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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.

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

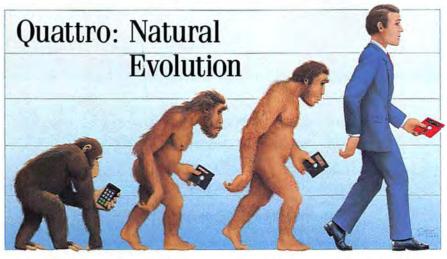
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Ezra Shapiro, Byte

Quattro includes SQZ!® Plus data compression

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HIC	Integrated Graph Printing	YES	NO
GRAPHICS	Full Graph Customization	YES	NO
9	On-Screen Font Styles	11	1
	PostScript Support	YES	NO
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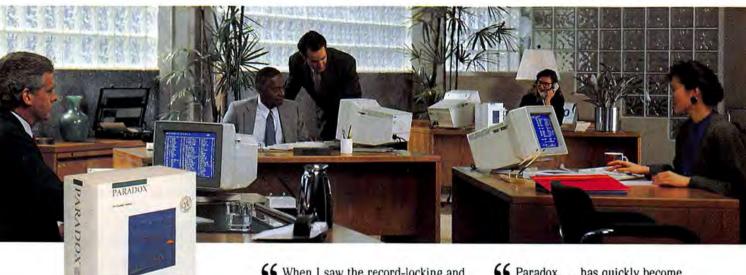
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Why Paradox 2.0 makes your network run like clockwork



Paradox* runs smoothly, intelligently and so transparently that multiple users can access the same data at the same time—without being aware of each other or getting in each other's way.

With Paradox news travels fast and it's always accurate

Paradox automatically updates itself with a screen-refresh that ensures that all the data is up to date and accurate all the time. Record-locking, Paradoxstyle, safeguards data integrity by preventing for example, two different users from making changes to the same record at the same time.

How to make your multiuser network work

To run Paradox 2.0 or the Paradox Network Pack on a network, you need:

- Novell with Novell Advanced Netware version 2.0A or higher 3Com 3Plus with 3Com 3+ operating system version 1.0, 1.1
- IBM Token Ring or PC Network with IBM PC Local Area Network
- Program version 1.12 or higher

 Torus Tapestry version 1.45 or higher

 AT&T Starlan version 1.1 or higher
- Banyan VINES version 2.10
- Other network configurations that are 100% compatible with DOS 3.1 and one of the listed networks

System Requirements for the Network Workstation

- DOS 3.1 or higher
- Any combination of hard, floppy, or no disk drives
- Compatible monochrome, color, or EGA monitor with adapter

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66 When I saw the record-locking and autorefresh in action, I couldn't believe it. Here was a true network application, a program that can actually take advantage of a network to provide more features and functions, things that can't be done with a standalone PC.

Aaron Brenner, LAN Magazine

With Version 2.0, Paradox becomes a sophisticated multiuser product that boasts an impressive selection of dataproduction features and passwordsecurity levels.

Rusel DeMaria, PC Week 99

Paradox responds instantly to "Query-by-Example"

The method you use to ask questions is called Query-by-Example. Instead of spending time figuring out how to do the query, you simply give Paradox an example of the results you're looking for. Paradox picks up the example and automatically seeks the fastest way of getting the answer.

Oueries are flexible and interactive. And in Paradox, unlike in other databases, it's just as simple to query more than one table as it is to query one.

66 The program elegantly handles all the chores of a multiuser database system with little or no effort by network users.

> Mark Cook and Steve King, Data Based Advisor 99

66 Paradox . . . has quickly become the state-of-the-art product among PC database managers . . . Paradox still reigns supreme as the thinking user's DBMS.

Jim Seymour, PC Magazine 99

You don't have to be a genius to use Paradox

Even if you're a beginner, Paradox is the only relational database manager that you can take out of the box and begin using right away.

Because Paradox is driven by the very latest in artificial intelligence technology, it does almost everything for you-except take itself out of the box. (If you've ever used 1-2-3° or dBASE,* you already know how to use Paradox. It has Lotus-like menus. and Paradox documentation includes "A Quick Guide to Paradox for Lotus Users" and "A Quick Guide to Paradox for dBASE users.") Paradox, it makes your network work.

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Crash Management



Left to right:
PC World
technical
editor Karl
Koessel and
NSTL's Jim
Hurd and
Charles Vogt.

Over the past year, *PC World* and National Software Testing Laboratories have tested well over 100 products, including dozens of computer systems. Our goal? To help users make informed, intelligent decisions about competing products. Beginning this month, our standard system benchmarks are joined by *PC World*'s exclusive Crash Test—a painstaking approach to compatibility testing that goes far beyond anything we've done before.

Jim Hurd, NSTL's vice president of research and development, and *PC World* technical editor Karl Koessel coordinated the development of the new procedures. "We're constantly evaluating our tests to see if they truly represent the way real people use PCs," says Koessel. Koessel and Hurd agreed that for a system to merit a thumbs-up in compatibility testing, it had to flawlessly run a spectrum of challenging applications.

Fortunately, Hurd and NSTL technical editor Charles Vogt had a wealth of pertinent experience to draw on. For its own monthly publication, *PC Digest*, NSTL devised a compatibility torture test that takes weeks to perform and was designed to certify a system's compatibility with the original IBM standards. Using the results from hundreds of those tests, Hurd and Vogt assembled a list of 272 operations—from 12 common business applications—known to cause compatibility prob-

lems. From now on, every system we review will undergo the *PC World/NSTL* Crash Test as part of its evaluation process.

And we aren't stopping there. Our test development team promises to reexamine all our test procedures regularly to make sure they are realistic, credible, and fair. Next month, for example, we'll introduce a revised suite of spreadsheet tests that will make it possible to compare the latest generation of contenders for the 1-2-3 throne. We welcome your opinions and suggestions for making our tests even more useful.

Also in this issue: Eric Alderman tackles the latest revision of the world's most popular word processing package ("WordPerfect Gets Better!"). Three PCW contributing editors had a hand in this month's Review section: Eric Brown ("High-Impact Printing") reviews an assortment of 24-pin printers that promise high-quality output at a manageable price. Judy Getts ("Smarter Modems") investigates a sextet of 2400-bps modems that may well unseat Hayes' Smartmodem 2400. And Ralph Soucie looks at three accounting packages for small to midsize businesses. Don't miss our Preview department either: You'll get a detailed look at Tandy's first-ever Micro Channel clone and the eagerly awaited OS/2 Presentation Manager. Finally, if you're one of those users who feels more at home in a spreadsheet than anywhere else, Mary Campbell ("Buyer's Guide: 30 Templates for 1-2-3") has rounded up an admirable assortment of 1-2-3 tools for five financial specialties.

Ed Both

Ed Bott Managing Editor

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-Lawrence Magid, Washington Post 99

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hat some of the sounds made by

maisome or the sources miles of whates are intended to communi-

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some measure of protection

There are several structural problems which have limited the

Problems which have united to actually limit to

whaling. First, any nation can

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TOP OF THE NEWS

DOS 4.0 Ships

DOS Upgrade: Graphic User Interface, Tree Directory, and New Power BM's newly-released DOS 4.0 includes functional enhancements plus a graphic user interface that buffers inexperienced users from DOS commands. DOS 4.0 melds a DOS shell and a tree directory with several other long-awaited enhancements intended to make DOS friendlier. DOS 4.0 can address hard disk partitions larger than 32MB-as large as 2 gigabytes, in fact—and supports the LIM 4.0 Expanded Memory Specification on IBM memory boards. IBM has added 30 functions or function enhancements, including more informative error messages and context-sensitive help. DOS alone now takes up 69K of memory, and a full-featured implementation of the shell requires another 153K of memory, leading IBM to recommend a minimum of 256K. However, all but a 3K kernel of the shell unloads when an application is run, and

users can exclude unneeded functions to save memory. DOS 4.0 is neither a multitasking operating system like OS/2 nor a Systems Application Architecture-compatible windowing environment like Microsoft Windows. "Overall, it seems to be the typical IBM incremental crawl forward," observes Steve Gibson, president of Gibson Research Corporation. An IBM spokesperson emphasized that the upgrade demonstrates an ongoing commitment to DOS, despite the advent of OS/2. The shell's graphic interface (which can be run in character or graphics mode) conforms to the common user access specification of SAA and is designed to ease users' transition from DOS 4.0 to OS/2, he adds. DOS 4.0 will cost \$150. Upgrades from earlier DOS versions will be available through IBM dealers for \$95 until next April 28.

Ashton-Tate Broadens dBASE

ObjectOriented
Programming
Sets Common
Platform
for All
Ashton-Tate
Applications

Ashton-Tate is engaged in a long-term project to extend the dBASE language, the foundation of its famous data base manager, into an object-oriented programming language. The company believes that the nonprocedural technique of combining programming commands with objects such as spreadsheet ranges, graphics, and word processing documents will make programming dBASE applications significantly easier. The first step in the evolution is to integrate 19 SQL commands with dBASE's 245 commands to create dBASE/SQL. That combination, in turn, will evolve into an "object-oriented-style language" using proprietary technology. Ashton-Tate will then extend dBASE/SQL into a superset called dBASE Cross Application Language

(dCAL), which will facilitate the movement of programmable objects across different Ashton-Tate applications, regardless of format (see *Top of the News*, *PCW*, July 1988). dCAL will provide the underlying programming metaphor that will enable developers to unite all of Ashton-Tate's disparate applications into a single, fully integrated office solution. However, dCAL will not be available in October as previously reported but will require another year or two of development, reports an Ashton-Tate spokesperson. The company plans to support industry-standard graphics platforms such as the OS/2 Presentation Manager, but its product development and release schedules do not depend on outside events, he adds.

AGA to Ship Erasable-Optical System

Company Claims First Fully Operational Subsystem Advanced Graphic Applications (AGA), a New York-based controller board maker and system integrator, may be the first to offer users a plug-and-play erasable-optical drive. AGA expects to ship its DISCUS erasable-optical subsystem in early November, while Maxtor, Verbatim, and Sony say their drives aren't likely to reach customers before first quarter 1989 (see *Top of the News, PCW*, June 1988). AGA executive vice president Stan Marder claims that AGA's 650MB drive will be the first on the market to respond directly to all popular PC

software and DOS commands, thanks to a proprietary software driver in the company's controller board. DISCUS can be carried from system to system like a floppy, adds Marder. Optical disks written on AGA systems will work on any brand of drive with the same form factor. DISCUS will ship with a 5½-inch, 76ms drive from Olympus, complete with controller, software, and cable for \$4995. Its 16-bit SCSI controller will support up to eight discrete devices, from a floppy drive to a CD-ROM drive.

TOP OF THE NEWS

Intel Delivers Fax/ Modem Board

Establishes Communications Specification for Applications Intel's Personal Computer Enhancement Operation (PCEO) has introduced the first of a family of communications coprocessor products built around an Intel Communicating Applications Specification (ICAS). The PCEO Connection CoProcessor for classic PCs uses its own 10-MHz Intel 80188 processor and 256K of memory for high-speed background transfer of binary files, E-mail, and facsimile images without interrupting the foreground job the computer's main processor is performing. The \$995 Connection CoProcessor offers a simple point-and-shoot menu interface, all but 6K of which can reside in high memory. ICAS is a batch-

mode file-transfer specification that a software developer can include in any type of application, enabling users to communicate at 9600 bps with fax machines and Connection CoProcessor—equipped PCs. ICAS lacks the interactive communications and scripting capabilities of a full-blown communications module, but approximately half a dozen major software developers, including Symantec, have endorsed it. For modem-to-modem transfers, PCEO provides a 2400-bps, Hayes-compatible modem option, the \$295 Intel 2400B Modem Option daughterboard. Future releases may also support network adapters and IBM 3270 emulation.

Environmental Upgrades Available

Microsoft and Quarterdeck Enhance Multitasking Windowing Packages Microsoft and Quarterdeck have released new versions of their multitasking environments, both of which increase the amount of available conventional memory. Versions 2.1 of Windows/286, Windows/386, and the Windows developer's tool kit add an extra 50K of addressable memory to the current 640K limit on classic PCs or PS/2s with 1MB of extended memory. This feat is accomplished by storing Windows' own code in an unused portion of memory that DOS reserves for memory-mapped devices such as video display adapters. Similarly, Desqview 2.2's 145K overhead is housed in these mapped areas, or in extended or expanded memory when available, to reduce its conventional memory requirements to zero on a

monochrome or CGA-equipped system and to 10K with EGA or VGA adapters. Additionally, Desqview 2.2 offers improved support for certain special-featured communications packages such as Lotus Express and IBM 3270 emulators; and Quarterdeck has enhanced the Desqview developer's tool kit with its application program interface and a background E-mail handling facility. Microsoft also claims speed improvements of 30 to 50 percent for Windows 2.1 and has added an installation routine that automatically detects the user's hardware configuration and simplifies setup. Quarterdeck has sold more than 1 million copies of Desqview, while Microsoft has delivered more than 2 million copies of Windows.

Competitors Attack dBASE IV

Oracle Offers dBASE Upgrade Path to SQL, Word-Tech Touts Faster Processing Two major Ashton-Tate competitors, Oracle Corporation and WordTech Systems, have teamed up to attack the dBASE IV market from both ends. The pair has signed an agreement giving Oracle marketing rights to SQL-based versions of Word-Tech's DBXL, a dBASE-compatible package, as well as WordTech's Quicksilver compiler. Oracle Quicksilver and Oracle DBXL, due for release this fall, will marry the SQL capability of Oracle data base products with the procedural language of the WordTech products. Oracle has 10,000 installations, most on large systems. The deal will help Oracle take advantage of the programming efforts of more than 250,000 dBASE application develop-

ers and will give WordTech the growth path represented by Oracle's SQL and distributed data base technologies. An estimated 2 million dBASE III Plus users will be able to run their applications simultaneously against dBASE, Oracle, or IBM DB2 data bases. A true distributed data base, Oracle can access files residing on mainframes, minicomputers, local area network servers, or PCs. Thus, the new products will attack Ashton-Tate's SQL Server strategy for communication with large systems as well as its sales of single-user copies of dBASE IV. WordTech's products have generally competed against dBASE on the basis of price and speed.

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S I G M A D E S I G N S

TOP OF THE NEWS

COBOL for OS/2 Available

Language Seen as Common Development Platform for PCs and Mainframes Predicting that COBOL will be a much more important development tool in the OS/2 environment than it has been in DOS, Microsoft has updated its COBOL Optimizing Compiler version 3.0 with an OS/2 version developed by Micro Focus. Microsoft Language Product Manager Greg Lobdell sees the product as a bridge between PCs and the big-system world, possibly resulting in mainframe applications being ported to PCs. He cites three factors that could boost COBOL in corporate PC environments—75 percent of all mainframe business programs are in COBOL; more than \$8 billion worth of COBOL code is in inventory; and IBM's own SAA-compatible version of the language, introduced in December, "is taking off." COBOL users will be

among the first to take advantage of OS/2, perhaps offloading mainframe programming to PC "front ends," says Lobdell. "Shell Oil alone has 800 CO-BOL programmers on staff," he notes. Previously hampered by DOS's 640K memory limit, COBOL programmers will be able to use the full 16MB of directly addressable memory available under OS/2 with Microsoft COBOL, which has been certified in compliance with the ANSI 1985 standard. While it lacks Microsoft's CodeView, the symbolic debugger that accompanies most other Microsoft languages, Microsoft's \$900 COBOL Optimizing Compiler will come with the Animator, a source-level debugger from Micro Focus. Users of Microsoft's version 2.2 compiler can upgrade for \$300.

Daybreak Launches New Products

Company Hopes Promotion Will Spin It Out of Chapter 11 Struggling to exit from Chapter 11 protection (see Top of the News, PCW, February 1988), Daybreak Technologies has acquired a backer and launched an aggressive direct sales campaign. The Torrance, California, company is shipping version 1.1 of its Silk spreadsheet as well as a keystroke-logging utility called Cocoon. To stimulate demand, Daybreak has lowered the price of the 1-2-3 clone from \$298 to \$69.95, and is selling Cocoon for \$49.95 rather than \$99 until September 30. President Gus Tsao reports that the company is conducting a \$500,000 advertising campaign in computer journals to boost its products' installed base, hoping that computer dealers will support the

packages in October when they return to full price. Daybreak will break even on the campaign and attract additional financing from its Taiwanese investor, says Tsao, if it can sell 12,000 copies of either program. Daybreak owes \$850,000 to creditors, more than 50 percent to investors like Tsao, who owns more than half the company. The company entered Chapter 11 in October 1987, about a year after introducing Silk, which has sold about 13,000 copies. A refinement of the keystroke logger found in Silk, Cocoon works with most popular programs for macro recording, program debugging, and the automatic creation of demos or tutorials.

DataFlex For OS/2 Appears

Language Features Interoperability Across Numerous Platforms Data Access Corporation recently began shipping an OS/2 version of *DataFlex*, its procedural language for data base development that features interoperability across a wide variety of hardware platforms and operating systems. Taking full advantage of the new operating system, *DataFlex for OS/2* lets commercial and in-house developers write applications that address up to 16MB of memory and lets them run more than one application concurrently. Because *DataFlex* is a modular language that adheres strictly to programming conventions, run-time versions of *DataFlex* applications are easily ported between OS/2, DOS, UNIX, Xenix, Concurrent DOS, VAX/VMS, and more than 20 other operating systems running on

either the Motorola 68000 or the Intel family of processors. Data Access has not produced a version for the Macintosh, but third-party developer Cubix Corporation of Irvine, California, offers a version of DataFlex for the Mac environment using the PC interface. Product Marketing Manager Diana Wilcox reports that Data Access plans to release versions in November that conform to IBM's SAA common user access in all of its run-time versions. That release will add enhancements to the language, which is optimized for transaction-oriented applications. More than 120,000 copies of DataFlex have been installed since 1981, and more than 300 applications have been written in the language. ●

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Taking It to the Streets

Computers & You is about people taking control of their lives.

Here's how you can help.



David Bunnell

early a year ago, I wrote a column in *PC World* called "The Participatory PC" in which I questioned the PC's ability to revolutionize our world. Less than ten years ago, the PC was heralded as a panacea for all social ills. It was going to be the tool to create a more democratic society. It would promote equal opportunity across class, age, race, and every other kind of line. It would even help save the whale, the condor, the kit fox.

As I noted in my column, however, reality has not matched those heady expectations. Instead of breaking down barriers, the PC has created a powerful new information elite. The rich are getting richer in information as well as money. But the poor are still among us, and they are increasing in numbers—and in their hopelessness.

After that column appeared, I received many letters from readers who said, "If you think computers could help more people, why don't you do something about it?"

Well, I have. I met recently with Pat McGovern, chairman of International Data Group, the parent company of PCW Communications. We shared our ideas about setting up a computer learning center in a disadvantaged area of San Francisco. Lore Harp, Pat's wife, suggested that the center be called Computers & You.

We didn't have any problem deciding where to launch such a project. The Tenderloin area immediately came to mind. Near City Hall, the Tenderloin is a 50block neighborhood populated by about 25,000 people. Almost half of them are Southeast Asian refugees. About 20 percent are black, 20 percent are white, and the rest of the residents are native American, Central American, Pacific Islanders, East Indian, or Caribbean. The homeless population is estimated at about 8000, and growing, just as it is elsewhere. Most residents have an annual income of less than \$9000—sometimes far less.

There's an old neighborhood church that serves as community hangout, drop-in center, and social service agency. It's called Glide Memorial Church, and it's been at the forefront of streetwise churchgoing for 25 years. The perfect shepherd for Computers & You is the Reverend Cecil Williams, Glide's charismatic minister. Since 1963, he has guided Glide's appealing and numerous service programs.

The message at Glide is one of self-esteem, cooperation, and (continues)



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positive change. Its spirit-lifting Sunday worship (complete with electric bands, gospel choir, and light show) is backed up by a week of down-to-earth offerings: hot meals, nightly shelter, free used clothing, crisis and job counseling, preschool and tutoring programs—even singing, dancing, and writing groups.

An estimated 1 million people come through Glide's doors every year with one need or another. Glide serves 100,000 meals a month; the Children's Program deals with about 300 families monthly; and over a thousand people have attended the Parents' Program, which teaches skills for improving family life.

I have observed Glide's outreach and impact since I moved to San Francisco in 1978. I always come away feeling grateful that there's some place providing a daily dose of hope and energy, along with some basic necessities like food, shelter, and clothing, to the poorest among us.

I got Pat McGovern and Cecil Williams together, and both men found that they share a vision about empowering people. Giving poor people access to personal computer technology can give them options: literacy, job skills, confidence, and a bigger picture than they might have had.

No, I'm not wearing rose-colored glasses. I don't think learning how to key in data base entries or process words all day long ends poverty or liberates the soul who's staring at the screen. But it is a step along the road to have a skill that lands a paying job or sets one's sights a little higher than merely surviving another day.

"Computers & You will help adults get unstuck," Rev. Williams says, and the kids, playing with educational software, "will take off and fly." The program deals not only with external realities but with internal values, too: dignity, self-respect, greater control over one's own life.

The basic setup of Computers & You will be simple. There's a big room on the top floor of Glide's six-story building that will be dedicated to the project. It's got the proper wiring, ventilation, and lighting—it's ready to go.

PCW Communications, IDG, Pat McGovern, and I have jointly pledged a total of \$100,000 to hire a small staff that will formulate the program and pursue additional fund-raising. We've asked a number of industry leaders to join the project's advisory board. Among those who have committed at this writing are John Warnock, president of Adobe Systems, Heidi Roizen, president of T/Maker, and Adam Osborne, chairman of Paperback Software International.

