to achieve—now, and some years from now?

Resolving the preliminary issues isn't terribly difficult. There's no longer any question that moving up requires a 286 or a 386 processor; the 8086/8088 series isn't adequate, period (no exception here for the Model 30). Both the 286 and 386 pack considerable processing power in "protected

(continues)

mode”—the mode exploited by OS/2 in which applications can coexist safely.

Support for protected mode means bona fide multitasking, but the 286 must be fed applications compiled expressly for protected mode. That's why existing DOS applications can't crack OS/2 without recompilation.

The 386 has at least two other liabilities. After more than a year on the market, 386 chips are still considerably more expensive than 286 processors, and given Intel's tight control of production, little relief is in sight. Including the necessary and costly support chips, 386-based systems can go for more than twice the price of their

to run even one OS/2 application along with the active DOS programs. If you're using a 386 machine, you'll eventually be forced to choose between two less-than-ideal scenarios: You can run a 386 operating system (and thus 386 and DOS 3.xx applications), or you can run OS/2—thereby placing the entire system into 286 emulation mode. In that case, you must use OS/2 applications almost exclusively; you'll be limited to one DOS application under OS/2's so-called compatibility box.

If all this sounds perplexing, it is. The 386 is more powerful than the 286, but its native mode is simply incompatible with the 286's protected mode. That's a frustrating fact of life, given the 386's superb 8086 compatibility through its virtual 86 mode.

Thankfully, the operating system scene isn't quite as convoluted as the hardware milieu. The list of available operating systems is relatively short. For the 286 alone, OS/2 is it. With backing from IBM and Microsoft, this well-bred newcomer is likely to enjoy wide adoption and a long life. OS/2 runs the 286 in protected mode; the cream of tomorrow's software crop will be written for it.

OS/2 shares with the 286 one of its key limitations: OS/2 cannot run multiple, unmodified DOS 3.xx applications outside of the compatibility box—and within it, there's only room for one program at a time.

Here's Rodney Dangerfield with a twist: While it doesn't get much respect, the aging 286 has walked

For the foreseeable future, the 386 is an orphan. Until someone releases an operating system written to exploit the 386, applications won't be able to tap 386 power without recompilation.

The 80386, the 286's strapping sibling, can do everything the 286 can do, including run OS/2 (in this case by emulating the 286). Unlike the 286, however, the 386 offers 32-bit internal data paths and “virtual 86” capability—a knack for tolerating simultaneous 8086 applications, side by side. The 386 is canny enough to fool DOS applications into thinking that each of them owns the entire machine.

That would seem to end the discussion, with the 386, muscular and fresh from so many benchmark triumphs, seemingly the CPU of choice. For the foreseeable future, however, the 386 is an orphan. Until someone in Redmond or Montvale releases an operating system written to exploit the 386—an OS/3, perhaps—applications won't be able to tap 386 power without recompilation.

286 counterparts. In the face-off of 286 versus 386, the difference in price currently exceeds the difference in power. The good news is that historically, prices generally drop before the technology fully matures.

My second major reservation about the 386 has more to do with the mundane business of computing itself. Although virtual 8086 mode enables the 386 to run DOS 3.xx object code, the 386 has no similar virtual 286 mode for that chip's protected mode. As OS/2 catches on, this gap may widen into a chasm. A future 386 operating system may be no more hospitable to OS/2 than OS/2 now is to DOS 3.xx applications.

Put a bit differently, the 386 can operate as a single 286 chip, but it cannot run multiple virtual 286 protected mode processes. Thus, while a 386 operating system should be able to run several DOS 3.xx applications, it won't be able

away with the operating system and with the software community's ample resources. Although several 386 control programs—notably Microsoft's *Windows/386* and Quarterdeck's *Desqview 2.0*—do plumb the 386's ability to manage multiple DOS applications, no truly viable product fully taps 386 native mode. (*Windows/386* has the additional appeal of visual consistency with OS/2's Presentation Manager, due out late this year.)

For the patient few, one other option looms: a special rendition of OS/2 that promises to unite the 386 with the 8086 and the 286. Microsoft has dubbed this magic bullet OS/2 386 and estimates its time of arrival at 1990. This hybrid, a 32-bit version of OS/2, will run in 386 native mode, tap the 386's virtual 86 talents, and *may* run OS/2 applications unmodified.

With this brief survey of processors, modes, and operating systems in hand, you may now be in a better position to provide real-life answers to those three questions.

Multitasking. Both OS/2 and 386 control software provide excellent multitasking capabilities, but they work on different sets of applications. OS/2 will support any number of OS/2-specific applications, but only one DOS 3.xx application—and that one poorly. *Windows/386* and *Desqview 2.0* can run any number of DOS 3.xx applications but can't handle any OS/2 applications. You decide: Do you want to run multiple DOS 3.xx applications now or wait for tomorrow's OS/2 software?

Balancing power against a one-track need. No doubt about it: The 386 is the king of the hill and will be, at least through the end of the decade. But much of its performance edge surfaces only when an application has been compiled explicitly for 386 native mode—as tools like PharLap's *DOS Extender* permit. Because OS/2 relies on hardware protection to prevent shifts between 286 (or 386) modes, technical fixes like PharLap's work only with DOS 3.xx. Nevertheless, if an application crucial to your business has been recompiled for the 386, you may have all the justification you need for moving up.

Staying in the software mainstream. Software developers can't and won't write for every machine and operating system

For starters, consider any of these havens:

Cover all your bases. If you want to switch among DOS applications now and money isn't an overriding concern, get a 386. When the market is chockablock with OS/2 applications you can't resist, your 386 system will run OS/2 as well as any 286 can. Just keep in mind that when running OS/2 applications, you'll have to surrender your 386 operating system for OS/2—and temporarily shelve any DOS 3.xx applications.

Prepare for new applications without doing violence to your budget. By the end of the year, we'll all be dwelling in an OS/2 world. By adopting an OS/2 strategy now, you can be ready for breakthrough applications and blaze a smooth trail out of the

Even as the 386 rules the hardware roost, the software industry has turned its energies to exploiting OS/2.

that finds its way on to a spec sheet. Even as the 386 rules the hardware roost, the software industry has turned its energies to exploiting OS/2. For the next two to three years, third parties are likely to continue to write for DOS 3.xx as they prepare OS/2 applications. Just about everything else will be neglected—including major applications written from scratch for 386 native mode. The landmark applications of the early nineties will be written to run atop OS/2.

For managers in search of a strategy, more than a few exist.

DOS 3.xx realm. Buy or upgrade 286 hardware capable of running OS/2. Continue running your favorite DOS 3.xx applications one at a time until they're available as OS/2 upgrades—then complete the switch to OS/2. In the interim, you'll be able to run one DOS 3.xx application in OS/2's compatibility box while simultaneously juggling several OS/2 applications.

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Can power users find greater happiness and smoother evolution with a 386 control program than with OS/2? For my money, the answer is a qualified no. Opting for control software ultimately means embracing four operating systems—DOS 3.xx, a 386 control program, OS/2, and OS/2 386—a daunting proposition. But if you value the ability to run multiple DOS 3.xx programs right now, 386 control software is undeniably attractive.

A comprehensive OS/2 strategy, on the other hand, evens out most of the rough spots. Assuming your work doesn't require access to true 32-bit power, you can handle just about everything the mainstream software business tosses your way with just two operating systems: DOS 3.xx and OS/2. Only a compelling need to probe

386 native mode would prompt you to add OS/2 386 to your arsenal.

A cautionary parting comment: Don't buy a 386 system just because it's the meanest machine on the block. At 20 MHz, the better 386 systems *are* processing brutes, but they don't yet represent a quantum leap in performance over the 286—even for CPU-intensive routines. (For sheer quickness, a better solution might be to install a graphics coprocessor.) Moreover, you can count on an OS/2-equipped 286 system to perform even more efficiently than it did running DOS 3.xx. That's chiefly because OS/2 applications will unlock the chip's latent power, enabling it to work smarter—and thus faster.

As I've indicated, 386 native mode has its troubles with 286 protected mode. OS/2 has quickly shifted, even commandeered, the personal computing mainstream—and OS/2 was written to exploit the 286, not the 386. The likely predominance of OS/2 over 386 native mode as an applications base during the next several years, combined with the 286's price advantage, makes the 80286 seem like a bargain and a haven indeed. ●

Robert M. Carr is the creator of Framework II and cofounder of Go Corporation, a software start-up.

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*Michael Harper
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The Blue Meanies

Big Blue: IBM's Use and Abuse of Power

Richard Thomas DeLamarter
Dodd, Mead & Co., New York,
1986

393 pages

\$22.95 hardcover

In 1982, Assistant Attorney General William Baxter abruptly dropped the government's antitrust suit against IBM. The suit charged the computer giant with engaging in unfair competitive practices and was the third such action filed by the Justice Department against IBM in 50 years. Was this latest antitrust action—with nearly 13 years of investigation, analysis, and argument behind it—really “without merit,” as Baxter decided?