The program will offer daily classes and practice time using a variety of reading, writing, math, and language software. I'm certain that kids of all ages and colors will be there every hour that they're allowed to be. Older people who have poor reading or comprehension skills may find that their aptitude increases dramatically after working with volunteer tutors and easy-to-use literacy software. Those people who are more skilled, but jobless, can gain much-needed experience with data bases, data entry, and word processing in order to land a steady job. (continues)

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LETTERS

Reactions and responses from the PC World community

Where There's a Will, There's a Wail

I'm still trying to figure out whether Will Zachmann is an objective industry muckraker or just a plain old irate son of a gun. In May he railed against OS/2 Standard Edition; in June he took exception to the Extended Edition. Yes, OS/2 takes more memory; so did 1-2-3 in comparison to VisiCalc. Yes, you can buy products that multitask, have pulldown menus, and support memory above 640K, but not all in one operating system—unless you consider UNIX, which many of us won't.

I don't mind criticism, as long as it is constructive, and I hope that *PC World* tells me when vendors are good and when they are bad. However, when I read Mr. Zachmann's column, I can't help but think that he bears some personal grudge against IBM.

Norm Bushman San Francisco, California

Power From the People

Your article "OS/2 in Transition" [PCW, May 1988] talks a lot about the promise of OS/2 and its apparently awe-inspiring Presentation Manager. I frankly wonder whether OS/2 and the Presentation Manager aren't already destined to go the way of dinosaurs and PCjr's.

Corporate MIS people are straining at the leash to get at OS/2 and its ability to connect and multitask PCs (spurred, no doubt, by unquenchable market hype). However, the PC market bloomed due to the support of end users, namely office managers and their employees who gained productivity and satisfaction from their machines; MIS had little to do with the PC's success. Now IBM has targeted those willing and deep-pocketed buyers with OS/2, but I wonder if IBM isn't shooting itself in the foot. Fat corporate accounts may look tempting now, but the OS/2 market may prove smaller than anticipated.

Keith Risler London, Ontario, Canada

HyperCard Gets a Misdeal

Robert M. Carr's discussion of hypertext [Tech Notes, PCW, June 1988] mistakenly implies that Apple's HyperCard was designed as a hypertext or hypermedia tool. While calling Hyper-Card "a superb applications development environment," Mr. Carr says it's less likely to become "an authentic hypertext publishing medium." That's analogous to an alien landing on Earth and, upon seeing an automobile parked atop a candy wrapper, saying, "Gee, that would make a great transportation device, but it's not a very convenient paperweight." (continues)

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Circle 257 on reader service card

Linking HyperCard to hypertext is a common miscue caused by the product's unfortunate name. Throughout its development, the product was called WildCard, a name that better reflects the program's abilities as an application development environment.

Yes, you can do hypertext-like things with *HyperCard*, but its impact on personal computing will prove to be far more important than as a hypertext publishing medium.

Danny Goodman San Francisco, California

DeskJet's a Mess

Your review of Hewlett-Packard's DeskJet printer [*The Hardware Shelf, PCW, June* 1988] failed to mention a particularly disturbing problem with the printer's output. Although it is true that the ink is dry by the time each page drops into the output bin, the ink is not permanent. Moisten your finger and run it across the page, and you will smear the ink.

People who moisten their fingers to thumb through a Desk-Jet-printed manuscript will smear it; even slight perspiration on the fingers smears the ink. This contradicts HP's advertisement that the DeskJet is a "laser-quality printer."

William W. Berry Harmony, Pennsylvania

Bless You, Byline

I commend Lan Barnes's review of Ashton-Tate's desktop publisher ["Byline—For Better Business Documents," *PCW*, May 1988] for observing that not every user needs the power and complexity of a *PageMaker* or *Ventura Publisher*. I am amazed at the ease with which I can import 1-2-3, *PC Paintbrush*, *dBASE*, and *Symphony* files into *Byline*, and the program's mail merge facility is a godsend.

Readers of *PC World*'s reviews get substantial product information that can make a big difference in how many hundreds of dollars they fork over at an Egghead store. *PageMaker* and *Ventura* may offer many more features, but I'm not ready to publish the daily gazette yet. With the money I saved, I took my mother out for dinner on Mother's Day and bought a color monitor.

Robert J. Roch San Diego, California

Key Resources

What is "cumbersome" about WordPerfect's command structure? Ralph Blodgett ["Word-Perfect Macros From A to Z," PCW, June 1988] apparently can't invoke commands except mnemonically.

For my work, which involves word processing a variety of documents from theses to product and address lists, 26 macros are sometimes not enough when several projects are under way at once. I have macros for columnization, styling, and switching printers from continuous to sheet-feed mode. Using macros to replace two- and three-key commands is a waste.

Patricia L. Maxey Fort Collins, Colorado

Give Me the Real Thing

Ralph Blodgett lists 26 macros "designed to streamline Word-Perfect 4.2 for everyday use." WordPerfect, to be sure, gives good macros, and the terrific streamlining they allow is one of the program's most delightful features. However, Mr. Blodgett seems to be unaware of the main purpose of macros: To accomplish a frequently repeated task (or insert frequently used text) with significantly fewer keystrokes. That's what macros are all about.

Rather than use up 25 of WordPerfect's 26 two-key macros, why not give us one of those quickies that automates an oft-performed and time-consuming process such as converting a single-spaced document to double-spaced for printing? Or how

about one that prints two copies of the document, one to send to Letters, and one to keep? Dodi Schultz New York, New York

In Defense of Word's Macros

I read with interest W. L. Brown's complaint ["Devil Macros," Letters, PCW, June 1988] about Word 4.0's macro feature. Mr. Brown states that he was unable to create a macro that reassigned the <F4> key to turn on Word's boldface function. I have found Word's macros powerful and easy to use; I wrote the macro he attempted and it worked perfectly. (continues)

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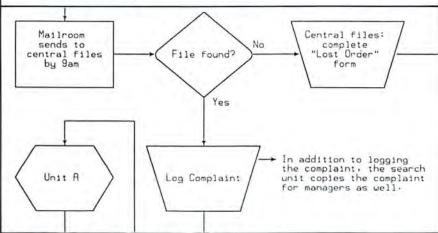
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LETTERS

However, this was a very simple macro that saved only one keystroke. Word macros can contain powerful conditional branching statements, pauses for user input, variable assignment and testing, and more. W. L. Brown's statement that "Word's macros are worse than useless" should not go unchallenged.

Michael J. Coyne Amherst, Massachusetts

Directory Insistence

In reference to your network word processing review ["Five Tools for Team Writing," PCW, April 1988], I don't understand why you have to set up a separate subdirectory for each Samna user on the network. Wouldn't that prohibit those users from sharing files? I have installed and supported this program on numerous Novell and AT&T Starlan networks, and as far as I know, Samna users may share files within a subdirectory as long as that subdirectory is located on drive F: (the Novell server default drive).

Michael D. Patterson Brooklyn, New York

A call to Samna Corporation's technical support line revealed that although separate user subdirectories are a good idea organizationally, they are not required. In fact, the version of Samna Word IV reviewed (1.1) keeps user default configuration files in the default program directory. Samna doesn't allow more than one user to edit a file at any time, and the ability to share files depends on what access rights a user is granted by the network software. -Ed. (continues)

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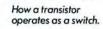
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Can we get the cost of goods sold under \$12?	- Tom	Materials
Bob will present ten-point incentives program at sales conference.	• Bob	Bonus Dollars
 Tom will have his report in by a week from Finday, make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing. 	• Tom	Distribution Vendors Pricing
Decision needed on research budget by end of this week—discuss options with Jim and Joan.	• Jim Joan	Research

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(55ut-5	Product Idéas	Who	Department
Packaging	 Accept packaging bids until the end of October. 	• Liz	Operations
Materials	Make sure synthetic materials are reliable.	• Sue	Operations
• Research	 Have Tom break down market research results into best case/worst case scenarios. 	• Tom	Marketing
Distribution Vendors Pricing	 Tom will have his report in by a week from Friday; make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing. 	• Tom	Marketing
Distribution	Do Tom and Bob think we need to adjust distribution mix?	• Tom Bob	Marketing Sales

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File: C: \ AGENDA \ FILES \ ISSUES Vew: Issues by Person		05/21/88 11:00	
tssues	Joan	Priority	When
Research	 Decision needed on research budget by end of this week— cliscuss options with Jim and Joan. 	• High	• 06/25/88
Competitive Tracking	Forward product comparison articles to Joan.	• Low	• 07/07/88
Insues	Boo	Poonly	When
Distribution	Do Tom and Bob think we need to adjust distribution mix?	• High	• 06/22/88
Bonus Dollars	Bob will present ten-point incentives program at sales conference.	• Medium	• 06/29/88

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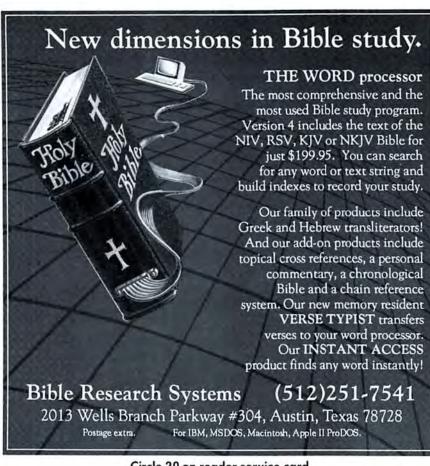
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PostScript Support

Daniel Miles Kehoe's review, "PostScript Printers' Progress" [PCW, May 1988], mentions some software applications that support PostScript, among them WordPerfect 5.0. This must be a big surprise for WordPerfect president Alan Ashton, who recently stated that even though WordPerfect 5.0 includes graphics-manipulation capabilities, it does not support PostScript printers.

Jozef Paulik New York, New York

At the time that the printer article was written, WordPerfect informed PC World that Word-Perfect 5.0 would include Post-Script support upon its release. The business and computer press mostly reported that it would not. A recent call to WordPerfect technical support and an inspection of printer drivers accompanying the new program confirmed that it supports a wide variety of Post-Script printers. -Ed.

Corrections

"PostScript Printers' Progress" (PCW, May 1988) contains an error. Contrary to the Features Evaluation on page 145, the NEC Silentwriter LC890 is not capable of HPGL plotter emulation. PC World regrets the error.

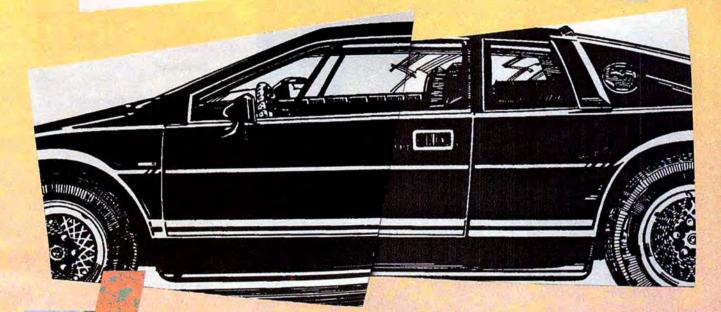
In "Match Wits With PC World: Answers and Winners" (PCW, June 1988), the typo bug bit us once more. The correct answer to question 28 is b, not d.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. .



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





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PC W\(\beta\)RLD

October

World Class PC Awards

For the sixth year running, PC World's readers select their favorite hardware and software products. A year marked by significant new technologies is bound to produce some surprises. Last year the Compag Deskpro 386 came out of nowhere to take top honors in the Desktop Computer category. Can the Deskproand longtime favorites WordPerfect, 1-2-3, and dBASE III Plus-do it again?

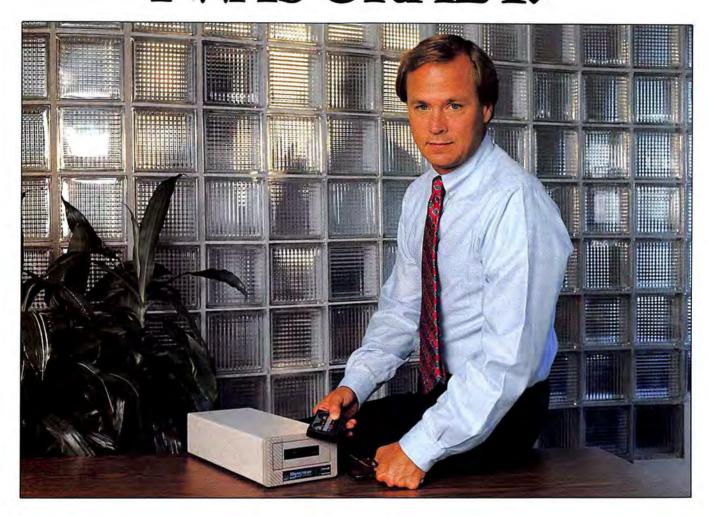
Getting Ready for OS/2

What sort of processing power and memory do you need to unleash the capabilities of OS/2? PC World and NSTL put OS/2 through its paces on more than 30 systems in a first-ever suite of real-world benchmarks of the new operating system.

Fax Board Roundup

Inexpensive add-on boards promise to give your PC all the power of a fax machine at a fraction of the cost. PC World reviews seven fax boards to see if they suit your business needs.

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The Cure for MacEnvy.



For years PC users have been conditioned to think of their computers in certain terms. Dependable. Versatile. Dull. To get superior graphics, some claimed that you need a different type of computer altogether. They said *their* computer was everything the PC wasn't. Easy to use. Graphically exciting. Fun. PC owners were, well, *green* with MacEnvy.

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Who's Building Work-Group Software?

Work-group computing requires PC software that gives users more control than ever before.

That won't happen until developers work together, too.



Richard Landry

With all the enthusiasm for work-group computing cropping up among industry types, you'd think that software packages geared toward this style of PC use were a dime a dozen. But in fact, the opposite is true. With few exceptions-like Data Access's Office Works electronic mail and scheduling system or Spectre Software's Command Performance—work-group software is still pretty much in the vaporous stage. Some promising products, like Lotus's Notes, have simply dropped from sight. Why? Because developers don't have the platform on which to build true work-group applications. And they're not likely to have it for some time.

Big programming houses are building applications to address this promising market in the future. But the rest of us are wondering, why the wait? With the number of LAN installations rising each year, the PC community is ripe for software that goes beyond E-mail to make users more productive working in groups than they can possibly be as individuals. Both Novell and 3Com now offer PC and Mac users ways to share data across a network. And the number of software applications that can trade files between Mac and PC versions is growing rapidly.

So what's the holdup? Well, as developers surely understand, work-group computing is not simply a matter of opening up the communications lines between different users, programs, and environments. Although these basic connectivity issues still present obstacles, the bigger problem is to find a way to give users the application building blocks they need to create their own fully customized work-group environments. And in this effort everyone is pretty much at the starting block.

One part of this problem is technological. While popular PC programs like WordStar, 1-2-3, and dBASE were written with specific, relatively isolated purposes in mind, work-group products will have to cross application boundaries in a way that's alien to today's PC software. That's because work groups operate naturally across multiple applications. At a minimum they need to combine data from word processors, data bases, and spreadsheets into reports that can be easily modified as information changes. But to really get mileage out of working together, (continues)

work groups must be able to create their own customized solutions that can grow as business conditions change—without having to wait for tech support or an outside consultant to tie it all together.

Instead of offering a tightly integrated set of features that can be modified to only a small degree by end users, work-group software will have to be much more open-ended. The basic building blocks of work-group software won't be data entry screens and report writers, but filing, editing, and messaging services that can be customized by the user without programming. Dialog boxes and customizable window displays will be the language of these new tools. Object-oriented environments like the Macintosh's or Hewlett-Packard's NewWave can provide the foundation for such applications. But as Borland vice president Rob Dickerson points out, for the near term, both OS/2's Presentation Manager and its precursor, Windows, lack the underlying language that permits such coherency.

Work-group software poses some previously unheard-of logistical problems for vendors, too. Symantec's Rod Turner notes that work-group software may tax vendors' traditional methods of selling PC software. Because a decision to buy a work-group package can affect an entire organization, software marketed as a work-group solution is unlikely to sneak in through the back door thanks to some enthusiastic user who ends up selling its benefits to the higher-ups. Instead, work-group software may well have to run the approval gauntlet that MIS occasionally puts in place just to keep unwanted applications out of its shop! The challenge, Turner believes, is to think small—to design software that offers benefits to individuals but which grows in power as it is adopted by other users throughout the organization.

We can see some of the pieces needed for work-group computing falling into place, but unfortunately they don't come from IBM-compatible product developers. Take Sun's 386i workstation and its UNIX-based network software, for example. Sun seems to have recognized that network software should give users the freedom to share resources in whatever way they want-not according to the whim of a network administrator who doesn't participate in the work-group's concerns. Sun users have a great deal more control over such basic issues as access privileges than they do in the conventional DOS world. Furthermore, they can turn their workstations into windows onto any system resource that's publicly available on the net, including PCs.

Similarly, in the Macintosh environment, the programming tool HyperCard is quickly evolving from an entertaining curiosity into a fully customizable front end to such daunting applications as Oracle's SQL data base. It's not hard to imagine a HyperCard stack that would integrate word processing, spreadsheet, data base, and communications functions into a turnkey application that work-group members create to suit their own needs. Such a setup is made possible by the rich, object-oriented

environment that the Mac provides to users and developers

But it's harder to imagine HyperCard for the PC. Without the programming discipline that Apple enforces on its developers, such a program would require Ashton-Tate, IBM, Lotus, and Microsoft to agree on a cross-application language they all can support. Will they do it? With Ashton-Tate's dCAL, Lotus's LEAF, and Microsoft's "macro-BASIC" all on the horizon, it's not, as they say, in the cards.

As always, I'm interested in your opinions on this or any other subject. Write to me at PC World, 501 Second St., San Francisco, CA 94107, or send an MCI message to Richard Landry/301-3685. ●

POWER TIP NO. 8

Use the Period to Adjust 1-2-3 Ranges

After you've selected a range in 1-2-3, you can press the period key to cycle the cursor among the range's four corners. This enables you to expand (or compress) the range without unanchoring it. Just position the cursor in an upper corner and use <Cursor Up> to expand the range upward, or put the cursor in a lower corner and use <Cursor Down> to expand the range downward.

Gary Schneider

San Diego, California

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How fast does it transmit.

Okay, this is the category we don't win; the hardware LANs are generally a little quicker. At least, they are under optimal conditions, which is how they rate themselves.

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The Importance of Being Earnest

Some software packages' sales go through the roof while others never get off the ground.

Is it marketing savvy, luck, or . . . user groups?



Stewart Alsop

ave you noticed how the personal computer industry seems to be turning into a giant popularity contest? If you live near one of the big cities fortunate enough to have an active user group-Houston, Boston, New York, Washington, Sacramento, San Francisco, and Atlanta come to mind-you may have noticed a parade of industry people cruising through the pages of your newsletter. If, like me, you happen to regularly read most of the newsletters published by those groups, vou've even been able to track the travel schedules of some of the leading lights in the industry.

Bill Gates, chairman of Microsoft, has been averaging about one user group a month for the past year, as he tries to drum up support for OS/2 and the Presentation Manager while pitching a few of the other products in his line. Borland International president Philippe Kahn, not to be outdone by his archrival, has been featured by at least two user groups a month.

It's almost as if this were a presidential election year in the PC industry and Kahn and Gates were the front-runners. Those two may be the most visible personalities on the user group circuit, but Gordon Eubanks of Symantec is also beginning to spend serious time on the road.

Even the reclusive Alan Ashton of WordPerfect Corporation has been sighted in Sacramento, promoting version 5.0 of his word processor.

There is a very good reason for all this flesh pressing and vote wooing: increasing software sales. And it's useful to understand what's going on when you try to figure out why some products sell well and others don't.

Many people seem to believe that the process of buying software is a rational and logical one. User X decides what his or her needs are, studies reviews and vendor literature, consults experts, sees demonstrations, and then buys just the right product. Nothing could be further from the truth. Instead, most software purchases are based on an emotional reaction to one of two experiences: User X goes to a user group meeting, decides that Philippe Kahn really is a smart guy, and buys a copy of Quattro because those Lotus people are insufferable. Or, more often, user X hears from a colleague who went to a user group meeting that Bill Gates not only knows what he's talking about but actually designs IBM's product line, so user (continues)

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X begins to think that maybe Windows isn't so bad, particularly if it runs on a hot 386 machine like the new Model 70.

Smart industry executives take this ripple effect seriously. If you review the successes and failures in the software business over the past ten years, you'll discover that the products that succeeded did so primarily on the basis of word of mouth. And the products that didn't usually failed because the companies that published them didn't pay attention to what customers were saying to each other.

Software firms—at least the ones that survived the Great Purge of '85—are much larger now and are usually more sophisticated about this phenomenon. Microsoft and Borland are run

by chief executives who understand the need for the big cheese to get on the road and pitch products directly to users. Other companies, like Ashton-Tate and Lotus, generally send product managers and sales reps to user groups. The smaller user groups are happy to hear from any warm body working for one of the big companies, but their members do wonder from time to time why some executives make the effort and some don't. Companies on the rise like WordPerfect and Symantec are increasingly making the effort, whether or not their chief executives like traveling and public speaking, simply because they don't know any more reliable way to stimulate their companies' growth.

So far this all sounds like a game the big software companies

feel they must play in order to win votes and sell product. That couldn't be more wrong. Indeed, the purloined headline on this column is far closer to the truth. Experienced user group goers (and I count myself among them, having spoken to the San Francisco, Sacramento, New York, Houston, San Diego, Boston, and Tokyo groups on various occasions) know firsthand that any attempt to use a group meeting as a sales opportunity can produce disastrous results. The New York PC Group, in particular, delights in carving up "marketing types" who don't understand the products they are demonstrating, and tossing them into the sewer system for the alligators to feed on.