Richard DeLamarter, an economist who spent eight years sifting through statistical evidence for the Justice Department's antitrust division, strongly disagrees. Denied his day in court, DeLamarter has taken his case directly to the public in *Big Blue: IBM's Use and Abuse of Power*.

DeLamarter disputes the commonly accepted image of IBM on almost every point: IBM's undeniable success is *not*, he claims, the result of wise management, skilled engineering, and a superior sales force. It does *not* offer better technology at competitive prices, and it has *not* triumphed in the marketplace by keeping customers

satisfied. The secret of its dominance, he boldly claims, is simple: IBM achieved preeminence in data processing by adopting ruthless, anticompetitive tactics, and it has maintained its position by exploiting the power of its virtual monopoly.

According to DeLamarter, IBM's monopolistic fever began early in this century, when Thomas J. Watson, Sr., took over the helm. Under Watson's direction, IBM controlled the market for tabulating machines through a combination of crafty maneuvers. First, it rented rather than sold its machines. Thus, no secondhand pricing threatened IBM's new machine market. Moreover, as part of the lease agreement, IBM customers were required to buy IBM punch cards—and to pay top dollar.

But the Justice Department considered this “tie-in” sales practice illegal and brought an antitrust suit against IBM in 1932. IBM's conviction was sustained all the way to the Supreme Court. Although customers were no longer forced to sign an agreement to buy IBM punch cards, IBM still owned all the relevant technology, so the effect was the same. Another suit, brought by the Justice Department in 1952, was dropped only when IBM signed a consent decree agreeing to make its punch-card manufacturing technology available to competitors and halve its share of the card market by 1963.

(continues)

DeLamarter goes beyond these specific tactics to identify IBM's "functional pricing" as a questionable business practice. It worked like this: Once customers were hooked into the IBM product line, they were charged for improvements and accessories not according to IBM's cost but according to the "increase in function or performance as seen by the customer." IBM would offer to upgrade a printing machine to make it run twice as fast for a little less than twice the price. Grateful customers signed on in droves, even though the "upgrade" consisted of moving a little rubber belt from one set of pulleys to another.

Tabulating machines gave way to room-size computers by the 1960s, and IBM jumped into that market. DeLamarter claims that IBM drummed up new business by selling entry-level devices (disk drives and mainframes) at fire-sale prices. Once hooked to an IBM system, customers paid dearly for upgrades and peripherals. Vague threats of incompatibility with non-IBM products forced customers to stay with the IBM line, and the company's announcements of vaporware computers froze orders for competitors' products. In short, argues DeLamarter, the consent decree changed IBM's tactics but not its strategy.

In 1969 the Justice Department filed another antitrust suit, charging that IBM's low prices on entry-level mainframes were unfair and monopolistic. Why did the

Reagan administration abandon the suit after 13 years? DeLamarter hints at connivance but also argues that the structure of high-tech manufacturing makes it difficult to present overwhelming evidence in court. Because R&D consumes much of the cost of developing high-tech products, IBM's actual cost per unit depends on how many units are ultimately sold. Thus, IBM can argue that its pricing was based on projections that were unintentionally optimistic.

Big Blue's argument concerning IBM's recent practices is persuasive but not conclusive: The primary evidence is statistical—development costs for a computer line, projected and actual sales—and the statistics are open to interpretation. DeLamarter presents a well-written, well-argued case, however, based on his analysis of public records from the Justice Department's suits and competitors' complaints. Readers can draw their own conclusions from the substantial raw evidence in both text and appendices. Certainly this fascinating history of IBM's business practices adds a new and disturbing resonance to the OS/2 announcements.



Global Reach

High-Tech Society: The Story of the Information Technology Revolution

Tom Forester
MIT Press, Cambridge, Massachusetts, 1987
311 pages
\$19.95 hardcover

As technological change rapidly transforms the way we work and play, the struggle for technological leadership has become the key to world economic and political supremacy. High-tech is looking increasingly like *High Noon*, with Japan and the United States moving inexorably toward a fateful showdown.

"America is at the crossroads," warns Tom Forester in *High-Tech Society*, "and it faces a crucial choice; either it can take the road of perpetual decline like the UK, or it can make the fundamental changes needed to regain world leadership. There should be a major national debate on the issue, but the silence from Washington is terrifying."