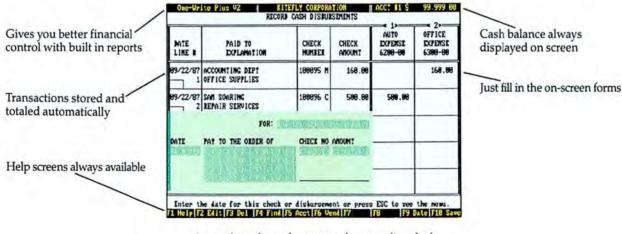
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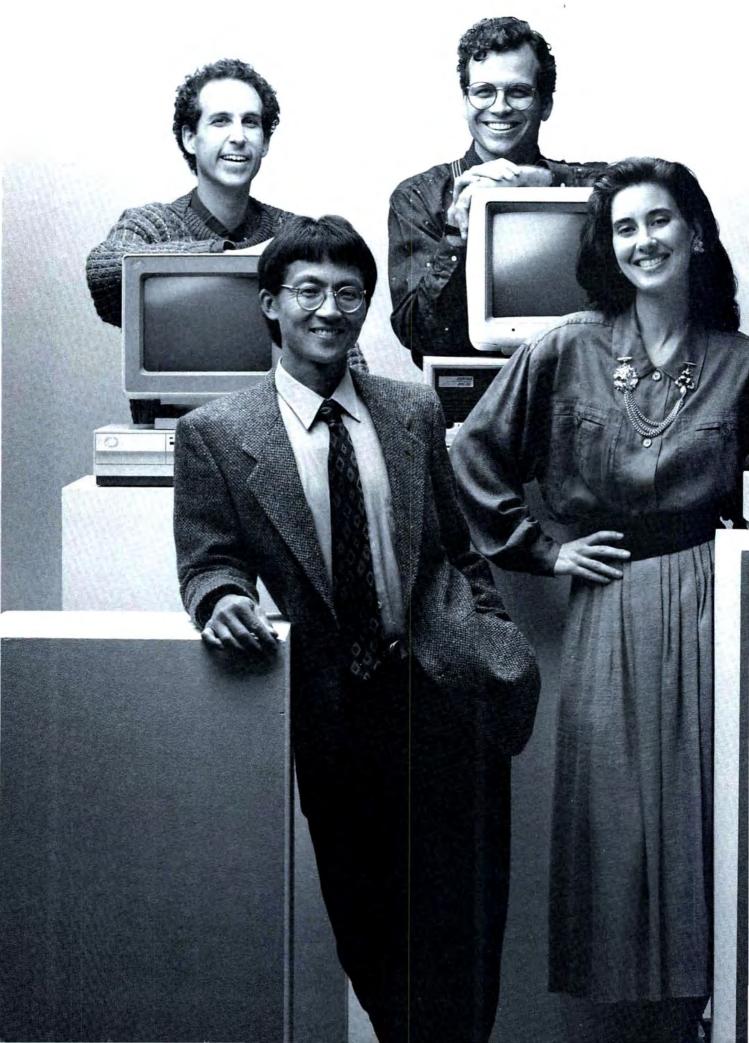
Think all this technology sounds expensive? It's not. CompuStar 20MHz 80286 systems start as low as \$1995†. There are also inexpensive 8086 and powerhouse 25MHz 80386 systems available. Plus, there is a wide variety of CompuStar display, tape and disk options including a one gigabyte erasable optical disk. You can choose a factory preconfigured CompuStar or custom design one yourself. Just unlock the front panel and literally "snap-in" a bus, CPU or disk module in a matter of seconds. It's system flexibility never before available. . .at any price.

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"Personal Computer AT, AT and PS/2 are trademarks of International Business Machines Corporation. †Photograph depicts optional equipment. Complete price list available upon request CompuStar 80286 base system (\$1995) includes built-in VGA/EGA display adapter, one diskette drive with controller, two serialione parallellone mouse port, keyboard and 220 watt power supply.



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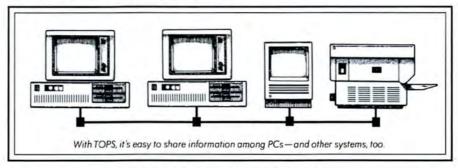
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More important, vendors (and industry observers) can learn a tremendous amount about what users are thinking, simply by keeping their eyes and ears open during a user group meeting. As just one example, I was one of the first PC analysts to understand that the success of laser printers had virtually nothing to do with their speed. Most vendors, trying to match Hewlett-Packard's and Apple's success. interpreted user demands for performance as a demand for speed. Instead, what most users were asking for was a less complicated system for managing fonts and for getting the printer to reproduce a particular look in a document. I didn't need any

expensive market research or user surveys to discover this; all I needed was to talk to people at user group meetings.

That's why I titled this column "The Importance of Being Earnest." User groups represent a tremendous resource to vendors serious about providing products that are really valuable and improve the lives of computer users. And user groups benefit tremendously from direct contact with leading industry executives. But the whole cycle works only if both sides are sincere about learning from each other.

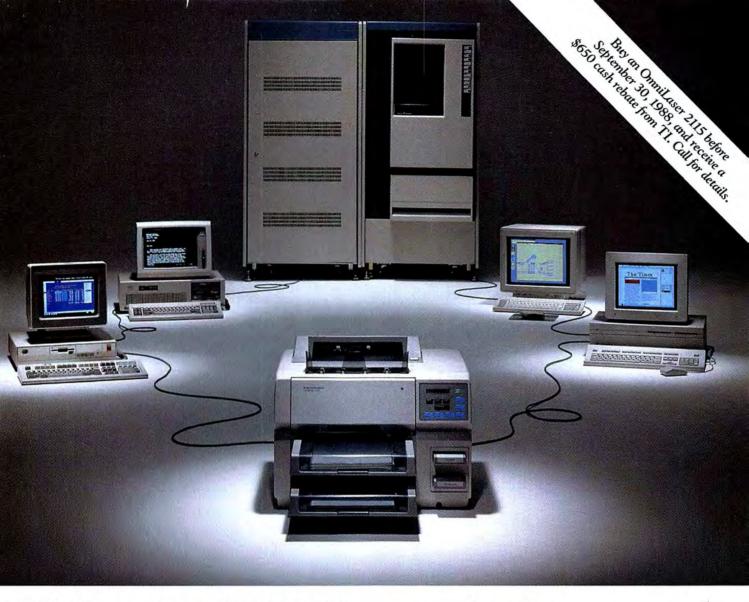
N.B.: Columnist Alsop claims, earnestly, to enjoy speaking to user groups and engaging in repartee with members of the group over some of his more outrageous predictions for the future of personal computing.
User group meeting coordinators are encouraged to write to him directly at 3 Lagoon Dr.
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Stewart Alsop is editor and publisher of P.C. Letter and a contributing editor for PC World.



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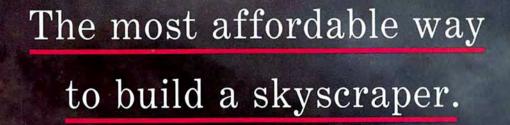
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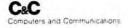
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IBM vs. Apple

The legendary rivalry between IBM and Apple is once again heating up, this time over whose graphic user interface will carry the day.

Does the Macintosh have what it takes to quell interest in IBM's OS/2 Presentation Manager?



William F. Zachmann

ast month, when I examined the matter of the OS/2 Presentation Manager and other graphic user interfaces, I implied that Apple wasn't likely to make major gains at IBM's expense. Apple's competitive challenge to IBM deserves a more complete examination, however.

The biggest factor working in Apple's favor is IBM itself: IBM seems to have seen the light about the graphic user interface. Lately, IBM has gone to great lengths to convince corporate buyers that the graphic user interface of the OS/2 Presentation Manager, combined with the PS/2's VGA graphics, offers tremendous benefits. Not only has IBM endorsed the idea that there are important advantages to a graphic user interface, it also happens to be true!

IBM's OS/2 Presentation Manager is still weeks (if not months) away and will require more system than most users of IBM and compatible systems have got (even including the vast majority of those who purchased PS/2s). Since Apple's graphic user interface has been around for half a decade, it isn't surprising that IBM has inadvertently renewed interest in the Macintosh.

Once it arrives, the OS/2 Presentation Manager will certainly diminish the Macintosh's functional advantages over IBM and compatible systems. But the long delay between the Presentation Manager's announcement and its delivery has created an excellent opportunity for Apple to make hay while the sun shines.

And in all fairness, even after the OS/2 Presentation Manager arrives, the Macintosh will still be easier to use. The OS/2 Presentation Manager, while a big step toward providing Macintosh-like capabilities for IBM and compatible systems, still lacks many of the features that make the Mac so attractive to firsttime users. The Presentation Manager will probably never be as intuitive to use as the Mac. Its links to the DOS command structure leave it well behind the Macintosh's handy desktop metaphor.

In addition, for a long time the Presentation Manager's software base will be more limited than the Mac's. Although some excellent programs that grew up under *Microsoft Windows* will also run under the Presentation Manager, they can't compare to the enormous range of Macintosh software already available.

Yet another advantage for the Macintosh is that it has become (continues)

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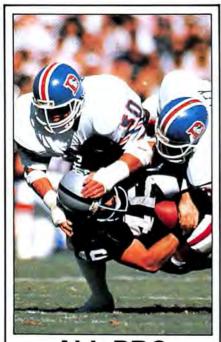
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relatively more open at the same time that IBM has sought to make its PS/2s relatively more closed. While Apple has gone to expansion slots and separate monitors, IBM has worked hard to eliminate competitors or inhibit them from offering systems that are compatible with the PS/2 and its proprietary Micro Channel Architecture.

Thus the gap between the desirable "open" world of the IBM PC, XT, AT, and compatibles and the undesirable "closed" world of the Macintosh has narrowed considerably, though it hasn't disappeared altogether. But as IBM moves toward even more proprietary systems, that gap is likely to close further. It is also possible, of course, that Macintosh-compatible systems may appear.

Finally, even as IBM moves toward duplicating many of the Macintosh's graphic user interface capabilities, Apple is keeping ahead in software. Apple's HyperCard is an excellent example. Although not yet a basis for big moneymaking products, HyperCard has already become a smashing success by creating an entirely new approach to software development for the Mac. Macintosh users have hundreds of stackware products from which to choose. HyperCard gives the Mac user a versatile tool kit for building applications. It also opens the door to an entirely new approach to electronic publishing. Nothing comparable is available for IBM systems or compatibles except for a few "hypertext" applications that bear only superficial similarity to HyperCard.

Given all the good news for the Macintosh, why do I still doubt that Apple will make major gains against IBM among business users? Why shouldn't Apple eat IBM's market share on the desktop?

In the first place, IBM occupies the high ground in business personal computer use at the present time. IBM (or compatible) systems are the de facto standard in the workplace. Despite Apple's strong presence in the home and its impressive showing in retail computer sales, corporate America is dominated by the Intel family of microprocessors in PC, XT, AT, and now PS/2 systems.

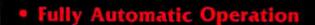
What's more, personal computer penetration of business environments is already very high. With roughly a third of white-collar workers already having access to personal computers (and another third to terminals of some sort), simply being the personal computer "for the rest of us" won't get Apple very far. To become a major player in the office, Apple must convert users from IBM and compatible systems to the Macintosh.

And that is a formidable task indeed. Human beings are, to an astonishing degree, creatures of habit. Once we get used to doing things in a manner that is at least adequate, we are reluctant to change. That is a big part of the reason that popular word processing, spreadsheet, and communications programs persist long after better products appear on the market.

While there is no question that a graphic user interface like the Mac's is much easier for many folks to learn and use than the DOS prompt, there is also no (continues)

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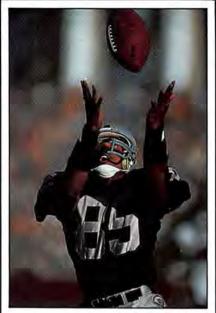
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question that millions of users have become sufficiently familiar with DOS to use it comfortably. All the talk about how difficult DOS is to learn and use hasn't prevented the vast majority of business users from using it.

And as I pointed out last month, a much neglected, misunderstood, and underestimated advantage of a graphic user interface actually has little or nothing to do with ease of learning or ease of use. Perhaps its greatest benefit is in making possible a wider range of applications in which graphics play an integral part, such as presentation graphics, desktop publishing, computer-aided design, even music composition or games.

One of the Macintosh's major advantages has been its ability to do things the earlier, inadequate CGA and EGA graphics of IBM and compatible systems couldn't. But now the combination of the Presentation Manager (or Microsoft Windows) and VGA graphics will provide platforms as powerful and versatile as Apple's for applications that need graphics. What's more, price competition from IBM's competitors virtually assures that VGA color systems will continue to sell for much less than Apple's high-end Macintosh II color systems.

With VGA color systems that run Windows typically costing no more than Apple's monochrome versions of the Macintosh, users who want color graphics can get more from IBM and compatible systems while spending less. As the software base for the OS/2 Presentation Manager and Windows grows, the cost advantages for IBM compatible systems will also grow.

Apple's real obstacle to greater penetration into personal computing in business isn't IBM at all. It is IBM's competitors, who, despite IBM's best efforts to move in a more proprietary direction, continue to assure a highly competitive environment with AT-bus systems that outperform IBM's Micro Channel Architecture systems. In fact, Apple is competing with dozens—even hundreds—of IBM-compatibles vendors.

The result is that neither Apple nor IBM is likely to gain major ground in business over the next few years. It's more likely that IBM's value-priced competitors will prove to be the real winners. By innovating within an established standard, they, rather than IBM, may make the greatest contribution to establishing OS/2 and the Presentation Manager as the logical successors to DOS—thereby limiting Apple's opportunities for major growth in market share. ●

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

POWER TIP NO. 9

Save Keystrokes With WordPerfect 5.0 Searches

You can quickly search backward or forward in a Word-Perfect 5.0 file by pressing <F2>, entering the search text string, and pressing <Cursor Up> or <Cursor Down> to indicate the direction of the search. Karen Acerson

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MS. Windows/386

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INDUSTRY 🕕 OUTLOOK

Edited by ERIC BENDER

Overseas Sales Strong

Symphony, Framework Quietly Recharge

Five-Function Packages Still Prosper



Symphony manager Donna Simonides: The package still offers a strategic fit with other Lotus products.

These were the champions of the two leading application software houses, and they were set to duel for the high ground in productivity applications.

Both hype and hopes were riding high four years ago as Ashton-Tate's Framework and Lotus's Symphony appeared on the market. The two packages (which both have spreadsheet, word processing, data base, graphics, and communications capabilities) were to dominate the emerging all-in-one market. Lotus put Symphony on TV, offered exchange kits for 1-2-3 users, and settled back to watch the new offering shoot past 1-2-3 on the charts.

But customers balked. Jamming all those functions into 640K or less, the packages—particularly Framework—lacked the power of stand-alone applications. They were hard to master—especially Symphony. And who really needed all the paraphernalia?

Symphony quickly pulled far ahead of Framework and other contenders, but talk died down as it became clear that neither of them would ever challenge 1-2-3.

Yet by any other measure, the packages were big hits. Launched as Ashton-Tate and Lotus began to spread their wings overseas, Symphony and Framework were international stars. For a year, Lotus kept Symphony development on the

front burner; the all-inone package supported the new expanded memory specification months before 1-2-3 did, and its powerful spreadsheet gave it entry into many corporations.

Perhaps because of that 1-2-3-like spreadsheet, Symphony easily remains one of the top ten PC applications, with over half a million customers. Framework has gathered a smaller band of 250,000 users, but many intensely loyal "Frameworkers" rave about its smooth melding of tasks via Windows-like frames. Both packages have quietly accrued power and polish, culminating in major upgrades this year. And although the industry shrugs them off because they haven't overshadowed single-application leaders as predicted, both are firmly established.

"Symphony sales are growing moderately this year—which was kind of a surprise to me," says analyst Rick Sherlund of Goldman Sachs. He estimates 1988 sales of \$45 million, up from \$41 million last year.

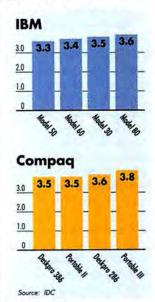
"Symphony 2.0 retail sales are going above our projections, and the growth internationally has been explosive," says Product Manager Donna Simonides. Among the new niceties, customers appreciate automatic justification in the word processor, bolstered menu-(continues)

Hyundai Launches Own Label

U.S. Test Drive Starts Smoothly

n a Seattle suburb, an auto dealership holds drawings for a free PC while the ComputerLand across the street raffles off a car. Why the crosspromotion? Both car and PC come from Hyundai. (continues on page 78)

Customer Satisfaction



Asked to rate their overall satisfaction with various PC models, customers generally gave Compaq a slight edge over IBM. International Data Corporation surveyed 200 sites, each with more than 50 PCs installed; satisfaction was rated on a scale from 1 to 4.

WORM Squirms for a Place in the Sun

Optical Drives Find Niches

M ore than a year after IBM "validated" write-once, read-many (WORM) optical disks, WORM is still merely inching along.

No one's developed a compelling PC application that makes unerasable optical memory a must. Rather than replacing magnetic disks, WORMs are being hooked to personal computers in just a few niches where they compete primarily with

paper, microfilm, and magnetic tape storage. Interface standards have not emerged, and erasable optical drives promise potent competition as early as next year.

Still, WORM volumes are creeping up. From 35,000 to 40,000 5¼-inch WORM drives will ship to users this year, forecasts analyst Jay Bretzmann of International Data Corporation. That would triple 1987 shipments. "You aren't going to see explosive growth but moderate growth," cautions Bretzmann. "Along about 1990 if we see 150,000 units, everybody ought to be ecstatic."

WORM drives offer some important advantages over hard disks, including higher capacity, lower cost per megabyte, permanent storage, and removable media. However, WORMs suffer from slower data transfer and access rates. The write-once feature can be a benefit or a drawback, depending on the application.

When IBM rolled out the 3363 in April 1987, the endorsement seemed likely to ignite much greater demand. But despite the giant supplier's clout and fairly aggressive pricing at \$2950 per device, only about 2000 IBM drives shipped last year, estimates Bretzmann. And he projects flat shipments this year.

"If IBM had come out with a 600MB machine with extremely high performance and priced right, the market would have taken off," gripes one competitor. At a time when other manufacturers offered two-sided 5¼-inch WORMs with capacities of up to 800MB, the (continues)

Symphony

(continued)

driven capabilities in the data base, and removal of copy protection.

"We compete against everything and nothing," she remarks. Some customers like not only the multiple functions but the price: five applications for \$695 list. As far as which modules are used most, "we see spreadsheet, word processor, data base, graphics, and communications, in that order." The user base is evenly split in terms of jobs and company size.

Incorporating 1-2-3 release 2.01's spreadsheet, "Symphony does fit strategically with other Lotus products," Simonides says. "We're still essentially at a crossroads" about future directions, such as a 1-2-3 release 3 spreadsheet or OS/2 ver-



Pat Pipkin: Framework targets decision support.

sions, but she adds that Symphony will support Lotus's standard application development language and Blueprint data hooks.

Similarly, Framework is becoming further entrenched in Ashton-Tate's corporate development and marketing plans. Author Robert Carr originally began with a technological philosophy ("I didn't want users to have to think about the software in between them and

their data," he says) rather than specific marketing targets. Ashton-Tate initially stumbled in positioning the product, but it now provides a quick description of *Framework*'s talents: organizing, analyzing, communicating.

Framework sales were slightly more than \$20 million last year, Ashton-Tate confirms, and should climb this year, especially overseas. Like Symphony, Framework outsells 1-2-3 in several countries.

Framework III represents "the first step toward the next generation of decision-support products," says Product Manager Pat Pipkin. It is also Ashton-Tate's first step into electronic mail, and President Luther Nussbaum notes that Frameworkers can employ "multiple metaphors" and pass them around to others in a work group. Ash-

ton-Tate also hints at future group-scheduling capabilities.

"The time is ripe for Framework," suggests Carr, who left Ashton-Tate last year. "Everyone has seen that doing multiple applications with OS/2 may take 5 or 6 megabytes of memory."

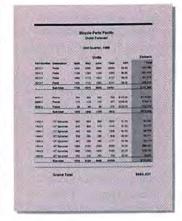
Still, others think OS/2 spells doom for all-in-one software. "The Presentation Manager will provide an integrating environment for a lot of the applications, and sales of integrated packages will ultimately suffer," says Goldman Sachs's Sherlund.

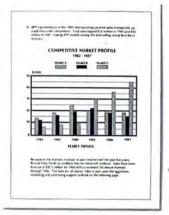
But customers show no signs of buying that argument yet, Simonides says. David Pritchard, head of international sales at Lotus, adds that "this represents a large business for us. It's not going away, and we'd be crazy not to go forward with it."

-E. B.

How to look good from start...



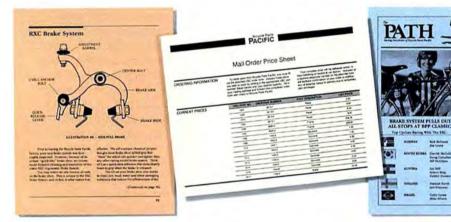




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Lanier Enlists for National Service

Office Equipment Player Integrates PC Systems

Seeking to cut its typesetting bills, Certified Automotive Warehouse, a Chicago auto parts distributor, decided to look into desktop publishing. Pat Bukovy, the company's sales and marketing administrator, was given the job of researching this new technology—from scratch.

"I had never touched a PC," Bukovy says. "At that point, I honestly thought a desktop publishing system was a single machine, like a copier."

As Bukovy made the rounds of computer dealers, no one would take the time to answer her most basic questions. "Our customers already know what they want," one dealer told her. Even after Bukovy figured which components she would need, answers were still scarce when it came to pulling the pieces together.

Bukovy first heard about Lanier Business Systems, an Atlantabased systems integrator, from a Lanier service rep fixing a typewriter in her office. Today, Certified Automotive is pumping out its sales pieces and price lists on a desktop publishing system that mixes Lanier's in-house hardware and software with third-party products such as Xerox's Ventura Publisher and Z-Soft's PC Paintbrush Plus.

"What we got from them was someone who was always willing to answer our questions," Bukovy says. "If the salespeople didn't know, they found out. Once the system was in, they continued to train and support us. If something goes wrong, we go straight to Lanier. We don't have to stop and think, 'OK, this scanner comes from Can-



Roger Reece: Lanier emphasizes system integration and networks.

on so I've got to get in touch with them."

Like many value-added resellers, Lanier believes that customers are looking for complete answers to business problems. Unlike competitors, Lanier's PC group has a 300-person national sales force and an extensive research and development department. Last year, Lanier (which has 47 offices in the United States and also offers a range of non-PC office products) reached sales of \$500 million.

Lanier historically marketed proprietary office automation products, but "once the PC became the dominant standard, we realized that it was silly to reinvent the wheel," says Product Marketing Manager Roger Reece. "Instead, we decided to assemble the pieces that were out there and then invest our research and development efforts in filling the holes between the various components." (continues)

WORM

(continued)

3363 held a paltry 200MB on single-sided media.

Further, while vendors were struggling to calm prospective users by adopting computer interface standards, IBM's WORM took off in a new direction tailored for the PS/2's Micro Channel Architecture.

IBM is far from alone in shrugging off standards, though. "The technology is too young to force standards," states Steve Popovich, president of Information Storage in Colorado Springs. ISI's 1.2-gigabyte drive, he says, might not have packed 600MB per side if

it had had to adhere to a standard. "And 600MB is not the end of it," he promises.

Interchangeability doesn't seem to be an issue in many applications, such as archiving records that aren't accessed often. But danger lurks if you buy media that can't be read by anything available a few years down the road.

Users also are perplexed by the range of WORM capacities, which extends from IBM's 200MB unit to ISI's 1.2-gigabyte drive, and by opposing theories on the viability of double-sided media. (To tap the full capacity of these cartridges, users must take them out and flip them over.)

IBM is selling its WORM drives largely as a replacement for tape drives, and many see WORM as an effective competitor here. Other suppliers are finding applications in storage of documents, engineering drawings, and medical images. Optotech of Colorado Springs is addressing a promising opportunity in desktop publishingstoring large quantities of type fonts and standard images. Micro Design International, a Winter Park, Florida, WORM drive maker, positions its equipment as central file backup systems for networks, but its drives have also found roles in everything from pilot training to surgical simulations to auto parts inventory systems. -Mark Henricks

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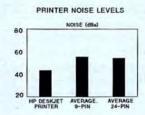


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Circle 39 on reader service card



Hyundai

(continued from page 73)

A giant Korean conglomerate with more than \$20 billion in revenues and 150,000 employees worldwide, Hyundai Business Group manufactures "anything you can think of," says Carmen Reitano, vice president for marketing and sales for the Information Systems Division of Hyundai Electronics of America in Santa Clara, California, In addition to ships, buildings, and semiconductors, the parent firm fabricates PC compatibles, memory chips, 3270 terminals for IBM, engineering workstations for Sun Microsystems, mobile phones, and telecommunications systems.

According to Reitano, Hyundai expanded into PCs simply because the company likes to source its own materials. "When they need an electronic component for a car dashboard, they'd rather build it themselves than buy it," he explains.

"The Koreans are beginning to do to Japan
what the Japanese have
been doing to Americans,"
adds Richard Rabins,
president of Alpha Software, whose integrated
Electric Desk package is
bundled with Hyundai
PCs. "Anything manufactured in Korea will be
more affordable."

"The Korean vendors have one crucial advantage over Japanese vendors—lower-cost labor," says market researcher Michael Goulde of CAP International. Hyundai production lines are staffed almost exclusively by young women just out of high school, who live

and eat in company dormitories.

As Rabins notes, the big four Korean conglomerates—Hyundai, Dae Woo, Samsung, and Lucky Gold Star—have all entered the U.S. PC arena. Hyundai formerly supplied low-end PCs resold by others, including Blue Chip. However, peddling PCs through discount merchandisers such as K mart just didn't work, says Reitano.

But at this late date, how can even a giant move into the cutthroat U.S. market? "Very carefully," Reitano says. Hyundai targeted first-time users and second-time corporate buyers for home computing, capitalizing on the visibility of its successful auto imports. "There's value in name recognition," asserts Reitano.

CAP's Goulde deadpans that he himself would prefer a BMW-built desktop but says Hyundai has garnered a respectable share of the PC market. In the first year, beginning in July 1987, 40,000 machines were sold.

"PCs are such a commodity market that you're not competing with product any more but with terms to dealers, product availability and reliability, and availability of parts," Goulde says. Hyundai currently has 300 dealers. Its dealer terms are notably supportive: The company promises to prevent direct sales clashes, gives exclusive territories, and accepts c.o.d. orders rather than requiring cash up front.

Hyundai wants to shift, Reitano says, from the "low-margin box business" into the high-mar-



Carmen Reitano: Hyundai launch sticks to plan.

gin niche of network and multiuser systems. Goulde cautions, though, that "when you start getting into networks, you're talking about entering corporations and getting on their short lists of approved vendors—and Fortune accounts are a lot fussier on IBM compatibility."

But Novell has certified the Hyundai line's compatibility, and Reitano sees clear roads ahead. "We didn't enter the market casually. We did it with a business plan, and we'll continue to execute according to plan."

—Marina Hirsch

Lanier

(continued)

One result of that investment is Lanier's VP File Manager, which simplifies copying and transmitting Ventura Publisher multifile publications over a network or modem hookup. Another benefit is that Lanier's laser printer can automatically switch from printing PostScript documents to printing non-PostScript documents.

Besides desktop publishing, Lanier offers systems geared toward small to medium size medical and legal offices. All exploit the company's highly regarded networking system, which builds on a Xenix network server. "Not all our desktop publishing customers will want to start with a networking setup," Reece notes. "But in 1988 it's clear that local area networks are here to stay, so we've built the potential into our system."

-Daniel Brogan

Mouse Market Roars

Microsoft Makes a Million

Q uietly, but in impressive numbers, mice are gaining pawholds on our desks.

Dataquest estimates that 8 million of the handheld input devices will be sitting next to microcomputers of all kinds by the end of this year. Microsoft, which claims a big lead over Logitech as the most successful vendor of PC mice, recently celebrated the shipment of its millionth unit. It commands about half the market in aftermarket mice, suggesting that about 2 million mice currently sit next to PCs.

Mice come in three forms: mechanical, optical, and optomechanical (see *The Hardware Shelf*'s mouse reviews in (continues)

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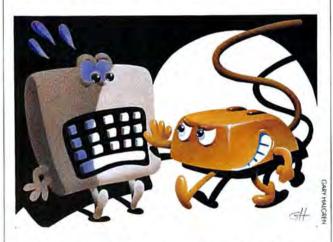
Mice

(continued)

this issue). Mechanical mice, the most common, contain a metal or rubber ball that rotates as it's dragged along a surface; the rolling ball, in turn, repeatedly triggers internal micro switches. Optical mice emit a beam of light, which is reflected

Not surprisingly, the driving force behind mice is the rise of graphics.

"As EGA became affordable, more and more people wrote software for it," says Rich Abel, Microsoft's vice president of hardware. "It's a situation that feeds on itself." These trends will be accelerated by the push into graphic user interfaces,



back into the mouse by a pad containing an embedded metal grid. Optomechanical mice use a ball to turn internal wheels whose movement is detected optically.

One recent alternative is Lightgate's Felix, a covered optical tablet with a pointer that you manipulate over an inch-square area. Felix differs from mice, says Lightgate chairman Vic Kley, because it is an absolute pointing device-when you position Felix's pointer at the upper right corner of the pointing area, the cursor will be in the upper right corner of the screen.

By all accounts, gardenvariety mice are breeding rapidly. Dataquest sees 45 percent compound annual growth for the next five years. particularly OS/2's Presentation Manager. You'll be able to run Presentation Manager applications without a mouse, but that would be like going to Disneyland and skipping the rides.

Microsoft, which resells mice made by the Swiss firm ALPS, took four years to sell the first 500,000 mice but only one year to sell the next 500,000. "We don't see the steepness of the curve changing," Abel comments.

IBM has shipped more than 2 million PS/2s, and every one has a built-in mouse port. The obvious next step, Abel predicts, is that "the mouse will become a standard part of a computing system."

-Daniel J. Rosenbaum

Attack of the Vapors

Read About It —Don't Try to Buy

This year, major software and hardware vendors finally showed self-restraint and careful planning, refusing to sell any product before its time of availability.

Just joking. Actually, the onslaught of vaporware products has redoubled. The major suppliers keep touting products that you can't buy yet.

Take IBM, which began promoting the PS/2 Model 70 in June but planned to ship it in September. Or Ashton-Tate, whose dBASE IV was trotted out at least half a year early. Or Lotus, with too many embryonic products to mention here. "We're seeing a lot of defensive positioning," remarks Maureen Fleming, editor of Software Industry Bulletin in Stamford, Connecticut.

In fairness, a little foottapping time won't shake the citadels of PC civilization, and not all vaporware offends equally. Most vendors take great pains to see that their products ship when they say they will and are under constant pressure from users and the press to give particulars on upcoming releases. Software developers and customers want to hear about major platforms like OS/2 well in advance. Some also make a case for early notice on new categories of applications. Additionally, vendors often feel their hands have been forced after product information leaks out from early customer demos.

But other suppliers simply fire off premature announcements and advertisements as preemptive strikes. "Some companies try to use that as a tactical strategy against competition," comments Gordon Eubanks, president of Symantec. "In the long run, it's a very poor strategy." In the short run, though, it seems to have paid off for Borland, Oracle, and others.

Meanwhile, the everincreasing complexity of products adds steam to vaporware. When software routinely takes more than six months to complete, no one can confidently predict schedules. "It doesn't seem like anything's tangible anymore," Fleming laments. "Everything's so complex, you know that it's going to take longer than expected, and turn out differently." -E. B.

Daniel Brogan writes a column on personal computing for the Chicago Tribune; Mark Henricks is a Fort Worth, Texas, business writer; Marina Hirsch is a freelance writer in Berkeley, California; and Daniel J. Rosenbaum writes on computers and communications.

























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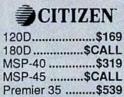




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Tandy Treads on IBM's Turf

No one expected the first Micro Channel clone to come from Tandy. But the real surprise is that Tandy's 5000 MC offers extras that IBM hasn't yet delivered.

Eric Knorr

Tandy Corporation isn't exactly known for dazzling displays of new technology. Despite the company's attempts to change its low-end image, most of us still associate it with home computing and solid but unexciting knockoffs of existing systems, such as the 80386-based Tandy 4000 or the (almost) ATcompatible 3000 HL.

But Tandy—bound and determined to prove how serious it is about the corporate market—expected at press time to ship the industry's first Micro Channel clone, the Tandy 5000 MC, by August.

And this small-footprint machine is no trailingedge work-alike. It offers much more than compatibility with the Micro

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

Channel Architecture that's embedded in IBM's most powerful PS/2 machines.

The 20-MHz 5000 MC—like Compaq's 386/20 and 386/25 and IBM's PS/2 Model 70-A21 (see PC World's August 1988 preview of the IBM system)—offers a memory-caching architecture based on Intel's 82385 cache controller. Although the benchmarks aren't in yet, this design should help put the 5000 MC among the top 20-MHz 80386 performers.

What sets the 5000 MC apart, however, are its optional SCSI devices. The 5000 MC offers 15-millisecond, 170MB and 344MB drives, along with a 150MB internal tape backup. According to a Tandy engineer, preliminary benchmarks using the industry-standard Core International test revealed that the 344MB SCSI drive offers a top

transfer rate of 2.9MB per second—nearly three times the maximum speed of the ESDI drives in most high-end 80386s. Those who don't need this kind of performance, or who can't wait for the superfast drives to become available, can install less expensive ST-506 and ESDI drives. These devices also deliver very respectable performance; Tandy claims to have the industry's highest performance ST-506 controller.

Tandy computers are generally much cheaper than their IBM counterparts, but in this case, R&D expenses kept the price fairly high. A version with a 40MB hard disk is priced at \$6499. With a 140MB ESDI hard disk, the 5000 MC costs \$7398-about \$600 cheaper than an IBM Model 70-121 with a 120MB ESDI drive. Each machine's price includes 2MB of RAM, one 1.44MB 31/2-inch floppy drive, an integrated VGA video controller, one serial and one parallel port, a mouse port, and a 101-key keyboard. The 5000 MC measures 6½ by 17 by 15½ inches, slightly bulkier than the Model 70.

Although PC World was unable to put Tandy's machine through the wringer, the company asserts that its Micro Channel design is fully compatible with IBM's. The 5000 MC motherboard features surface-mount technology, Intel's Micro Channel chipset, and, of course, slots incompatible with AT boards. Other true Blue features include a high-throughput burst mode, low radio-frequency-interference emissions, and support for bus masters (those long-awaited, microprocessor-laden devices that work independently of the main processor). By the company's account, it's all there,

right down to superior error handling and levelsensitive interrupts. A note of caution: Full MCA compatibility will be extremely difficult for anyone but systems vendors themselves to fully verify.

Storage Device Independence

Though the two PCs share many features, the 5000 MC offers a substantial edge over the Model 70 in expansion capability. Both machines provide two "standard" 32-bit expansion slots and include a special connector for IBM's high-resolution 8514/A graphics adapter (Tandy does not supply an 8514/A-style adapter itself). But the 5000 MC, once its 1-megabitequipped memory modules are available, will hold 16MB of 32-bit. motherboard RAM, while the high-end Model 70 motherboard supports only 8MB. (Memory access through the motherboard is faster than through the expansion bus.)

Beyond this, the 5000 MC provides three 16-bit slots to the Model 70's one—though, because the 5000 MC lacks the Model 70's integrated hard disk controller, that advantage is effectively reduced to a single slot. Better yet, the 5000 MC holds up to four half-height devices—two 3½-inch and two 5¼-inch drives—all of which are



The Tandy 5000 MC stands as the first Micro Channel clone to reach dealer shelves. It one-ups IBM's line by offering several SCSI options.

externally accessible. The Model 70 includes three 3½-inch bays, but you can access only two of them from the outside.

Because you can daisychain multiple drives from a single SCSI interface, the 5000 MC's respectable device capacity ties in neatly with its SCSI support. In fact, multiple SCSI drive schemes appear to be an integral part of Tandy's OS/2 positioning.

OS/2 and multiple drives are a natural mix. Multitasking—or serving files on a network, for that matter—greatly increases the number of random seeks. In such cases, two hard disks can vastly improve throughput. Tandy developers say that when they ran their own OS/2 multitasking benchmarks with two SCSI drives instead of one, performance increased by 86 percent.

Ready for the Future

A close look at the motherboard reveals that the 5000 MC may have other tricks up its sleeve. The guts of the machine -the 80386, a socket for an 80387 math coprocessor, the 82385 cache controller, and a 32K cache of 35-nanosecond RAM-are seated on a vertical CPU board that plugs into the motherboard. Although a Tandy engineer avers that this arrangement was intended mainly to keep the footprint small, the design seems ideal for, say, an upgrade to a 25-MHz 80386.

Future options notwithstanding, Tandy's new industrial strength 101-key keyboard and complete array of monitor options mean business. The keyboard offers IBM-like solidity and responsiveness, in contrast to the older, plastic Tandy feel. And from a company that was one of the last major PC vendors to offer EGA graphics, the choice of three state-of-the-art, 14-inch VGA monitors seems like a giant leap forward.

The firm has targeted its latest machine primarily at those key corporate customers who want a second source for Micro Channel desktops. After the 5000 MC, Tandy shouldn't have to worry about its image among those customers any more.

After months of discussions with IBM on licensing PS/2 technology, Tandy expects no legal challenge, says Chairman John Roach.

More important, the 5000 MC doesn't just tag along after IBM's line. It actually delivers added value, especially in the mass storage department. The Micro Channel's unique talents have yet to be fully demonstrated, but this time, Tandy stands to share the benefit—and the risk—of being on the cutting edge. ●

Eric Knorr is a senior editor for PC World.

Tandy 5000 MC

Tandy Corp. 1700 One Tandy Center Fort Worth, TX 76102 817/390-3300

For more information, see Products Featured in This Issue.

Windows on OS/2

What Microsoft Windows does for DOS, the Presentation Manager does for OS/2. It masks a complicated operating system with a graphic front end designed for managing multiple applications.

Robert Luhn

We have seen the future, say Microsoft and IBM, and it is called the OS/2 Presentation Manager. The pundits and programmers are naturally joining this chorus, proclaiming that everything before—Microsoft Windows and the character-based OS/2 1.0 included—has merely been a warm-up act. The Presentation Manager is the hot ticket.

How hot won't be clear until the Presentation Manager and applications that take advantage of this mouse-driven Windows-like graphic interface for OS/2 debut late this year. But the prerelease version of the Presentation Manager indicates that the hubbub may be warranted.

A few misconceptions, however, should be quashed at the outset. Contrary to Microsoft's claims, the Presentation Manager and Windows interfaces are not identical.

The Presentation Manager displays a much different default opening screen, menu options vary considerably, and unlike in *Windows*, on-line contextual help is always available via a menu or the <F1> key.

But Windows users will by and large feel comfortable. You select functions from pulldown menus and dialog boxes; run programs by highlighting and double-clicking their names; run multiple copies of the same application; and open, size, and drag windows with a mouse. In true Windows fashion, you can also run the environment totally from the keyboard.

Second, don't expect all OS/2 1.0 applications (which are characterbased) to run within the Presentation Manager's windows. Although most will, some OS/2 1.0 programs will take over the entire screen, just like 1-2-3 does when you attempt to run it in Windows. Running DOS applications in the com-

patibility box means exiting the Presentation Manager desktop altogether; once you're done, you can return to the desktop by pressing two keys.

Finally, remember that the Presentation Manager is a superset of OS/2 1.0. Strip away the window dressing, and you'll find OS/2 1.0 growling underneath. All the same powers-from the ability to run multiple applications to OS/2's virtual memory scheme-are on hand. The advantage of the Presentation Manager, of course, is that you don't have to descend to the [C:\] prompt and issue arcane commands to tame the beast.

Dualing Windows

The Presentation Manager mostly follows the Windows way, with some key differences. On the plus side, the environment does more automatically and offers an abundance of controls. Add a printer, for example, and a dialog

box pops up and asks which driver you want to install. Want to save the current desktop-applications, window size, and placement? Select a single menu command, and the next time you reboot or turn on the system, the session is laid out in apple-pie order. (Doing the rough equivalent in Windows means writing special batch files and system-level statementsdefinitely not a task for beginners.)

On the downside. Microsoft has failed to improve the opening screen. When you first load the Presentation Manager. you're not presented with a Macintosh-like icon-oriented desktop. You don't get even a single screen listing files and subdirectories (like Windows' MS-DOS Executive) from which to launch applications, log on to subdirectories, and access system commands. Instead, the

Presentation Manager curiously displays two opening windows.

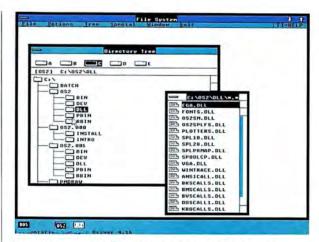
The Start Programs window lists only Presentation Manager utilities and programs that you have added specifically to this roster. You can run listed programs by double-clicking the names and even corral related applications (such as word processors, spelling checkers, and so on) into "groups" and flick between them with a menu command. Some users, however, will probably select the window's Filing System utility, which presents an Xtree-like schematic of all subdirectories on the drive. Click on a subdirectory's icon, and the associated files are cataloged in a window; double-click a program name, and the Presentation Manager cracks open a new window and executes the program on the spot.

As you might expect, a full range of OS/2 commands is available from various menus-you can copy, delete, move, and print files and create (but not remove) subdirectories. You can even link a data file with a program file, so that clicking the former loads the latter. The Start Programs window also includes a Control Panel utility much like Windows', where you add and delete new printers, fonts, drivers, and spooler programs and assign communications ports.

The Task Manager window, which handily lists all active applications, seems to be an afterthought. If you want to switch from one program to another from this window, you must highlight the desired program on the list, open a menu, and select the 'Switch to' command. Most users will bypass this clumsy system and bring the desired application to the top of the stack by either pressing <Alt>-<Tab> or simply clicking the application's window.

One major disappointment: The Task Manager window is not a place to specify an application's tasking status. In Windows/386, for example, you merely pop open an on-screen form and indicate whether a program is a foreground or background task, whether it has exclusive use of the processor, and so on. Such controls are totally lacking in the Presentation Manager. (As in OS/2 1.0, priorities are set by the applications themselves; however, you can alter processor time allotted to each application by modifying CONFIG.SYS.)