The struggle for supremacy—even for survival—among the world's nations is a major theme of *High-Tech Society*, a wide-ranging survey of silicon's dramatic impact on our lives. Forester, a lecturer in computing and information studies at Griffith University in Queensland, Australia, has produced a detailed account of the current state of technology, its uses, and its producers.

Forester's judgment that "Japan is the one to beat" is firmly

(continues)



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grounded in a well-informed study of the latest developments in silicon chip manufacture, artificial intelligence, telecommunications, personal computers, robotics, office automation, and electronic banking. Japanese hardware is already superior, he concludes, and now Japan Inc. is making a "determined effort" to overcome its long-standing weakness in software. Launched in 1985, Japan's \$250 to \$300 million Sigma Project aims to bring about national software compatibility, link 10,000 software development workstations to a national headquarters in Tokyo, and build up an extensive software library.

Forester points out that the U.S.-Japan battle is also being waged on foreign turf, noting that European manufacturers control only one-fifth of the European market for information-processing goods. The future of individual U.S. and Japanese firms may well be decided across the Atlantic as they compete for that lucrative market, he argues, adding that European telecommunications offers especially attractive opportunities.

Europe also provides Forester with some telling examples of how high-tech affects life at humbler levels. The future may be glimpsed in France's sudden love affair with videotex. By 1990, 10 million French households will be using Minitel terminals to access news, games, stock prices, credit records, medical advice—even to swap spouses. In a more chilling

development, a 1986 West German law requires citizens to carry computer-readable identity cards and passports so their movements can be recorded on government computers.

The issues Forester examines have been around for a while, but two ingredients make *High-Tech Society* particularly valuable: the broad but detailed survey that results from a global perspective, and the cool analytical gaze Forester brings to his research.



Build Your Own Expertise

*Expert System Technology:
Development and Application*
Robert Keller
Yourdon Press/Prentice-Hall, Englewood Cliffs, New Jersey, 1987
246 pages
\$26.95 softcover

Want to get an inside track on expert systems, but without the headaches? Forget it. *Expert System Technology* is well-organized, free of jargon, and clearly written, but it's by no means an easy read. What makes this book so demanding is also what makes it valuable—its clear perspective on how difficult it is to capture experience in software.

Previously an engineer and computer scientist with Westing-

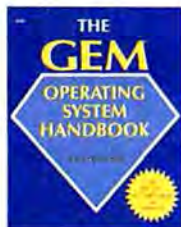
house, Du Pont, and the University of Pennsylvania, Robert Keller is currently an AI consultant who has distilled much of his expertise into a book aimed at management and professional people "who have real, day-to-day, hard-to-solve problems."

Keller rolls up his sleeves and gets down to the nitty-gritty of expert systems, exploring PROLOG in depth along the way. He takes the reader step by step through the construction of a simple (but not trivial) example—an expert system designed to evaluate business tasks in terms of their suitability for expert systems.

Dubbed the Knowledge Base Evaluator (KBE) by Keller, this system isn't the tautology it seems. Rather, it offers a reader the next best thing to hands-on practice at building a knowledge base. Subsequent chapters apply the KBE to specific, hypothetical cases using General Research Corporation's mainframe and PC shell, TIMM, as a sample product. Perhaps most important, the KBE exhibits programmatically all the factors that Keller advises taking into account in deciding whether a task is a good candidate for AI.

Expert System Technology won't turn you into a knowledge engineer, but it will show you what's involved in the rather daunting process and help you identify tasks where expert systems can pay off.

(continues)



Environmental Jewel

The Gem Operating System Handbook

Dave Prochnow

Tab Books, Blue Ridge Summit, Pennsylvania, 1987

212 pages

\$16.95 softcover

When CP/M-86 lost out to MS-DOS in the PC operating system stakes, Digital Research struck back forcefully by introducing GEM (*Graphics Environment Manager*). Although stymied by the threat of Apple lawsuits and competition from well-heeled Microsoft, GEM may find a window of opportunity in the confusion brought on by OS/2 announcements.

Like *Microsoft Windows*, GEM is a Macintosh-like user interface that runs atop MS-DOS. The full power of GEM emerges when you run programs written specifically for it; other applications can run from GEM Desktop, but there you can't take advantage of the pulldown menus, icons, and mouse interface that make GEM such a delight.

Dave Prochnow is a GEM enthusiast, preferring it to the original releases of *Desqview*, *Windows*, and IBM's *TopView*.

Unlike its competitors, GEM does not handle concurrent program operation, but Prochnow tells you how to install Digital Research's Concurrent PC-DOS 4.1 to handle the concurrency trick.

The Gem Operating System Handbook goes far beyond the manuals, supplying a mother lode of hands-on advice. It covers all the bases, from installation to advanced techniques in *GEM Paint*, *GEM Write*, *GEM Draw*, *GEM Graph*, and *GEM Wordchart*. Prochnow includes tips and cautions that will save the new user considerable grief. His presentation is clear and lively, and the screen displays are especially helpful. GEM users will want to keep this book next to the keyboard. Those on the lookout for a new operating environment may be understandably tantalized by the details of GEM's power. —M. H.

Books in Brief

■ ■ ■ ■ ■
Sure, plenty of good public domain and user-supported programs are floating around out there, but how do you get your hands on them? Rather than spend hours scouring bulletin board systems, you might invest \$12.95 for *The PC-SIG Library, Fourth Edition*. This catalog of 705 disks contains thousands of programs for the PC, representing the crème de la crème of PC-SIG's enormous library. PC-SIG has established itself as the preeminent software clearinghouse for free and shareware programs, and it delivers at only \$10 per disk. In addition to games, utilities, and

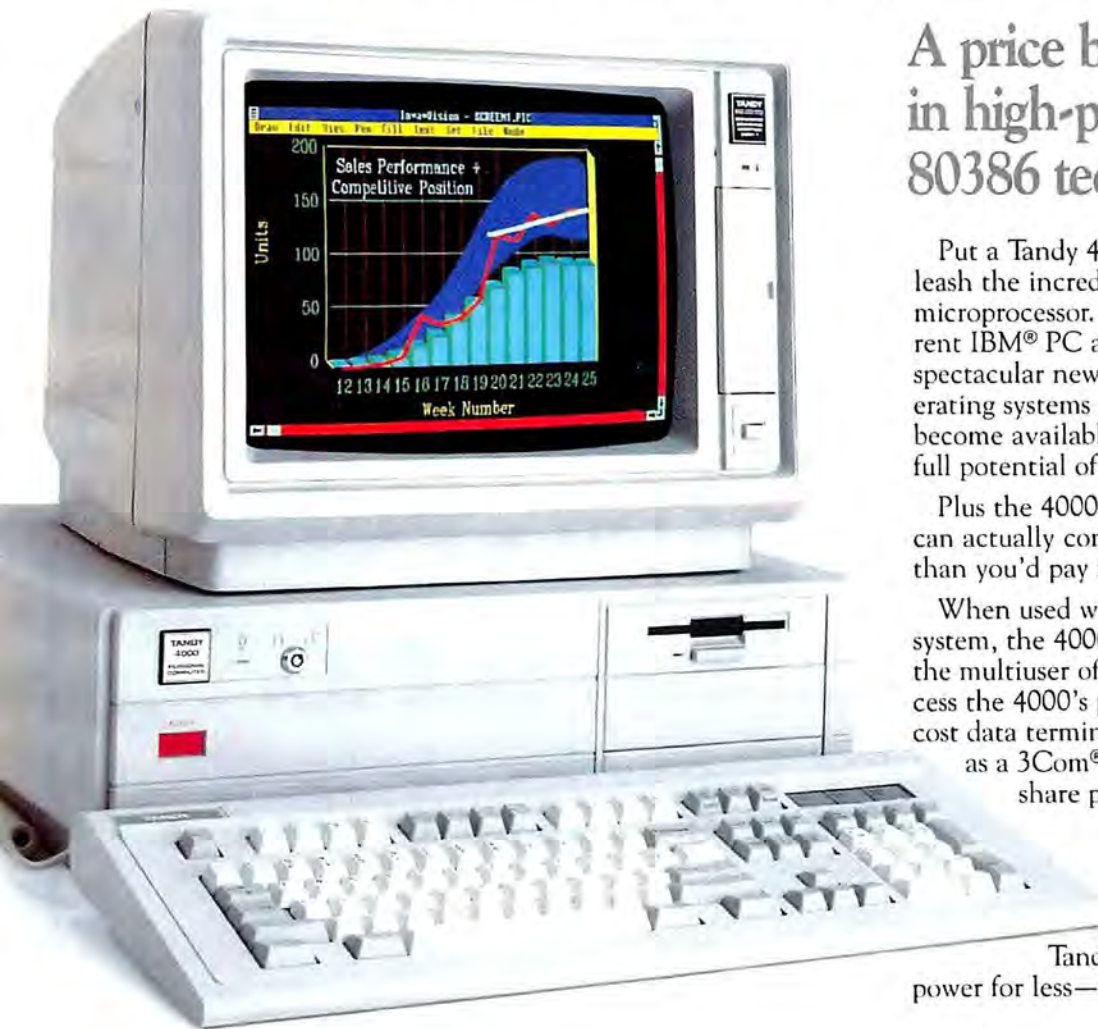
spreadsheet templates, the catalog offers application software in all the major categories, as well as exotica like expert system shells and mapping programs. Each entry in the indexed catalog includes a refreshingly candid capsule review and critical user comments. In addition to listing system requirements and suggested donations, the entries include descriptions of every file on a program's disk and instructions for locating documentation. A great resource at a teensy price. PC-SIG, Sunnyvale, California, 1987; 424 pages, softcover.