The Price of Presentations The Presentation Manager has its merits, but its



For the icon-minded, Presentation Manager displays an Xtree-style directory listing. Click a directory's icon, and its files are displayed in a separate window; double-click a program and it runs automatically.

slightly schizoid approach is not for new users. A better approach might have been to emulate Hewlett-Packard's Maclike NewWave environment. NewWave expands the graphic interface by using icons for many operations and makes linking different applications a breeze. Fortunately, HP reportedly has a retail version of NewWave in the works for the Presentation Manager.

Consider system requirements, too. An 80286 computer, 2MB of RAM, and a CGA (!) video setup are minimums, but multitasking two or three applications requires an 80386 machine, 3MB to 4MB of RAM, an EGA video setup, and a fast hard disk.

Keep in mind that you won't be able to stroll into a ComputerLand and pick up a copy of the Presentation Manager when it's released. Registered OS/2 1.0 owners will be upgraded to the Presentation Manager at no charge, but otherwise you must obtain the product directly from your system vendor. According to an IBM spokesperson, the Presentation Manager will be priced at \$325. ●

Robert Luhn is a senior editor for PC World.

OS/2 Standard Edition 1.1, Presentation Manager

Old Orchard Rd. Armonk, NY 10504 800/447-4700 (dealer information)

For more information, see Products Featured in This Issue.

The Dell System 220. Once again the critics stole the words right out of our mouth

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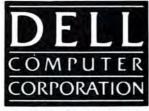
PRINTER SYSTEM 600; \$499.95. 9-wire dot matrix. Draft quality at 240 cps. Near-letter quality at 60 cps. Standard parallel interface. PRINTER SYSTEM 300; \$199.95. 9-wire dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Paper parking. Standard parallel interface.

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PRODUCT OUTLOOK

92 PRODUCT OUTLOOK

Passport

Take your data on the road, port it to your home PC, or place it under lock and key with a portable hard disk.

GrandView

Symantee's all-in-one outliner, word processor, and data base puts you in charge of your PC rather than in thrall to it.

FlexNode 286 and 386

If your desktop is awash in computers and peripherals, these shoe box-size terminals will gain you the power of a network workstation at a fraction of the real estate.

BusinessMate 386

Want maximum computer power for your dollar? Team a BusinessMate 386 with a web of low-cost PCs.

Q-DOS Network Manager

Live-in help for network file management and other housekeeping chores.

Human Resources Partner

Reduce paperwork with a tool that supplies standard personnel reports or lets you build your own.

MyBase

Print your data base in book, Rolodex, or binder size for traveling light.

98 BRIEFLY NOTED

TurboScan/Flatbed Scanner

Scan almost any item you want—from bulky books to odd-size art—then fine-tune the image.

386AE File Server, ATterminal Workstation

Novell's popular network gets a new file server and a new workstation, and updates the parts you need to put it all together.

WinText

Desktop publishers who need WYSIWYG capabilities or have to juggle four documents at once should check out this *Windows*-based entry.

STA-BLK

Self-inking cartridges that stay black for up to 10,000 pages—and cost less per page than conventional cartridges.

FileBank

Directories and subdirectories don't have to make your head spin—*FileBank* has an easier way to navigate.

Deja View

Cheaper than a backup device, *Deja View* salvages your data in the event of a system crash or power outage.

102 UPDATE

Database Accounting Library, Series Six Plus

SBT beefs up its accounting product with sales and purchase histories and more flexible reports.

Harvard Graphics Accessories

Harvard Graphics fans: Make maps, add 3-D symbols to reports, choose from 125 business charts, and put together on-screen presentations.

Paradox OS/2

Large data bases get a performance boost as *Paradox* trades up to OS/2.

Genifer 2.0

An improved interface and multiple-file linkage flesh out *dBASE*'s application generator.

Open Access II Plus 2.10

Already a powerful integrated package, *Open Access* has added more SQL programming and statistics functions.

Relay Gold 3.0

Speed file transfers by as much as four times and conduct 15 sessions at once.

Quad386XT/20

Bring new life to your PC XT or compatible with this 20-MHz 386 upgrade board.

Word IV and Plus IV

Samna's word processors display documents the way they'll look when printed, complete with art elements and multiple fonts.

Plus Passport

Disk on the Run

As PCs proliferate and increasingly massive applications generate everlarger mounds of data, you may need to take more than a laptop's worth of spreadsheets or data base files on the road—be it to a job site across the country or to your home PC.

Whether you're a traveling CPA, a lawyer, or just someone who hates to copy numerous files back and forth between portable and desktop, Plus Development has a portable hard disk that provides the high-volume data mobility you need. The Plus Passport holds a 31/2-inch or half-height 51/4-inch 20MB or 40MB hard disk in a rugged, removable plastic case that fits in the appropriate-size bay on any classic PC or IBM PS/2.

Passport is meant to be a primary storage medium—not just a back-up device. Since it ships with its own AT- or PS/2-compatible controller board, cable, and chassis, it offers complete compatibility and data interchange whether it's plugged into a PC or a PS/2 with a Micro Channel.

Another obvious Passport plus is data security. The drive is ideal for government and defense industry users who need to



If you need to take more than a laptop's worth of spreadsheets or data base files on the road, the Plus Passport ruggedized hard disk gives you mobility for up to 40MB worth of data.

put their data under lock and key. But then, a recent survey indicates that 41 percent of corporate PC users also want to secure their data storage units on a daily basis. Removing and transporting data is literally a snap: The drive snaps in and out in the same way as a videotape on a front-loading VCR. An external chassis also is available.

Both the 20MB and 40MB Plus models are fast. The 28ms drives employ a 1:1 interleave for enhanced data throughput. The controller uses 16K of on-board disk caching RAM for faster reads and writes, and shock mounts protect the hard disk from the bumps and bruises of travel.

Operating systems can be made to boot directly from a Passport drive, regardless of what other drives are present. Other features include a lock button on the back of the drive to prevent unauthorized access, and the ability to remove the hard disk in the event of a power failure. The system automatically locks the heads in a nondata zone when power is turned off.

A 20MB Passport starter system retails for \$1250, while a 40MB version is \$1550. Plus Development Corp., 1778 McCarthy Blvd., Milpitas, CA; 408/434-6900.

GrandView

View From the Screen

At last, you're the boss! The company that brought you the *ThinkTank* outliner has just promoted you to manager of your own information. With Symantec's *GrandView*, a personal information manager, you won't have to kowtow to uncompromising data base managers. Instead, you're awarded flexible, integrated orga-

nizational tools that help whip your work into shape.

Using pulldown menus, you can look at your work life from three perspectives: outline, document, and category views. Based on Symantec's ThinkTank, the outliner forms the backbone of GrandView. It's the program's principal data entry avenue, letting you add free-form text that becomes the headlines of your documents.

The document view is a word processor equipped with the most popular features-and you can easily import data from other word processors such as WordPerfect. You can write documents up to 64K in length and call them with a single keystroke from within the outliner. Additionally, you can work in nine windows at once, choose your own font sizes, customize headers and footers, and break pages at will.

The information that you enter in the outliner is automatically stored in a data base whose structure you can rearrange in the category view. There you can link, in any number of creative ways, the names, dates, or text strings vou've randomly entered in the outline view. You can, for example, create an alphabetical list of names, addresses, and phone numbers, then go into category view and display only the names of your business associates



GrandView lets you manage your personal data on the fly, creating a free-form data base from a friendly outliner interface.

from that list. You can code a list as you create it, or, if you're developing something like a marketing plan, you can automatically pull a category view based on a particular word or symbol (such as \$).

With its mix-and-match capabilities, GrandView is adept at everything from simple agendas to complicated marketing plans. Whatever the nature of your input, you can track projects by task, person responsible, due date, priority, department, or any other category that you create.

GrandView requires DOS 2.00 or a later version and 256K of memory, and it retails for \$295. Living Videotext Division, Symantec Corp., 117 Easy St., Mountain View, CA 94043; 415/964-6300.

FlexNode 286 and 386

Big Impression

When E. F. Schumacher wrote Small Is Beautiful he didn't have miniature PCs in mind, but Advanced Logic Research (ALR) has taken a page from his book for its Flex-Node 286 and 386.

Designed to liberate desktop space, the Flex-Node 286 and 386 are "submicro" computers perfect for use as nodes in desktop publishing or CAD/CAM network environments. Not surprisingly, the FlexNode models, which complement ALR's own line of high-end FileCache file servers, are best suited for scientific and engineering communities where digitizer pads, plotters, and scanners quickly swamp the desktop. Realtors and other professionals who have to share desk space as well as file space might also value these midget PCs.

The FlexNode systems are a mere 4½ inches wide by 15 inches deep by 7 inches high—not much bigger than a shoe box. Small as they are, they sacrifice nothing in functionality compared to full-size workstations. There's no motherboard here and no need for one. The system consists of a passive backplane AT bus with 20-MHz processor cards.

A hard/floppy disk drive controller with a serial port takes another slot. Both the FlexNode 286 and FlexNode 386 come with a single 31/2-inch, 1.44MB drive; a 101-key keyboard; and sockets for an optional 80287 or 80387 math coprocessor, respectively. Two more 8/16-bit slots are available for a video adapter, a network card, or extra memory. The FlexNode 286 ships with 512K of memory (expandable to 5MB on the processor card), while the 386 has 1MB of memory, expandable to 13MB with ALR's optional 8MB RAMpak daughterboard.

Both the FlexNode 286 and FlexNode 386 come in three versions. The basic models, 210 and 310, have no hard disk drives. They retail for \$1990 and \$3499, respectively. The step-up models, 230 and 330, include a 30MB hard disk drive with 65ms access time and list for \$2549 and \$3990, respectively. The top-of-the-line mod-



Each the size of a shoe box turned on its end, the FlexNode 286 and 386 computers are perfect for use as nodes in desktop publishing or CAD/CAM network environments.

els, 250 and 350, offer a 50MB hard disk drive with 28ms access time for \$2990 and \$4449, respectively. Advanced Logic Research, 10 Chrysler, Irvine, CA 92718; 714/581-6770.

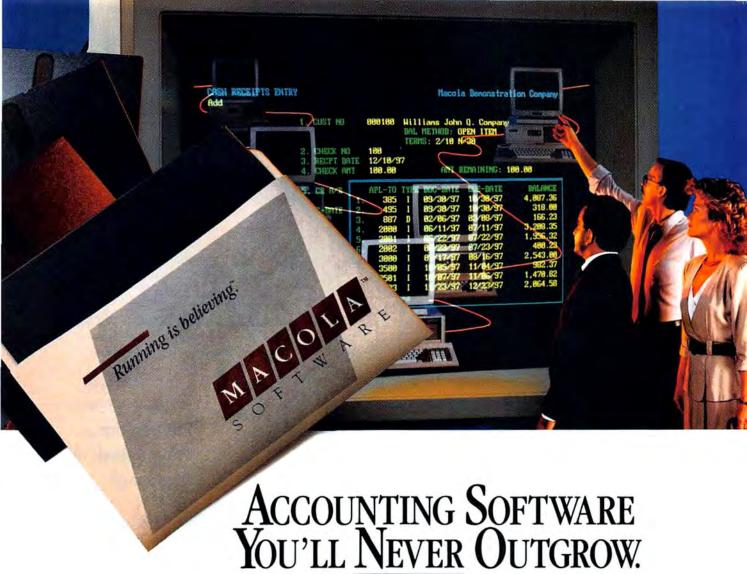
BusinessMate 386

16 for One

f you've got a mountain to move—be it rocks or paperwork—you won't get the job done without applying a little leverage. If your work group is on a limited budget, NEC Information Systems offers an 80386-based fulcrum that will make a molehill out of your workload.

The BusinessMate 386 exploits the 16-MHz processing speed of the Intel 80386 chip to create a multiuser system capable of supporting up to 16 nodes. Since few PC users can keep an 80386 processor busy all day, it's most efficient to attach lowpriced PCs to your BusinessMate 386. The more closely knit your work group and the less diskhungry its applications. the better the system's performance. With an offthe-shelf multitasking operating system like PC-MOS or Xenix, each user can run multiple applications at his or her desk, including the most popular DOS-based productivity applications.

The system's base configuration gives you eight expansion slots—one for the 32-bit memory card, as well as five 8/16-bit and



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Circle 252 on reader service card

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two 8-bit slots. One 8/16-bit slot holds a four-port multiuser card, and another holds the hard disk controller. You can add three more multiuser cards to the remaining 8/16-bit slots to bring the system up to a total of 16 ports.

The base unit comes with two serial ports, one parallel port, a clock/calendar, and a floppy disk controller built into the motherboard. The dedicated memory card. which comes with 2MB of RAM, is expandable to 10MB. Beyond that, the BusinessMate 386 has space for five half-height 51/4-inch mass-storage devices. You can pick from among a 1.2MB floppy drive, 40MB and 66MB hard disks, and 80MB and 130MB ESDI hard disks



The BusinessMate 386 leverages the 16-MHz processing speed of the Intel 386 chip to create a multiuser system capable of supporting up to 16 nodes.

for a total of up to 260MB of disk storage.

You can also get a 40MB streaming-tape backup unit that fits in one of the storage-device bays. The base configuration includes a 1.2MB floppy disk drive and a 40MB hard disk for \$5945. NEC Information Systems, 1414 Massachusetts Ave., Boxborough, MA 01719; 617/264-8000.

Q-DOS Network Manager

Straightening Up

A local area network is the ideal way to let your work group share information, but the clutter on everyone's hard drives seems to increase exponentially as new users come on line. Using DOS to manage network housekeeping chores is the equivalent of mopping the floor with a toothbrush. But you can save your network manager hours of routine "straightening up" with a software assistant that handles ongoing disk maintenance with a minimum of effort and frustration.

Gazelle Systems touts its Q-DOS Network Manager as the fastest network file and directory housekeeper on the market. It manages up to 800 files in each of 550 directories, relieving network managers of all those nasty little file deletion and copying tasks so that they can concentrate on user support.

Q-DOS Network Manager, which runs on



Q-DOS Network Manager is a fast network file and directory housekeeper that can manage up to 800 files in each of 550 directories.

3Com's 3+, IBM's PC LAN, and Novell's Netware, supports and simplifies all the common DOS file-management commands including copying, moving, renaming, viewing, deleting, and printing files. You can immediately see the tree structure of any drive on the network with a pictorial directory map that shows how subdirectories relate to one another. This speeds the moving of files as well as the creation and deletion of subdirectories and eliminates the need to log between them.

Q-DOS Network Manager requires DOS 2.00 or a later version and 256K of memory in the file server. It retails for \$249.95 for a four-user license. Additional licenses and manuals can be purchased directly from Gazelle for \$35 per node. Gazelle Systems, 42 N. University Ave. #10, Provo, UT 84601; 801/377-1288.

Human Resources Partner

Putting the People Back in Personnel

Most people join a personnel department because they like working with other people, but they usually end up spending most of their time buried in personnel reports instead. ProCode has found a way to dig them out from under the paperwork.

The Human Resources Partner allows you to develop standard reports on salary distribution, turnover analysis, performance reviews, service awards, salary totals, and even birthdays, as well as phone directories and mailing labels. But it goes a step further. You can build your own reports from scratch simply by choosing 'Custom Reports' from the menu and typing in your data. The program can hold more

SPEND 200 SECONDS WITH AN IZE USER.

When a new kind of software is released, some explaining needs to be done. In the case of IZE, a quick demonstration is the best explanation.

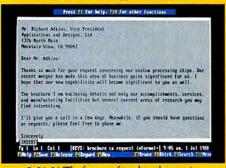
Picture an executive opening her IZE and requesting an outline of letters re-



0:00:05 With IZE open, a request is made.



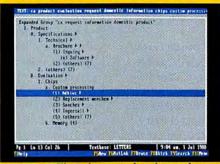
0:00:24 An outline appears to scrutinize.



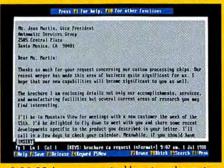
0:01:01 The facts are found ready to revise.



0:00:17 In seconds, IZE organizes the facts.



0:00:35 The outline expands to sharpen focus.



0:03:20 A new, customized letter is ready to print.

sponding to inquiries for information written to contacts in California. Based on the request, her complete collection of letters is searched. IZE finds 190 information response letters to addressees in California.

From the IZE outline, our executive can quickly find what she needs. An in-depth outline guides her to precisely what she is looking for. One keystroke presents the letter she was seeking. It's now simple, using IZE word processing features, to customize the letter she found for the current task.

A call brings a request for some sales projections. IZE will find them fast even in other applications.

The executive simply hot links directly from IZE to a spreadsheet document. The figures are found and

the question answered. Returning to the customized letter, the executive gives it a final look, prints it, and moves on.

If these 3 minutes and 20 seconds of productivity are something you'd like to see more of, don't waste time before taking the next step.

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than 500 data elements for each employee.

Once you've keyed in your data, locating records is as easy as entering a file number, social security number, or last name. Of course, you may not remember everyone's last name if your company has 5000 employees. Not to worry. Enter even the first letter of the name and Human Resources Partner will prompt you with all the names that begin with that letter. It will also generate an EEO-1 (Equal Employment Opportunity) report for those 5000 employees in less than 3 minutes. You can access a file in 2 to 3 seconds, go directly to a specific page when you open that file, move between pages with a single keystroke, and update all affected records by changing only one.

The Human Resources Partner requires DOS 2.00 or a later version, a hard disk, one floppy drive, and 512K of internal memory. Price depends on the number of employee records involved, ranging from \$99 for 25 employees to \$6995 for an unlimited number. When you upgrade from one level to the next, Pro-Code gives you a full refund on the first level. The Human Resources Partner is available in network and UNIX versions, Pro-Code, 9737 66th St. N. Pinellas Park, FL 34666; 813/545-9551.

MyBase

Have Data Base, Will Travel

Your computer-based personal data would be just as useful to you on the road as it is at the office. But taking your data base for a ride usually means lugging along a data-packed laptop, a stack of fanfold paper, or a Rolodex. That's not practical—and not necessary, now that Useful Software has introduced MuBase.

Because people crave their data even when the computers are off or they themselves are off on a trip, MyBase outputs data in a cornucopia of carryalong options. You can design and print your data base in book, Rolodex, billfold, or three-ring binder form. Also available are Day Timer- or Day Runner-style appointment books, Traveling SideKick and Filofax styles, and a couple of mailing and shipping label formats.

MyBase, a flat-file data base, prompts you for address book-type entries in phone book mode, but it also can accept any kind of alphanumeric data. The phone book holds up to five phone numbers per entry in different formats, as well as three names, two addresses, and up to 700 characters of wordwrapped notes for each record. But these fields can be used for whatever you want, and you can sort and create a quick reference record using

three different cross-reference headings.

You can print and carry your customized reference book or books with data cross-referenced under different headings, or leave copies in strategic locations such as your home and car. Useful Software even provides preprinted forms and two checkbook-size Quick Reference Guide covers for pocket-sized references. A line of supplies for other printout formats is also offered.

With its unique printout options, MyBase takes you a step beyond Everex's Little Black Book. Fortunately, it doesn't take you so far away that you need to reenter data. The program includes conversion utilities for Little Black Book as well as Traveling SideKick and SideKick, Rolodex Label Express, and ASCII delimited or System Data Format files so that you can import data from nearly any word processor or data base, including dBASE.

The \$89.95 program requires DOS 2.00 or a later version and 384K of memory; it supports more than 400 printers, including most popular laser printers. It prints in compressed as well as regular type. Useful Software, 2301 Stokes Canyon, Calabasas, CA 91302; 818/880-4001.



TurboScan/ Flatbed Scanner

AST Research has introduced the TurboScan/
Flatbed, whose flat scanning surface can handle books, delicate materials, and odd-size artwork in addition to the more conventional reports, letters, and photographs. The TurboScan/Flatbed scans a typical 8½-by-11-inch page in about 10 seconds at a resolution of 300 dpi. The scanner also scans material up to 14 inches long.

AST's Eyestar Plus software, which is included, provides paint and image manipulation down to the pixel level and produces 64 levels of gray. It works under a run-time version of Windows supplied with every scanner.

Separate operating modes handle the scanning of black-and-white materials and documents with continuous shading. Users can display both modes simultaneously in a single scan by outlining portions of a scanned frame for separate shading.

The TurboScan/Flatbed retails for \$1995. Optional ReadRight Optical Character Recognition software for converting scanned text documents into word processing files is available for \$695. AST Research, 2121 Alton Ave., Irvine, CA 92714; 714/863-1333.

Mt.St.Helens Can Teach Us A Lot About Hard Disks.

Like a dormant volcano, your hard disk is a disaster waiting to happen. It can blow at anytime. And most people don't do anything to protect themselves.

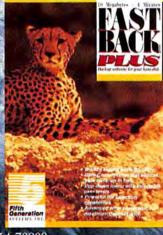
They think the only way to backup files is to do the whole disk. And that it takes too long. They're wrong on both counts.

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*With PC AT or equivalent, XT machines will take longer. easy to use graphic display and support for DOS 3½ or 5¼ inch floppies, prompted PC Magazine to nominate FASTBACK PLUS for its coveted Technical Excellence Award. The same technical excellence that made FASTBACK the all-time bestselling backup utility. Don't trust your data to anything less.

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Circle 198 on reader service card

386AE File Server, ATterminal Workstation

Novell has announced an 80386-based file server, an 80286-based diskless local area workstation, and several updated network peripherals. The Novell 386AE file server, based on the 16-MHz Intel 80386 processor, enhances throughput for its 18ms 155MB SCSI drive because of Novell's intelligent cache controller card, the Disk Coprocessor Board.

The 386AE comes with 4MB of 32-bit memory on the system board, expandable to 16MB via any one of six 8/16-bit slots. It also has two 32-bit slots. and Novell plans a 32-bit memory card. Using Netware's bridging capabilities, the 386AE can support up to four satellite file servers, each with a different network topology. It sells for \$9795 with a single 155MB drive and for \$13,695 with dual drives.

The ATterminal Workstation, designed for Netware ethernet networks, includes a network programmable read-only memory chip that enables it to boot DOS from its file server. It runs at 6 or 12 MHz and is equipped with 512K of memory, three 8/16-bit slots, one 8-bit slot, serial and parallel ports, integrated controllers for monochrome text display, floppy drives, and an ethernet interface. It also offers an option for either one 5¼-inch half-height or two 3½-inch disk drives. The AT-terminal Workstation sells for \$1595 with a keyboard but without a monitor.

Novell also has announced the NE2000 and NE/2 Ethernet LAN adapters, 16-bit versions of the NE1000A Ethernet adapter designed for Netware. The NE2000, which can be used in either the file server or a diskless workstation, retails for \$495. The NE/2 for IBM PS/2s costs the same. Novell, 122 East 1700 S. Provo, UT 84601; 800/453-1267, 801/379-5900.

WinText

Palantir has introduced a Windows-compatible word processor that lets you edit four documents at a time and view text and graphics in true what-you-see-is-what-you-get fashion. WinText is a high-end word processor with a range of functions that its creator claims ri-

vals Microsoft Word's and WordPerfect's. WinText takes advantage of Windows' graphic user interface, letting you maneuver through the system via pulldown menus and dialog boxes. Text and graphics are printed exactly as displayed, with true proportional spacing and up to four on-screen fonts.

Other features include mail merge, a 130,000-word spelling checker, and a reversible 2000-character undo command. In addition to the Windows clipboard, WinText furnishes a second, "private" clipboard for communication among windows and for altering text and graphics without affecting what's in the Windows clipboard.

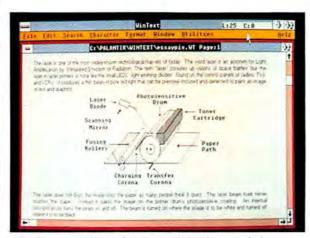
WinText lets you stretch or shrink graphics to fit, draw boxes, and create simple fill-in-the-blank forms. You can also generate tables of contents and keyword-based indexes, along with multiple header and footer lines and alternating-offset left margins. You can vary page length, justification, spacing, indentation, and other formats within a document by embedding multiple rulers. And you can have files backed up automatically based on time elapsed or number of characters entered since the last backup.

WinText requires at least an 80286-based computer with DOS 2.00 or a later version, 640K of memory, and a copy of Windows. Suggested retail price is \$350. Palantir, 12777 Jones Rd., Houston, TX 77070; 713/955-8880.

STA-BLK

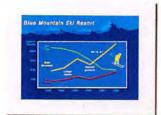
Like struggling entrepreneurs, impact printer cartridges have trouble staying in the black. One ribbon may produce clean, crisp print for weeks of regular use, while another will begin to fade after only a few pages.

With STA-BLK automatic re-inking printer cartridges, you don't have to tolerate this inconsistency. A patented design provides consistently clear, black print for up to 20 million characters. the equivalent of 8000 to 10,000 single-spaced pages. The cartridge operates much like a ballpoint pen. During printing, ink flows through a demand valve from a reservoir built into the cartridge, automatically replenishing ink on the print ribbon as needed.

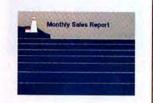


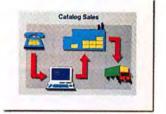
A Windows-compatible word processor, WinText lets you edit four documents at a time and view text and graphics in true WYSIWYG fashion.

Of all the graphics you can create with Freelance Plus,













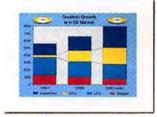


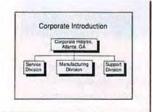












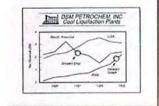




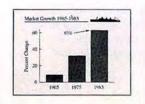




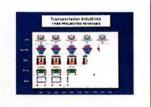














STA-BLK cartridges cost more than standard printer ribbons-\$39.95 for narrow-carriage Epson models, \$49.95 for wide-carriage models, and \$49.95 for the Apple ImageWriter I and II and C. Itoh Prowriter printers. However, STA-BLK is a cheaper alternative on a cost-per-page basis. Based on a life span of 200 consistent pages for a typical \$7 printer cartridge, you would need 40 standard cartridges (or \$280 worth of ribbon) to print 8000 pages at the level of quality you can expect from a single STA-BLK cartridge, claims the company.

Backed by a 60-day money-back guarantee, STA-BLK cartridges are currently available for more than 350 printer models. Chronos Computers, 4186 Sorrento Valley Rd., Ste. H, San Diego, CA 92121; 619/455-8200.

FileBank

FileBank from Support
Station Software helps
you find files quickly by
using an office metaphor.
FileBank graphically represents your hard or floppy disk drives as file
rooms and your subdirectories as electronic file
cabinets with up to 300
drawers (subdirectories
within subdirectories)
containing folders that are
your files.

To find a file, you hotkey to the FileBank interface from your application and type in its name at the file-room or file-cabinet level. FileBank will



FileBank helps you find files quickly by graphically representing your hard or floppy disk drives as file rooms and your subdirectories as electronic file cabinets.

search across all your subdirectories to retrieve it.

The program also offers disk management enhancements. With a few keystrokes, you can transfer a file to another folder, to another drawer in the same cabinet, to another cabinet in the same room (drive), or to a newly named cabinet in any room. Like any good DOS shell, FileBank lets you tag, delete, rename, view, and print files at will, but the current version won't format a disk or execute a program.

FileBank can be used as a memory-resident or stand-alone product, and a graphics card is not required for the characterbased program. FileBank requires DOS 3.00 or a later version and 348K of memory. It takes 100K of RAM, although the manufacturer says that should drop to 75K in future versions. Support Station Software, P.O. Box 8282, Aspen, CO 71612; 303/925-6040.

Deja View

System crashes, power failures, operator errors-threats to your data are always lurking. For many corporations, uninterruptible power supplies provide needed insurance. But if you don't want to spring for backup power, Deja View may be an alternative. A memoryresident program that takes pictures of a PC's RAM and video memory and saves them to hard disk, Deja View lets you retrieve individual files, complete spreadsheets, large CAD drawings, even memory residing on an expanded memory card, in the event of a system "meltdown."

The program's autosave function lets you specify either a time interval or a number of keystrokes between "photographic" backups. *Deja View* provides simple keyboard switches between active and suspended operating modes, between two software applications, and for flashbacks to a previous save.

The program can specify the drive where the image will reside and extends DOS's 15-character keyboard buffer to 150 characters during a save. Deja View, which supports the major graphics standards, requires at least 256K of memory and a hard disk. It retails for \$95. Meridian Technology, 1140 Hammon Dr. #A-1125, Atlanta, GA 30328; 404/390-9152.

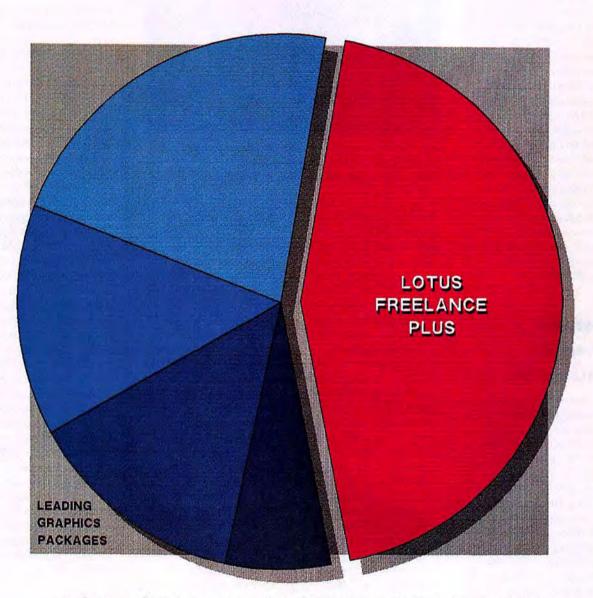


Database Accounting Library, Series Six Plus

SBT Corporation has upgraded its Database Accounting Library to Series Six Plus and enhanced the dBASE language-based product for managers, accountants, controllers, bookkeepers, and application developers. New tools to boost a manager's productivity include a query-by-example option, a one-page business status report, and a global percentage-

cost and price-updating capability. Managers will also benefit from immediate display of 24-month sales histories for customers, purchase histories for vendors, and 36-month unit/dollar sales histories with monthly average selling prices and inventory trends. Enhancements for accounting professionals include user-definable lookup tables for validating data entry, tighter integration between all Accounting Library modules, more flexible reports, and an external

This is the one were particularly proud of.



Lotus* Freelance* Plus is the most versatile graphics package for the PC. And that's probably why it's the #1 selling business graphics package on the market.*

Freelance Plus lets you create everything from data-driven charts like bar charts, to graphics based on ideas like flowcharts. And Freelance Plus is the complete graphics solution, because you get all the tools you need for creating effective business graphics in a single package.

What's more, Freelance Plus is compatible with other Lotus software, like 1-2-3, Symphony, and Manuscript. And it's incredibly easy to use.

Find out why Freelance Plus has the biggest slice of the pie. To order a \$10 demo kit, call 1-800-345-1043 and ask for demo kit AJA-1658. Lotus Freelance Plus



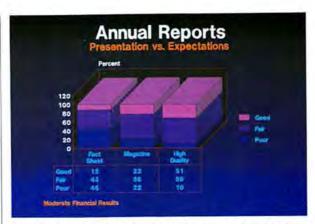
*Based on national audits conducted by Audits & Surveys, Inc., May, 1987-April, 1988.

Based on national audits conducted by Audits & Surveys, Inc., May, 1987-April, 1988. Lotus Development Corporation. Lotus, 1-2-3, Symphory, Manuscript and Freelance are registered trademarks of Lotus Development Corporation.

audit trail. Internal comments, coding guidelines, and enhanced multiuser support have been added for developers. Series Six Plus requires either DOS 2.00 or a later version and 512K of memory for single users, or DOS 3.10 or a later version and 640K for the multiuser versions. Each module still costs \$295 for a precompiled, executable version, and \$395 and \$595, respectively, for the single-user and multiuser source code versions. Source code versions require dBASE or a dBASE-compatible data base manager. SBT Corp., One Harbor Dr., Sausalito, CA 94965; 415/331-9900.

Harvard Graphics Accessories

Software Publishing Corporation has announced a group of five accessory programs designed to bolster the functionality of Harvard Graphics versions 2.x. U.S. MapMaker holds a data base of U.S. state outlines and city coordinates that sales and marketing managers can use to create color-coded maps of the entire country or portions thereof. Business Symbols adds 300 symbols of computer and telecommunications equipment and other three-dimensional objects for reports and presentations. Quick Charts contains 125 of the most commonly used business



One of five new Harvard Graphics Accessories, ScreenShow Utilities lets you capture and save text and graphics images for use later in onscreen slide shows without having to run Harvard Graphics.

charts and graphs, while Designer Galleries provides on-disk design advice and lets you preview your chart options. Finally. ScreenShow Utilities lets you capture and save text and graphics images that you can use later for on-screen slide shows without running Harvard Graphics. U.S. MapMaker and ScreenShow Utilities sell for \$149 each, while the other programs retail for \$99. They require a \$495 copy of Harvard Graphics, which needs DOS 2.00 or a later version, 512K of memory, and a hard disk. Designer Galleries and ScreenShow Utilities require an EGAcompatible color monitor and adapter. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94039-7210: 415/962-8910.

Paradox OS/2

Borland International has released an OS/2 version of its Paradox relational data base manager. Paradox OS/2 enhances large data base performance by tapping OS/2's protected mode to break the DOS 640K memory barrier and address up to 16MB of RAM. It also can run concurrent protected-mode Paradox applications while performing ad hoc data base operations even on a network. You can print a lengthy report in one session while performing a query on the same or any other table in another session and entering data in a third. Network users of Paradox OS/2 can share files with users running Paradox under DOS. All existing Paradox applications, tables, forms, and reports will work in Paradox OS/2. It is priced at \$795. Upgrades for other Paradox users are available for \$99.95. Borland Int'l. 1800 Green Hills Rd., Scotts Valley, CA 95066; 408/438-8400.

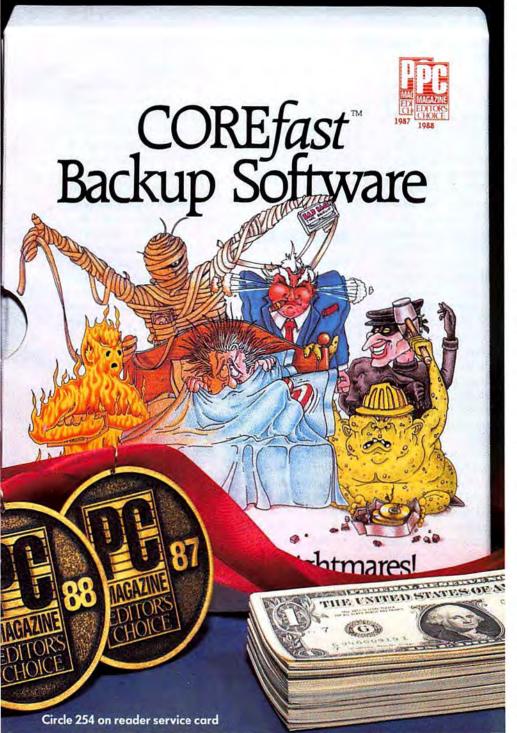
Genifer 2.0

Version 2.0 of the dBASE application generator Genifer has greatly enhanced multiple-file capability for both screens and reports. Index files can now handle multiple-file linkage, and Genifer 2.0 automatically generates index expressions for both screen and report modules. The developer interface has been improved with both beginner and advanced-user modes, as have context-sensitive help and error-trapping messages that suggest corrective actions. Application-specific templates control the application generation process, and Genifer's template language optimizes output for dBASE-compatible dialects like Clipper, DBXL, Foxbase +, and Quicksilver. Prewritten templates for menu, maintenance, inquiry, and report programs are included. Genifer 2.0, which is compatible with dBASE III Plus, requires DOS 2.00 or a later version, 512K of memory, and a hard disk. It retails for \$395. A dBASE IV version is planned. Bytel Corp., 1029 Solano Ave., Berkeley, CA 94706; 415/527-1157.

Open Access II Plus 2.10

In version 2.10, Open Access II Plus gains enhanced SQL programming capabilities and access to DOS from within the program. Open Ac-

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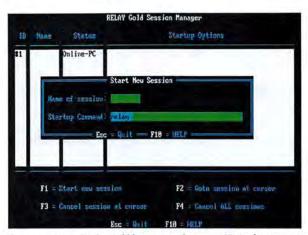
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cess II Plus is an integrated program that includes a relational data base with SQL support and a fourth-generation programming language, a spreadsheet, 3-D graphics, a word processor with a spelling checker and mail merge, a communications module, and desk accessories. The package has a windowed interface and the ability to cut and paste between modules. Open Access already was equipped with ANSI SQL, but now you can hone your queries using conditional data expressions.

The data base programming language is enhanced by a symbol table showing currently active variables and values, and powerful statistics functions have been added to the spreadsheet. The program requires DOS 2.00 or a later version and 256K of memory. The retail price for version 2.10 has been increased to \$695 from \$595. Current owners can update for \$125. Software Products Int'l, 10240 Sorrento Valley Rd., San Diego, CA 92121; 800/521-3511, 800/621-7490 California. 619/450-1526.

Relay Gold 3.0

Relay Communications (formerly VM Personal Computing) has increased the speed and versatility of its PC communications and micro-to-mainframe



The new version of Relay Gold lets you conduct up to 15 simultaneous communications sessions, including a mixture of asynchronous and 3270 emulation sessions.

linking software. Besides permitting you to communicate at speeds of up to 38,400 bps, Relay Gold version 3.0 includes a compression algorithm from Adaptive Computer Technologies that makes some file transfers as much as four times faster, reducing communications costs. Relay Gold also lets you conduct up to 15 simultaneous communications sessions, including a mixture of asynchronous and 3270-emulation sessions. You can use all eight of the communications ports available on IBM PS/2 models. Enhancements to the script language enable you to download data from a mainframe without leaving your PC application. The program also gains additional DEC and IBM terminal emulation modes. Relay Gold requires DOS 2.00 or a later version and 192K of memory; it retails for \$295. Current users can upgrade for \$75, and owners of *Relay* version 2.4 or earlier can upgrade for \$125. Relay Communications, 41 Kenosia Ave., Danbury, CT 06810; 800/847-3529.

Quad386XT/20

Quadram has unveiled a 20-MHz version of its Quad386XT system upgrade board. The Quad386XT/20, based on the 20-MHz Intel 80386 chip, is designed to upgrade an IBM PC XT or compatible. It comes with 1MB of 100ns 32-bit memory and will support an additional 1MB or 8MB through the use of daughter cards. Also standard are the Quad Virtual Monitor software for memory management, as well as software to support a RAM disk, print spooling, and expanded and extended memory. The Quad386XT/20 has sockets for the Intel 80387 and the Weitek 1167 math coprocessors. Its self-running installation software

eliminates the need to set switches. The board retails for \$1895 and fits in any full-size 8-bit slot. Quadram Corp., One Quad Way, Norcross, GA 30093-2919; 404/923-6666.

Word IV and Plus IV

The latest versions of Word IV and Plus IV by Samna have a preview feature that lets you inspect your document before printing-complete with fonts, graphs, and other style elements. Versions 2.0 of the word processors also permit three levels of screen magnification in preview mode. A thesaurus with 40,000 entries and 1.4 million alternative suggestions has been added, as has enhanced text-revision marking for users of Hercules RamFont boards. Word IV and Plus IV support scanned documents and images and the most popular graphic file formats. Word IV retails for \$595, while Plus IV is \$695. Both require DOS 2.00 or a later version, 640K of memory, and EGA or VGA graphics adapters. Current users should contact the company for upgrade information. Samna Corp., 5600 Glenridge Dr., Atlanta, GA 30342; 404/851-0007, 404/373-8042.



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WordPerfect Gets Better!

WordPerfect's long-awaited upgrade adds desktop publishing features—

> plus a robust macro language, and tools for managing large documents.

eviewing WordPerfect 5.0 is like sitting down to Thanksgiving dinner—it's hard to know where to begin. The most talked-about features, of course, are the new desktop publishing capabilities, which include superior support for graphics and printers, the ability to preview documents, and flexible font management.

However, there's much more to it than that. WordPerfect now has a powerful style-sheet function, a rich macro programming language, a completely redefinable keyboard, automatic cross-referencing, and some interface improvements. The minimum RAM requirement for 5.0 is 512K (a hard disk is recommended).

Presentation Perfect

WordPerfect 5.0 provides an unprecedented level of control over printer details, such as managing a laser printer's fonts. For example, as you detail precisely which downloadable fonts and font cartridges you have, the program tracks the printer memory required and won't allow you to select more fonts than would fit in memory at one time.

Specify a base font for a document, and WordPerfect will select point sizes and character styles intelligently throughout the document based on that font. Switching to a different point size or character style invokes an automatic font change. This means you can print the same document on more than one printer with consistently good results.

WordPerfect also allows you to position graphics on a page, although it doesn't support color graph printing. It imports practically every popular graphics format, including TIFF (common for scanned images), Encapsulated PostScript, .PIC files (from Lotus products), paint-type graphics from just about anywhere, AutoCAD .DXF drawings (although this requires an additional conversion step), and HPGL (for programs that support plotters).

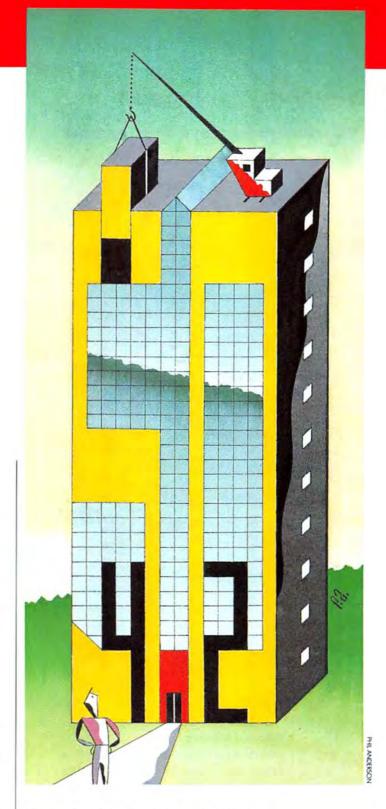
Once loaded, a graphics image can be viewed and scaled; line graphs can also be rotated. You can tie the image to a paragraph or fix it on the page. Text will automatically wrap around a graphics image in a rectangular fashion, or you can manually fit it around irregular shapes.

You can also adorn your document with rules (lines). However, once you've entered the specifications for a line (such as length,

Eric Alderman position, thickness, or shading), you cannot edit them. You must delete the original line and then create a new one.

A snazzy new feature is the full graphics preview of the printed page, which displays various font sizes and styles (although a limited number of screen fonts represents all the fonts), as well as all graphics and inserted rules and boxes. You can start with a bird's-eye view of the entire page, then zero in on actual size, and finally zoom way in to 200 percent of actual size. At actual size, the text is readable only with a high-resolution graphics board. With a Hercules Graphics Card Plus or an InColor Card, you can display text on the editing screen in several different styles.

Although the package's desktop publishing features are impressive, WordPerfect is not about to unseat programs such as Page-Maker and Ventura Publisher. Compared to longtime competitor Microsoft Word 4.0, however, WordPerfect is one step ahead. Word has always supported laser printers ably, but it's not as flexible as WordPerfect.