■ ■ ■ ■ ■
At first, *Using Lotus HAL* seems something of an incongruity. If HAL, Lotus's English-language interface for 1-2-3, is so intuitive, why do you need a tutorial? As the reader soon finds out (and the user already knows), there's far more to HAL than just an English-language parser. David P. Gobel, an experienced PC consultant, escorts both novices and devotees through the land of HAL in a friendly, relaxed style. Gobel emphasizes new features, such as the Undo command, and improved macro, data base reporting, and linking capabilities. He also introduces strategies for extending HAL's vocabulary with synonyms and improving the help system. Those already hooked on HAL should appreciate the book's numerous tips and traps, marked

(continues)

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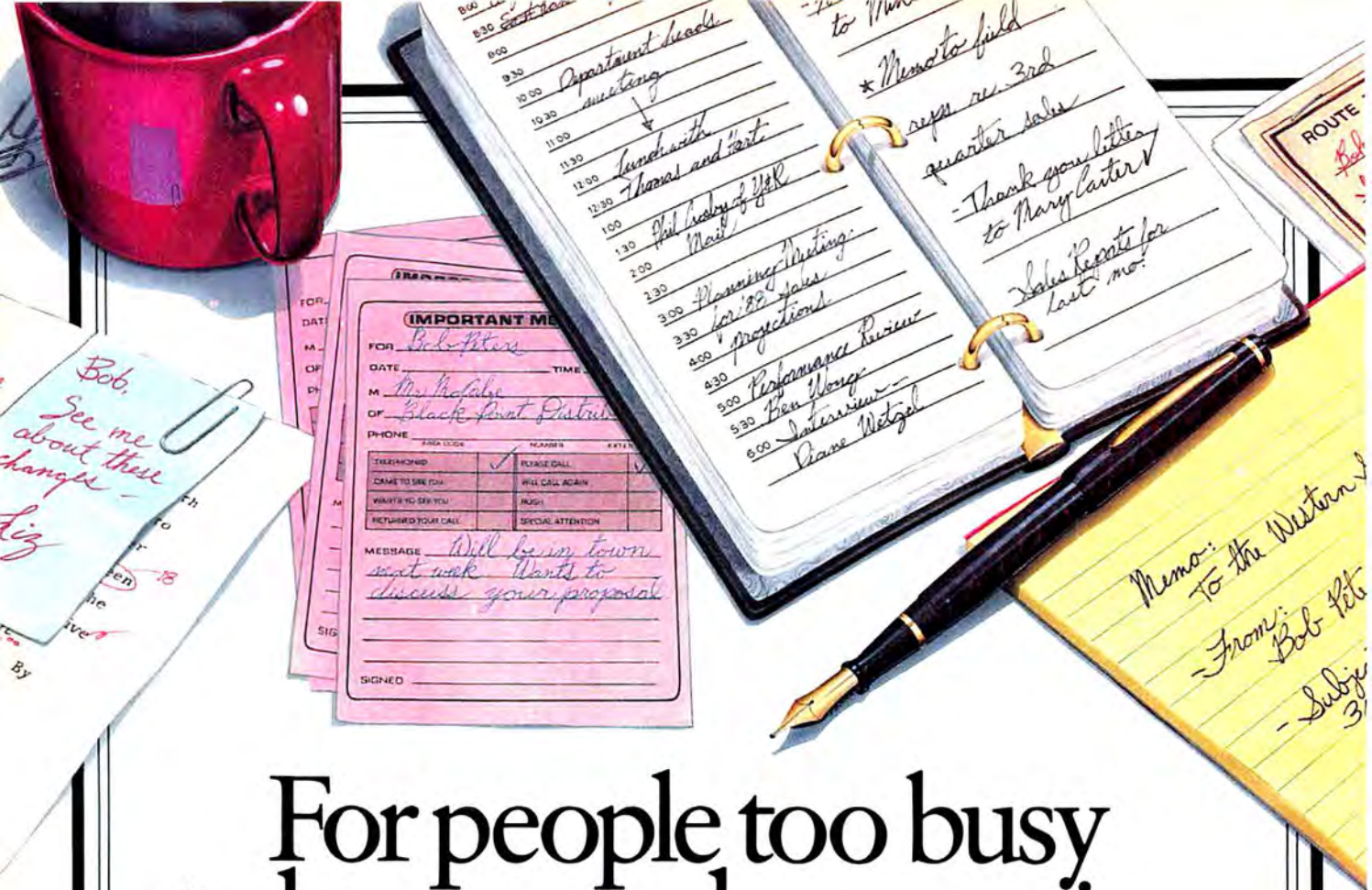
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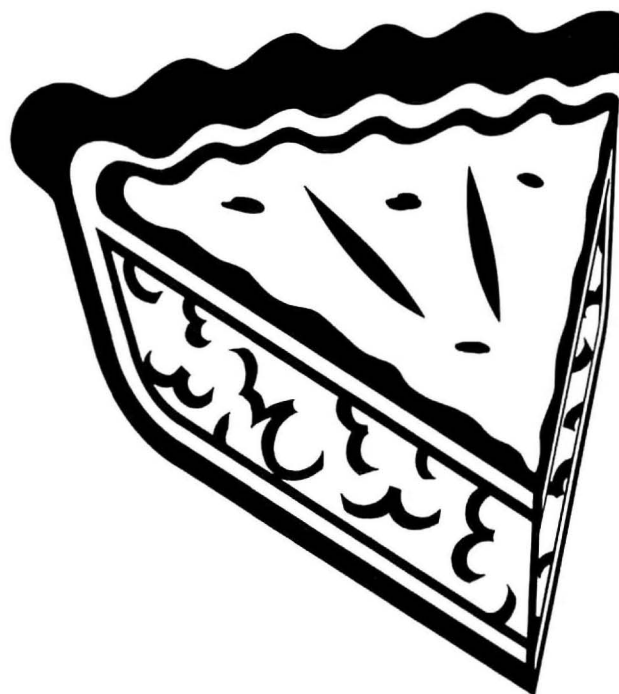
by icons in the margins. Well-written and illustrated, *Using Lotus HAL* is worth its \$19.95 price. Que Corporation, Carmel, Indiana, 1987; 375 pages, softcover.