Word has only a rudimentary method of incorporating graphics. PageView, a companion product from Microsoft, allows for smoother graphics integration and page preview, but even it is limited compared to WordPerfect.

FEATURES EVALUATION

Word Processors Compared

A strong set of new features boosts WordPerfect 5.0 ahead of its competitors.

\8	Mag 25	5.00	
Editing	Microsoft Word	5.0 Single of the state of the	rdpertect
Maximum number of windows	8	2	2
Undo command		Q 1	01
Jumps to bookmark	0	0	0
Temporarily exits to DOS		•	•
Wild-card search	•	•	•
Searches control characters		•	•
Spelling checker/thesaurus	•	•	•
Cross-referencing	0	0	•
Redlining	0	•	•
Outliner	•	⊖2	⊖2
Mail merge	•	•	•
Creates index	•	•	
Creates table of contents	•	•	•
Macros	•	•	•
Macro learn mode	•	•	•
Macro editor		0	•
Macro programming language		0	•
Formatting			
Style sheets		0	•
Conditional page breaks		•	•
Widow/orphan control	•	•	•
Automatic hyphenation	•	•	•
Leading control	•	0	•
Kerning control	0	0	⊕3
Decimal tabs	•	•	•
Snaking columns		•	•
Side-by-side columns	•	•	•
Both styles on same page		•	•

\ io Mag	100	00	*
9raphics 6	1.2 Word	apertect	ortest
Imports graphics	€4	04	•
Sizes, crops, rotates graphics	0	0	•
Automatic text flow around graphics	0	0	•
Page preview	0	•	•
Line draw	•	•	•
Text boxes/borders	•	0	•
rinting			
Proportional spacing	•	•	•
Queues documents	•	•	
Prints in background	•	•	
Landscape printing	•	•	
Supports PostScript	•	€6	•

PE | PE | UE |

If Speed Matters

Despite its new formatting features, Word-Perfect's performance has remained solid. However, National Software Testing Laboratories' benchmarks indicate that 5.0 is generally slower than 4.2. Compared to Microsoft Word 4.0, WordPerfect's printing speed was clearly slower, but other features were more evenly matched. For example, while the spelling check timings would indicate a tight

race, *WordPerfect*'s one-keystroke operation for replacing misspelled words makes its practical speed much better than *Word*'s.

Like Word, WordPerfect now lets you speed up the cursor repeat rate to scroll through a document rapidly. And with its Fast Save option enabled, WordPerfect quickly saves documents in an unformatted state (which means you can't print them directly from disk). Saving a 46-page document (105K) took 3 seconds using Fast Save, whereas saving the same document in Word-Perfect 4.2 took over 23 seconds.

[●] Yes ○ No ● Deficient

¹ This function recovers deleted text but does not reverse other actions.

² Outliner only inserts heading numbers and doesn't support collapsible headings.

³ Most kerned-pair definitions are for fonts of 18 points or larger.

⁴ Graphics stored separately in a printer-ready file can be imported but not viewed or manipulated.

⁵ Rotates line drawings only.

⁶ PostScript support is limited compared to that of the other programs.

Better Macros for Power Users

Power-hungry users will be pleased with WordPerfect's new macro programming features, which include the use of variables, conditional testing, the ability to produce prompts for user input, error handling, case statements, and the ability to call macros as subroutines.

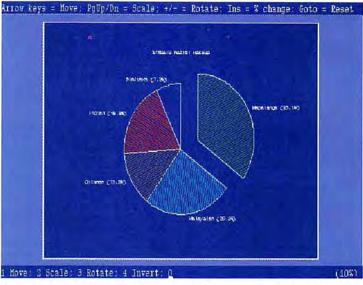
Two commands, Char and Text, direct a macro to display a message, pause for user input, and then place the user's text into a specified variable. You can then test the variable against a list of possible options and branch to a different part of the macro depending on the match found. But you'll find only ten variables to work with—far fewer than in most programming languages.

The Step On command allows you to single-step through a macro, but otherwise it isn't a particularly helpful debugging tool. While a macro is executing, it displays messages like 'MACRO CMD 4'. No list of command numbers appears anywhere in the documentation, but users can request this rather technical information from WordPerfect—just ask for the developer's tool kit.

EXECUTIVE SUMMARY WordPerfect 5.0 Word processor WordPerfect incorporates a RFST slew of new desktop publishing features, plus style sheets and a macro language sure to please power users. Ease of use has also increased, thanks to the menu's new look and structure. Unfortunately, the user manual is rather terse. Editing **Formatting** Graphics Printing Performance Overall value

```
Macro: Edit
                                               {;}connent*
       File
                      LETTER3.UPM
                                               {ASSIGN} variable value
                                                (BELL)
                      Create a letter from ad
                                               (RREAK)
   1 - Description
                                                {CALL}label"
                                               {CANCEL OFF}
   2 - Action
        (;)Create a letter from address record"
        (;)Copyright (c) 1988, by Eric Aldernan
        (Hone) (Hone) (Left)
                                           {;}Go to left edge of line"
        (Block)
        (Search) (^E) (Search)
                                           {;}Block to end of record
        {Right}
        (Save) letter.add (Enter)
                                            {:}Save record as a file"
        (IF)-(STATE)&1024"
                                           {;} If file exists, replace"
        (END IF)
                                       (Name Search) Enter or arrows to Exit)
```

The Macro Editing screen lays out all the steps of a macro, complete with added comments. At the upper right, a pop-up scrolling list shows all of the available macro commands.



After you've imported a graphic, you can move it horizontally or vertically within its borders, scale it, or invert it. From the Options menu, border styles can be changed, and gray shading can be added for effect.

WordPerfect's new built-in macro editor makes modifying macros much easier than before. However, you can't edit a macro longer than 5K, work with two macros at once, copy and move sections of macros, or print out the steps of a macro. Those who want to create larger, more complex macros will have to wait for an update of M-Edit (included

NSTL TEST REPORT

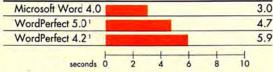
WordPerfect 5.0

While WordPerfect 5.0 is noticeably faster than 4.2 in some operations, printing is much slower.

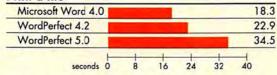
Scroll by line



Reformat document



Print a file



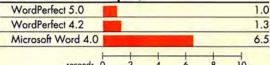
These results measure the time required to issue the reformating command and move to the end of the document. This command sequence compensates for WordPerfect's background information.

All benchmarks were performed on an 8-MHz IBM AT with 640K of RAM and a 30MB hard disk running under DOS 3.20. All tests except the spelling check used an 8-page (480-line) text file consisting of groups of 4 characters separated by spaces (e.g., aaaa bbbb cccc). The file was formatted at 60 lines per page with margins set at 1 and 60. Two carriage returns followed every 9 lines of text. This pattern was repeated throughout the document. Times were measured from the keystroke initiating the test until control was returned to the user.

Scroll by line

This test measured the time required to scroll line by line from the top of the file to the end and then from the end back to the top. The two times were then averaged. A program was used to generate 30 keystrokes per second. Without such a program, times would have been greater.

Global search and replace



Spelling check



Reformat document

The times to reformat the document after changing the right margin from 60 to 50, and then from 50 to 60, were averaged for each program.

Print a file

This benchmark used a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement. The text file was "printed" to the device at the maximum speed supported by the program. Times with an actual printer would be greater.

Global search and replace

With the cursor positioned at the beginning of the text file, the program was instructed to automatically replace all 240 instances of aaaa with AAAA.

Spelling check

This benchmark recorded the time a program's spelling checker required to proof a 28,052-character ASCII file (thirty 14-line paragraphs) after the file had been read into each program and saved in that program's format.

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

with the separately sold *WordPerfect Library*), which will support 5.0 macros. Note, too, that you must use a conversion utility to put 4.2 macros to work in 5.0, but this utility only translates text, cursor movements, and command sequences that have remained exactly the same.

Compared to 4.2, 5.0 offers much more flexibility in assigning macros to specific keys. You can redefine function keys you don't use frequently, modify the cursor

movement keys, and assign macros to <Ctrl>-letter and <Alt>-number combinations. (Version 4.2 is limited to <Alt>-letter combinations.)

Support for Big Documents

One of the most important new tools for managing large documents is the Styles function. As in *Microsoft Word*, you can globally define document styles—specifying, for example, that all headings should be bold and underlined—and easily apply that format by choosing it from a list. But the real

power of Styles comes later, when you need to make global formatting changes. By simply modifying the appropriate style, you instantly implement the change.

Another powerful feature allows you to insert codes that dynamically link cross-references in a document. Say you have a reference such as "See Figure 31 on page 9." If you move the figure to a different page or change its number, you can update all the cross-references at once—a big time-saver.

When it comes time to print, WordPerfect's Master Document feature associates a group of subdocuments stored separately on disk—such as the chapters of a book—as one cohesive document for the purposes of printing, page and paragraph numbering, and index and tables generation.

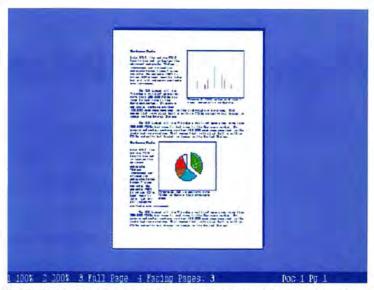
Last but not least, the Document Compare function allows you to determine the differences between two versions of a document. Unfortunately, WordPerfect marks whole phrases, no matter how minor the change, so determining exactly what was modified may take some scrutiny. Standalone compare programs usually let you narrow a comparison down to individual words.

A Better Look

But that's not all. In addition to the flashy new features, the Word Search feature now permits searches through documents stored on disk based on data in the document

NSTL BENCHMARK TESTING

The exclusive test facility for PC World, National Software Testing Laboratories (NSTL), is an independent organization that specializes in evaluating personal computer hardware and software. A recognized pioneer in state-of-the-art test design, NSTL believes that the most useful benchmark tests measure how well products perform when executing typical business tasks. NSTL testers follow detailed test plans that simulate normal operating conditions. A controlled testing methodology ensures objective, accurate, and consistent results and gives consumers a sound basis for making purchase decisions. NSTL publishes its test results in Software Digest Ratings Report® and PC Digest.™ Neither publication accepts advertising. NSTL is located in Philadelphia, Pennsylvania.



WordPerfect's preview mode lets you view a page before committing it to print. Fonts, rules and boxes, and graphics can all be displayed. You can view facing pages, too, or examine the document at 200 percent of actual size.

summaries, such as date or subject. Word-Perfect's refurbished interface provides mnemonic menu choices, a significant improvement. Too bad WordPerfect's documentation wasn't as thoughtfully designed. Although a good tutorial workbook is now included, the information is still skimpy for a program of this magnitude. That deficiency aside, WordPerfect 5.0's colossal improvements recommend it to power users of all stripes. ●

Eric Alderman is the primary coauthor of Advanced WordPerfect: Series 5 Edition, due this year from Osborne/McGraw-Hill, and the author of numerous books and articles on computer technology.

WHERE TO BUY

WordPerfect 5.0

WordPerfect Corp. 1555 N. Technology Way Orem, UT 84057 801/225-5000 **List price: \$**495, up-

List price: \$495, upgrade from previous versions (except for Student, Junior, or Personal) \$60

Requirements: 512K (hard disk recommended); DOS 2.00 or later version Technical support: unlimited toll-free support M-F 6-6, S 8-12
Other support services: user BBS on CompuServe, The Source, and direct (801/225-4414); on-site training available For more information, see Products Featured in This Issue.

High-Impact Printing

24-pin dot matrix printers offer something for everybody: fast draft printing, near letter quality type, and advanced paper handling.

PC World reviews seven printers and finds that some models deliver more value than others.

Sure, everybody would like a laser printer on the desk, but for an all-in-one printing solution, wide-carriage 24-pin dot matrix printers are the logical choice. They not only churn out draft quality text at a fast clip, print on wide paper, and create carbon copies, they also produce letter quality and graphics output that is more than adequate for most needs.

This review examines seven 24-pin dot matrix printers that cost between \$925 and \$1149: the Brother M-1724L, the Citizen Tribute 224, the Dataproducts 9044, the Fujitsu DL3400, the Panasonic KX-P1524, the Star Micronics NB 24-15, and the Texas Instruments (TI) Omni 800 Model 877.

Letter Perfect, Feature Rich

Most people want a printer that offers both speed and high-quality output. Not surprisingly, the two don't always coincide. The fastest printer, according to NSTL benchmarks, is the Fujitsu DL3400, but the slowest printer, the Panasonic KX-P1524, produced the best output. For the sake of a comprehensive comparison, NSTL tested printer speeds using draft and letter quality text files, enhanced draft and enhanced letter quality text, and 1-2-3 graphs.

Other considerations in choosing a printer include software compatibility and typographic versatility. All the printers can emulate at the very least a 9-pin, a 24-pin, and a daisy wheel. All come with one or two internal fonts and accommodate optional fonts in the form of integrated circuit cards and cartridges. All provide proportional spacing plus three pitch settings. Last but not least, all can generate graphics at 180 by 360 dots per inch.

Another important point is ergonomic design. None of the printers reviewed here lets you select all parameters directly from panel controls. To change settings such as emulations and character sets, four of the machines make you flip DIP switches, and three let you print out menus and make selections from them by pressing panel buttons. Generally, the more functions you can select directly from the panel, the easier the printer is to use.

Paper Prowess

One key benefit of 24-pin printers over most 9-pin models is advanced paper handling. All the printers reviewed have wide carriages for printing up to 134 columns on 15-inchwide paper. Additionally, each printer accommodates envelopes and multipart forms. In *PC World* tests, every printer handled envelopes and five-part carbon forms without error.

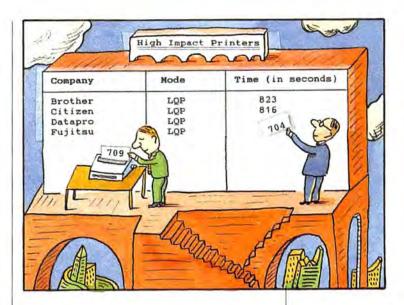
Eric Brown

Every unit furnishes a single-sheet feeder and a push-feed tractor for fanfold paper and continuous forms, except the TI Omni 800, whose combination push/pull tractor is optional. Push-feed provides more accurate dot placement than pull-feed and doesn't waste a sheet of paper each time you print. Pull tractors are good at keeping the paper properly aligned and are preferable for labels and multipart forms. The TI and the Panasonic (which also offers a push/pull option) provide bottom feeding. Bottom feeding requires a pull tractor and helps reduce paper jams by loading paper from underneath the printer. Every printer but the Citizen and the Star also provides forms parking, which enables you to print single sheets without having to unload and reload the tractor.

Fujitsu DL3400

If you want the job done fast, the Fujitsu DL3400 is the printer for you. Despite its limited panel controls, the DL3400's combination of first-place speed and above-average print quality is hard to beat. The Fujitsu's text and graphics throughput was the fastest of all the printers, and its letter quality printing looked particularly impressive. Toss in an extensive printed menu, good paper handling, and a \$925 price tag (the lowest of the printers reviewed), and the Fujitsu rates a Best Buy.

The DL3400's front-panel controls are limited, but membrane switches enable you to choose from among the two resident fonts and an optional font card. You must use a printed menu to select other printer parameters; however, the DL3400's menu system is the most sophisticated of all the printers'. Eight menus enable you to tinker with 11 pitch settings, eight line spacings, 14 page lengths, and print speed; they also let you choose bold, italic, and shadow styles and double or quadruple character width and



height. The DL3400 delivers a full complement of emulations, including Fujitsu's proprietary DPL/24I 24-pin printer emulation. The 24K print buffer is sufficient but not expandable.

The Fujitsu is the clear winner in almost every category. With its exceptional speed, respectable print quality, well-implemented paper handling, and handy array of extras, you can't go wrong.

Citizen Tribute 224

If print quality is your primary need, the Tribute 224 is willing to please. The \$999 printer is hampered by limited panel features and lack of forms parking, but excellent print quality and superior speed place it second in overall value.

The Tribute 224 was the second-fastest printer overall, thanks primarily to its quick graphics output, but it placed an unimpressive fourth in text printing, with poky draft production. However, its output quality, par-

FEATURES EVALUATION

A 24-Pin Lineup

The Fujitsu DL3400 and the Citizen Tribute 224 combine excellent speed and top-quality output with ample features.

0 \ *\	1	8	13	1	10	20	
Yes One No Deficient	Hiron Iribute	nataproducts vo	tujitsu DI3AOO	Damasonik KX-Y	1 2	1. 0mmi 800 87	.\
Deficient	-/:	3/3	2	1	£ \ 2	3	1
	1	-	-	1	-/	3	-)
Standard features		1		_	_	1. 0mmi 800 8/	
Price	\$949	5999	\$1099	5925	5949	2444	599
Buffer size	16K	24K	32K	24K	13.5K	-	7K
Maximum buffer size	48K	24K	32K	24K	-	516.5K	711
Serial port	•	•	•	01	•	01	0
Parallel port	•	•	•	•	•	•	•
Typographic features							
Number of fonts standard	1	2	2	2	1	1	1
Number of fonts available simultaneously	4	4	2	3	2	3	2
Cartridge fonts	•		•	•	•	•	
Emulation							
Diablo 630	•	•		•	•	•	
Epson FX-80	0	0	0	•	0	0	0
Epson JX-80	0	0	01	•	0	0	
Epson LQ-1000	•	01	•	0	•	•	
IBM Proprinter XL	•	01	0	•	•	•	0
Toshiba/Qume	0	•	0	0	0	0	0
Color printing option	0	0	•	•	0	0	
Compressed print	•	•	•	•	•	•	•
Italics	•	•	•		•	•	
180 by 360 resolution	•	•	•	•	•	•	•
Panel controls	77						
Formfeed	•	•	•	•		•	
Linefeed	•	•	0	•	•	•	
Print quality	•	•	•	•	•	•	
Pitch	•	•	•	0	•	•	
Font selection	•	•		•	•	•	
Line spacing	0	0	0	0	0	0	
Page length	•	0	0	0	•	•	0
Reset	•	0	•	0	0	•	0
Paper-out indicator	0	•	0	•	•	•	•
Error indicator	•	0	•	0	•	0	
Paper handling							
Forms parking	•	0	•	•	•	0	•
Push-feed	•	•	•	•	•	•	0
Pull-feed	0	0	0	0	01	0	0
Optional sheet feeder	•	•	•	•	•	•	•
Tear bar	0	•	0	•	•	•	•
Envelope printing	•	•	•	•	•	•	

Optional; see Where To Buy for prices.

ticularly with graphics and draft text, is exceptional.

The Tribute 224 panel has utilitarian plastic controls instead of the less-responsive membrane switches. However, changing the most basic defaults requires setting DIP switches, which are conveniently placed on the front of the unit.

The Tribute 224 does a poor job with emulations. Toshiba/Qume emulation is standard, but installing Epson LQ emulation requires a separate RAM-resident utility. For \$99 you can buy a card for Epson LQ-1000 and IBM Proprinter emulation. The Tribute can use up to four fonts at once by teaming its two internal fonts with an optional \$60 card that contains two fonts.

The Citizen's lack of forms parking is a regrettable oversight, especially since the automatic sheet loader has problems. If a form is crooked, there's no time to straighten it before it's sucked in.

Despite paper handling flaws and emulation hassles, the Tribute 224's top quality output and impressive speed add up to a second place finish.

Panasonic KX-P1524

If speed isn't an issue, the \$949 KX-P1524 offers everything you'd want in a printer: excellent print quality, extensive typographic options, and thorough panel controls. Considering its first-place showing in print quality, the Panasonic is highly recommended for users who value professional-looking output. Unfortunately, quality doesn't always accompany speed. The KX-P1524 was the slowest printer reviewed, with notably sluggish text printing.

The membrane switches control a wealth of features. You can select between two fonts, three speed settings, and five pitch settings, and a front-mounted dial lets you choose from among 12 page sizes. To make other adjustments, you have to flip DIP switches at the rear of the printer.

The printer's typographical treasure chest includes one internal font, six optional fonts (each costing \$59), and a full array of print enhancements, including double-wide, double-strike, emphasized, shadow, boldface,

underlined, and overlined type. The 13.5K buffer is rather skimpy but can be upgraded to 45.5K for \$60.

The feature-rich Panasonic is a perfect match for output perfectionists, but its leisurely printing pace will cause the impatient to look elsewhere. The unit places third in overall value; however, that rating could swing considerably depending on your priorities.

Texas Instruments Omni 800 Model 877

At \$1149 (\$999 without a push/pull tractor), the Omni 800 is the most expensive of the group. It stands apart from the crowd as the only printer reviewed that comes standard with a color ribbon. The printer's throughput is respectable, ranking third overall, but output quality is somewhat less than dazzling, taking fifth place. Nevertheless, superb panel controls and sophisticated features land the Omni 800 in fourth place for overall value.

The Omni's panel controls are the most extensive of any unit reviewed. You can choose between three print quality settings,

EXECUTIVE SUMMARY

Fuiitsu DL3400

24-pin dot matrix printer



The overall winner in NSTL speed tests, the DL3400 is also blessed with admirable print quality. Eight print menus enable you to fine tune extensive typographic options. Add good pa-

per handling and a low price tag and this printer rates a Best Buy.

204	1	88 KU	1
Text and graphics quality		•	
Performance			
Typographic features			•
Paper handling			
Panel controls			
Overall value			









four pitch settings, and two fonts, and it's the only printer that lets you select line spacing from the front panel.