■ ■ ■ ■ ■

Oracle was the first data base using SQL to become available for PCs, and in many ways it remains the most polished PC implementation of this powerful query language. If you've got *Oracle* on line, however, you know it don't come easy. Here's help. Jack and Carolyn Hursch, two computer science Ph.D.'s with extensive experience in both large and small systems, offer shortcuts and tips for users in their new book, *Working With Oracle*. The dry, no-nonsense tone makes it clear that *Oracle* and SQL are no laughing matter. But if the authors aren't vivid, at least they're practical—devoting well over half the book to hands-on exercises in such particulars as definition and manipulation statements, report writing, and forms generation. Since *Oracle* is a multiuser data base, much text is devoted to file and data locking and allocating disk space. With a captive market and few books out there on the subject, this is a must-have for *Oracle* users. At \$19.95, it'll quickly pay for itself. Tab Books, Blue Ridge Summit, Pennsylvania; 228 pages, softcover. —E. B. ●

Michael Harper teaches English at Scripps College in Claremont, California. Eric Brown is a contributing editor for PC World.

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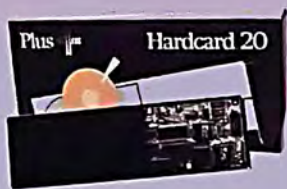
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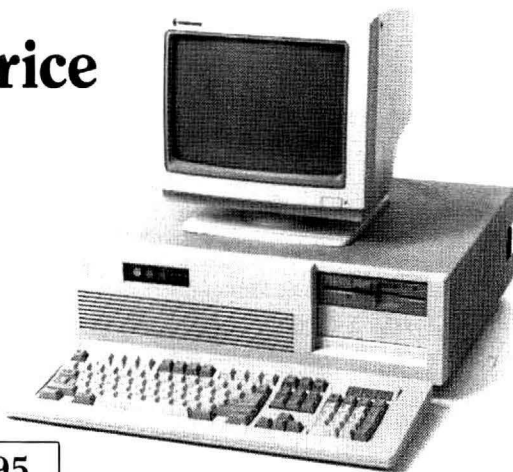
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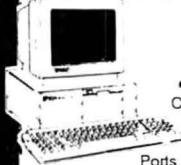
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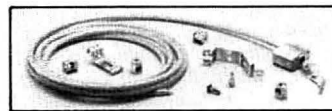
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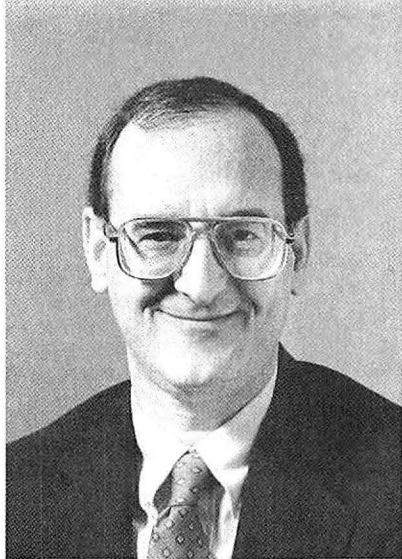
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Julian Ross

Another Angle: Support Your Local SYSOP

Born in the seventies, personal computing grew up in the eighties, so I guess we should expect to bump into a little cultural flotsam and jetsam from the "me generation" every now and then.

But the egocentricity of the past decade is weighing down the personal computing movement. Specifically, the attitudes of what I call "gimme brats" are sinking many of our outstanding bulletin board systems (BBS's).

Gimme brats—more often adults than kids—call up their favorite BBS to check for personal mail, read the bulletins, download some text files or public domain software, and then log off. Such users rarely give anything back to the BBS. Their refrain is "gimme answers to my technical problems, gimme new sub-boards, gimme new software (I've downloaded all you have), gimme more access time, and gimme a quick response when I leave feedback for the SYSOP (I have more complaints than compliments)!"

Am I too cynical? Maybe, but my bulletin board has been among those victimized by the gimme brats. BBS users in general

have become spoiled by the number and variety of boards available. If they tire of one (or get kicked off), they just dial another. They don't realize that a BBS is a community that requires contributions from all its members, not just a few.

Being a SYSOP is a labor of love, and when I get a few good users on my BBS, it makes all the time, money, and effort worthwhile. But hey, it's a two-way phone line. If you want to keep downloading quality software and tech advice, you have to give something back.

"I don't ask for thanks, just for information in kind," says a frustrated Norm Strassner, who runs Los Angeles's Videoman BBS for the entertainment industry. He adds that "PC Pursuit 'looky-loos' are a pain because they take up a lot of time on those flat phone rates." (Telenet's PC Pursuit is a low-cost long-distance data line.)

I've heard all the excuses: "I don't have time to post bulletins." "I don't have anything to say." Or else they ask, "Can I upload *Space Zombies From Mars*?" (No! Public domain or shareware *only*!)

We all have something to offer. We can share not only our professional expertise but also our hobbies, be they stamp collecting,

pottery, raising horses, photography, or whatever. We can voice our opinions on movies, books, TV, politicians, hardware, software, the price of eggplant, or civil liberties. And no advertisements please; we get enough of those on television.

I'm not suggesting that the BBS is an endangered species. Some estimate there are 20,000 BBS's in operation—although, as *Connect* newsletter editor Steve Cisler observes, counting bulletin boards is "like counting fruit flies—they won't stand still for it."

The real issues are quality and fairness. If we want high-caliber BBS's to flourish—not just exist—then we all have to be participants, not BBS couch potatoes. Post bulletins, upload noncommercial software, and send mail to your fellow users. Support your local BBS and your local SYSOP!

Julian Ross is a computer consultant and co-SYSOP of a private BBS that once was public.

Have a different perspective on computing? Send your opinions to Another Angle, PC World, or MCI Mail PCWorld/179-3813. ●

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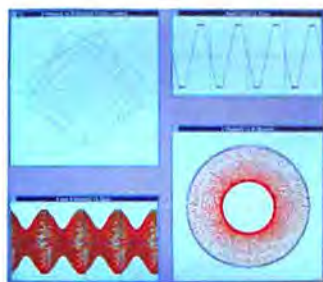
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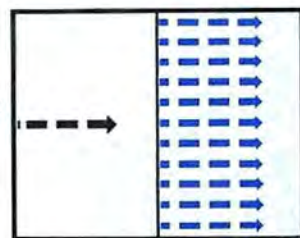


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