To change other parameters, you select choices from the descriptive printed menu. Among the many available settings are 14 page lengths and boldface, italic, and double-high/double-wide print enhancements. However, the Omni 800 offers only one slot for both the buffer expansion card and the optional font card, so you must choose between installing a \$115 memory board, which boosts the paltry 7K buffer by 64K, and adding a second font.

Four printers for everyday chores (clockwise from top left): Fujitsu DL3400, Citizen Tribute 224, Panasonic KX-P1524, TI Omni 800 Model 877

EXECUTIVE SUMMARY

Citizen Tribute 224

24-pin dot matrix printer

Superior print quality and speedy graphics generation win the Tribute 224 a strong second place. Text output is somewhat slow, and forms parking is noticeably

absent.	4 3	All	1
Text and graphics quality			•
Performance		•	
Typographic features		•	
Paper handling	•		
Panel controls			U
Overall value		•	

STAN MUSILEK







Unexciting output and inconsistent features plague these printers (clockwise from left): Dataproducts 9044, Brother M-1724L, Star Micronics NB 24-15

The Omni 800's performance and output quality are hardly earth-shattering, but the printer's comprehensive features and friendly interface make it a good value. If you want color printing and bottom feeding, give it a look.

Dataproducts 9044

The contrasting extremes of the 9044 make it difficult to rate. Its text printing is swift, its type is crisp, and it offers optional color printing. However, its \$1099 price is high, its graphics printing sluggish, and its controls

EXECUTIVE SUMMARY

Panasonic KX-P1524

24-pin dot matrix printer

Excellent print quality combines with lumbering performance to give the KX-P1524 third place in this review. The printer's commendable typographic and paper-handling features garner it a solid

recommendation.

Text and graphics quality

Performance

Typographic features

Paper handling

Panel controls

Overall value

limited. Take your pick; this review puts the 9044 in fifth place overall.

With breakneck plain-text printing, the Dataproducts 9044 just barely missed tying the Fujitsu for first place in that category. However, it ran dead last in the graphics tests, for a sixth place performance finish. The printer's output ranked right behind the Fujitsu's in quality, and its performance with multipart forms was first-rate.

The 9044's membrane controls are sparse. You can select two fonts and three pitch settings from the panel, but not proportional spacing. Like the Fujitsu and the TI, the Dataproducts 9044 eschews DIP switches for a printed menu. However, the menu is poorly designed and requires constant reference to the manual.

The 9044 offers two internal fonts, each with an italic version. Only one resident font is available at a time, but plug in an optional \$75 font card, and you can have two active fonts. The printer's 32K buffer is substantial but not expandable.

The Dataproducts 9044 may be a good choice for simple text printing, but with its slow graphics performance and scarcity of extras, it isn't recommended for sophisticated applications.

EXECUTIVE SUMMARY

Texas Instruments Omni 800 Model 877

24-pin dot matrix printer

Occupying the middle of the lineup in fourth place, the Omni 800's performance is slightly above average and its output quality slightly below. However, it's the only unit tested that offers color printing as standard.

/3/	1/2	/di	*
Text and graphics quality			
Performance		•	
Typographic features			•
Paper handling		•	
Panel controls		0	•
Overall value		•	

NSTL TEST REPORT

24-Pin Dot Matrix Printers

The Fujitsu DL3400 won four out of six speed tests. However, speed isn't the only factor that makes a printer good. The Panasonic KX-P1524 was the slowest in four out of six tests but produced the highest quality output.

Plain draft text

Fujitsu	331
Dataproducts	359
Citizen	390
Texas Instruments	394
Star	402
Brother	409
Panasonic	435
seconds 0	500

Enhanced draft text

Citizen	93
Texas Instruments	99
Brother	101
Fujitsu	108
Star	127
Dataproducts	130
Panasonic	246
seconds 0	250

Bar chart

Fujitsu	152
Citizen	161
Panasonic	171
Star	190
Brother	213
Texas Instruments	215
Dataproducts	284
1-1-1	111
seconds 0	250

Plain letter quality text

Dataproducts	703
Fujitsu	709
Texas Instruments	781
Citizen	796
Brother	823
Star	839
Panasonic	899
seconds 0	1000

Enhanced letter quality text

Fujitsu	134
Brother	145
Texas Instruments	155
Citizen	180
Star	184
Dataproducts	236
Panasonic	431
seconds 0	500

Pie chart

Fujitsu	80
Star	106
Citizen	110
Panasonic	135
Texas Instruments	141
Brother	174
Dataproducts	223
seconds 0	250

Models tested include the Brother M-1724L, Citizen Tribute 224, Dataproducts 9044, Fujitsu DL3400, Panasonic KX-P1524, Star Micronics NB 24-15, and Texas Instruments Omni 800 Model 877. All tests were performed using a parallel interface between the printer and a Compaq Deskpro 286 equipped with 1.15MB of memory, a monochrome monitor, and a 20MB hard disk. For each test, an application program's printer output was captured in a file. The DOS command COPY was then used to send that file from a RAM disk to the printer. Timing began when the <Enter> key was pressed to issue the COPY command and ended when the printer stopped printing.

Plain draft text

This benchmark times the printing of plain text in draft mode. The test file was created by capturing 20 pages of text without enhancements or formating; it was then printed with Microsoft Word using the TTY driver.

Plain letter quality text

This benchmark times the printing of plain text in letter quality mode. The same procedure used for the plain draft text benchmark was used for this benchmark, except that the printers were set to their respective letter quality modes.

Enhanced draft text

This benchmark times the printing of enhanced text in draft mode. The test file was created by capturing the output of 4 pages of text that included enhancements such as boldface, italics, underlining, and superscripts; it was then printed with Microsoft Ward. Each printer used the Epson Epson LQ-1000 driver except for the Citizen, which used the Toshiba 1340 driver.

Enhanced letter quality text

This benchmark times the printing of enhanced text in letter quality mode. The same procedure used for the enhanced draft text benchmark was used for this benchmark, except that the printers were set to their respective letter quality modes.

Bar chart

This benchmark times the printing of simple graphics. The test file was created by capturing the output of a high-density 1-2-3 bor chart and was then printed by PGRAPH using the Epson IQ-1500 driver. All printers were set for Epson emulation.

Pie chart

This benchmark times the printing of simple graphics. The same procedure used for the bar chart benchmark was used for this benchmark, except that a pie chart was produced.

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

Brother M-1724L

The \$949 M-1724L is a likable machine with a small footprint, thorough emulations, friendly panel controls, and well-designed paper handling, but it suffers from mediocre performance and lackluster output quality. The M-1724L took fifth place in overall speed and finished sixth in print quality.

The M-1724L's membrane switches are efficiently designed, providing speed and pitch control and access to a unique feature that lets you print copies from the printer's 16K buffer (expandable to 48K). The front panel's function mode lets you change parameters such as print style, page length, and font.

Other default settings must be changed with DIP switches, which are inconveniently housed under the printhead.

The Brother's paper handling features are well implemented. All controls, including head gap and platen levers, are located on the outside, so you don't have to open up the printer. But all in all, the Brother's friendly interface can't overcome its below-average performance and output quality. It merits a sixth place finish overall.

Star Micronics NB 24-15

The NB 24-15 offers numerous typographic extras, but all those fonts and pitches are wasted on its miserable output quality. In addition, the \$999 Star's performance is slow, its panel controls are awkward, and it lacks forms parking.

Of all the printers reviewed, only the NB 24-15 delivered unacceptable output. Faint and inconsistent inking and characters with missing extenders put the Star's output solidly in last place. The printer fared better in the speed category, coming in fourth.

The Star's panel controls are extensive but extremely clumsy. Unlike with the other printers, in order to change speeds, fonts, and pitch settings, you have to turn off the printer and hold down a membrane switch while turning the printer back on again. The Star's function mode unleashes numerous features from the front panel, such as buffer clearing, margin setting, and forward and reverse microline spacing. To change other settings, however, you have to flip DIP switches, which are a hassle to reach in their hiding place under the ribbon cartridge.

Typographic features are the NB 24-15's only strength. The Star comes standard with the Prestige font in both roman and italic, and optional font cartridges are available for \$59.90 apiece. The standard buffer is only 4.5K, but for \$149 you can upgrade to 20.5K, and for \$340 to 516.5K—the largest buffer available among the units tested. You can also purchase a unique 32K memory cartridge for storing downloadable fonts.

Despite these spiffy typographic options, the NB 24-15's tedious interface and inferior output make it the obvious loser in this evaluation. Coming in last in overall value, the Star is not recommended.

Zippy Pinheads

In judging these printers, speed and output quality were primary considerations, while typographic features, paper handling, and panel controls were also evaluated. The Fujitsu DL3400 not only was the fastest printer, it also scored well in almost every other category. Second place goes to the Citizen, which delivers crisp print quality and respectable speed. The winner in print aesthetics, the

EXECUTIVE SUMMARY

Dataproducts 9044

24-pin dot matrix printer

A high-priced object of extremes, the 9044 takes a qualified fifth place. Lightning fast at text printing, the 9044 bogs down with graphics.

Output quality is respectable, but the interface is frustrating.

130	福	800	Stell	/
Text and graphics quality	1	1	7.	*/
Performance		•		
Typographic features		•		
Paper handling			•	
Panel controls	•			
Overall value		•		

EXECUTIVE SUMMARY

Brother M-1724L

24-pin dot matrix printer

Friendly panel controls and paper-handling features can't overcome the Brother's fainthearted performance and mundane output quality. The Brother takes sixth place overall; there aren't enough extras

3 1 8 8

to recommend it.

/	1	1	18	1
Text and graphics quality	•	1		
Performance		•		
Typographic features			•	
Paper handling			•	
Panel controls			•	
Overall value		•		- 0

Panasonic, takes third despite its slow operation. And although its price is high and its quality mediocre, TI's Omni 800 places fourth by combining above-average speed with an extensive assortment of features. Close on its heels, the Dataproducts 9044 confuses matters with fast text speed, slow graphics, laudable output, and an awkward interface. Mediocre speed combined with uninspired print quality puts the Brother solidly in sixth place, while the Star falls far behind thanks to poor output quality.

A printer can be many things to many people, so your priorities may yield different rankings. Still, the Fujitsu would be a winner in anybody's book, and the Citizen, the Panasonic, the TI, and the Dataproducts all warrant a closer look.

Eric Brown is a contributing editor for PC World.

EXECUTIVE SUMMARY

Star Micronics NB 24-15

24-pin dot matrix printer

Aside from a wealth of typographic extras, the NB 24-15 leaves much to be desired. With wretched output and just average speed, it ranks last

in this review.

	1	1	18	4
Text and graphics quality	•			
Performance		•		
Typographic features				•
Paper handling	1	•		
Panel controls				
Overall value				

8 1 8 8

WHERE TO BUY

Brother M-1724L

Brother Int'l Corp. 8 Corporate Pl. Piscataway, NJ 08854 800/284-4357, 201/981-0300

List price: \$949

Accessories: singlebin sheet feeder \$179; LQ-300 font and 32K memory card \$149

Warranty: one year parts and labor via authorized dealerships

Extended warranty: none

Technical support: unlimited phone support, toll-free number, M-F 8-5

Other support services: none

Citizen Tribute 224

Citizen America Corp. 2401 Colorado Ave. Santa Monica, CA 90404 213/453-0614 List price: \$999 Accessories: singlebin sheet feeder \$289, dual-bin sheet feeder

\$468; emulation card \$99; font card \$60 Warranty: one year parts and labor via authorized dealers **Extended warran**ty: none Technical support: unlimited phone support, toll-free number, M-F 8-5

Other support services: none

Dataproducts 9044

Dataproducts Corp. 6200 Canoga Ave. Woodland Hills, CA 91365

818/887-8000 List price: \$1099 Accessories: single-

bin sheet feeder \$299, dual-bin sheet feeder \$379; font card \$75; color option \$100

Warranty: one year parts and labor via authorized distributors

Extended warranty: none

Technical support: unlimited phone support, toll-free number, M-F 8-5

Other support services: none

Fujitsu DL3400

Fujitsu America 3055 Orchard Dr. San Jose, CA 95134 408/432-1300 List price: \$925

Accessories: singlebin sheet feeder \$295, dual-bin sheet feeder \$580; font card \$45; color option \$100 Warranty: one year

parts and labor via authorized distributors, \$135 for on-site repair Extended warran-

ty: ship-in or carry-in \$90 per repair, on-site \$185 per repair

Technical support: unlimited phone support, toll-free number, M-F 6:30-5:30

Other support services: none

Panasonic KX-P1524

Panasonic Industrial Co. Office Automation Group Two Panasonic Way

Secaucus, NJ 07094 201/348-7000

List price: \$949 Accessories: singlebin sheet feeder \$259, bottom-feed pull tractor \$110, font cards \$59 each, 32K buffer chip

Warranty: two year parts and labor via

original distributor (for original manufacturer defects)

Extended warranty: none

Technical support: unlimited phone support, toll-free number, M-F 9-5

Other support services: none

Star Micronics NB 24-15

Star Micronics America 200 Park Ave. #3510 New York, NY 10166 212/986-6770

List price: \$999 Accessories: singlebin sheet feeder \$299. dual-bin sheet feeder \$499; font cartridges \$59.90 each; 32K RAM storage cartridge \$89.95; 16K buffer expansion \$149, 512K buffer expansion \$340 Warranty: one year parts and labor via au-

thorized service centers **Extended warran**ty: none

Technical support: unlimited phone support, toll-free number, M-F 8-6

Other support services: none

Texas Instruments Omni 800 Model 877

Texas Instruments Data Systems Group P.O. Box 181153 Austin, TX 78718 800/527-3500

List price: \$999 Accessories: singlebin sheet feeder \$225, dual-bin sheet feeder \$375; push/pull tractor \$150; font cartridge \$65; 64K buffer option \$115; serial interface

Warranty: 90-day warranty on parts and labor via distributor or field depot

\$65

Extended warranty: carry-in \$96 per

Technical support: unlimited phone support, toll-free number, M-F 8-5

Other support services: none

For more more information, see Products Featured in This Issue.

Accounting Software: Good for Business

General accounting software is all the automation many small businesses need.

PC World compares general ledger, accounts receivable, and accounts payable modules from Accpac BPI, RealWorld, and Solomon III.

hen they decide to take the plunge into computerizing their accounting system, most small businesses begin by shopping for a general ledger—the central clearinghouse for accounting information. It consolidates key details into financial statements and other management reports. The two other most commonly used modules—accounts receivable and accounts payable—handle the mechanics of income and outgo, and feed the results into the general ledger for useful summary and analysis.

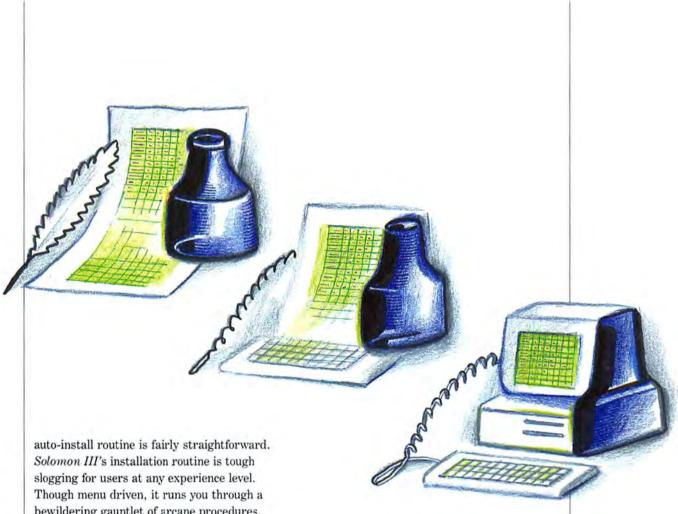
With that triad of basic functions in focus, this roundup compares three of the most popular multimodule accounting families: Computer Associates' Accpac BPI, Real-World Corporation's RealWorld, and TLB's Solomon III. For between \$400 and \$800 per module, each offers usable menus and integration, good basic functionality for small to midsize businesses, and generally, an audit system your CPA needn't sniff at.

Bargain-priced *BPI* general ledger, accounts receivable, and accounts payable modules present a friendly face to small business users. Equivalent modules from the *Real-World* series boast an unorthodox but rigorous audit system; stable performance and a flexible, date-sensitive data base have won it a loyal following. The powerhouse of the bunch—and at \$795 per module, the most expensive—is the *Solomon III* trio. Great reporting and consolidation features make its three modules attractive for multisite organizations.

Installation

BPI's installation is the simplest of the three. Ample prompts and lucid, step-by-step explanations in the manual guide an uncomplicated menu-driven company setup procedure. RealWorld's documentation suffers by contrast; the manual recommends early on that you consult your accountant before installing the package (not bad advice), and then proves that you need one by dosing the prose with jargon. Fortunately, though, the

Ralph Soucie



Solomon III's installation routine is tough slogging for users at any experience level. Though menu driven, it runs you through a bewildering gauntlet of arcane procedures. Then you have to call the vendor to obtain a registration key code; otherwise, you're limited to 20 accesses to the data base of accounts.

The General Ledger

If you're running a small to midsize business, what should you look for in a general ledger? First off, get one that's big enough to handle the total number of your current (and projected) accounts. You also need competent error trapping and convenient transaction editing. Reporting and budgeting functions should include predesigned formats and adequate memo fields, and editing report formats shouldn't drive you crazy. Finally, since data integrity is the backbone of any accounting system, make sure your general

ledger protects against errors and embezzlement by employing password schemes and audit trails.

All three general ledger packages cover these basics, but beyond that they are optimized quite differently. BPI's general ledger contains functions reserved for separate modules in RealWorld and Solomon III. However, BPI's product line consists of a skimpy five modules, and the program has the smallest account capacity of the three—just under 10,000 accounts—while RealWorld allows 10 million and Solomon III is limited only by the size of the hard disk.

All the packages accommodate subaccount suffixes for multiple profit centers, but consolidation features differ sharply. Though each system provides good on-line help, the quality of their menu organization and documentation varies.

FEATURES EVALUATION

Accounting Software Compared

Solomon III scores high marks for general ledger features and flexibility, while BPI is the price leader. RealWorld offers solid value in its accounts receivable and accounts payable modules.

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General ledger	ealWorld	Jomon III	(pat BP)
Number of accounts allowed	10 million	Δ	9998
Number of digits allowed in account numbers	7	12	12
Full-screen editing of journal entries	0	•	•
Point-and-shoot selector key	0	•	•
Account ranges accepted in reports	0	•	0
Flexible columnar computations in reports	0	•	•
Automatic ratio analysis report	0	•	0
Unattended printing of multiple reports	•	0	
Bank reconciliation	0	0	•
Operation-level password protection	•	•	0
Consolidates multiple companies	•	•	0
Consolidates remote companies	0	•	0
Accounts receivable			
Number of customer accounts allowed	Δ	Δ	1 million
Number of past-due intervals for aging	3	4	5
Prints invoices for single transactions	01	01	
Recurring invoices	•		0
Puts disputed invoices on hold	01	01	
Option to compound finance charges	•	•	0
Automatic sales tax computation	•	0	0
Tracks sales by salesperson	•	01	0
Posts activity to general ledger in summary or detail	•	•	O ²
Age-dependent dunning notices	•	•	0
Accounts payable			
Number of vendor accounts allowed	Δ	Δ	1 million
Number of aging intervals	4	6	4
1099 processing and reporting	•	•	0
1099 backup withholding	0	•	0
Check reconciliation (limited)	01	•	• 3
User-defined aging categories	•		• 4
Prevents duplicate payments	•	•	O 5
Posts activity to general ledger in summary or detail		•	O2

Yes ○ No Deficient Limited by available storage

Menu Navigation BPI's task-oriented menu system and helpful documentation add up to the most hospitable interface for neophyte users. Especially useful is the gaggle of "journal prompts" it supplies. These customizable data entry screens provide some of the functionality which, in other systems, is available only in expensive separate modules. Included in the general ledger are journals for cash register receipts, invoices, merchandise purchases, and payroll.

RealWorld's menu system is well-organized but suffers the same flaw as the documentation—jargon-laden descriptions. And you must use <End> rather than <Esc> to back out of screens, which can be a drag if you like to keep <NumLock> on during data entry.

Solomon III's menu system is the most complex of the three but manages to be clear and logical. Though unhelpful on setup matters, Solomon's manual is otherwise topnotch, with lots of screen shots as well as procedural tips and on-disk forms to help organize the conversion process.

BPI and Solomon III ease data entry in other ways. Both display the entire journal entry on screen for orientation, and both supply one-key commands that pop up a list of valid responses. RealWorld provides neither of these niceties, so if sheer data entry throughput is your primary concern, view RealWorld with caution.

Botch Processing Alone of the three general ledgers, BPI makes batch processing optional. If you accept its default mode, each entry to the general ledger is automatically posted as you key it in. Switching from real-time posting to batch posting is a matter of pressing the <Esc> key, but leaving this decision to the user may give your CPA a few gray hairs.

Though unorthodox, RealWorld's enforced batch system is highly effective. Instead of numbering transaction batches as Solomon III does, or numbering individual journal entries as is BPI's wont, RealWorld assigns a report number to each entry on a transac-

Available through separate module.

² Transactions are posted in detail, but detail is lost when general ledger is closed.

³ Included with general ledger module.

⁴ Aging intervals must be entered when aging report is produced.

⁵ Only if duplication is within one accounting period.

tion listing. Each line item can have a 25-character explanation, which carries through to reports. (*BPI* permits 10-character lines for each journal entry, but these are suppressed in its summary reports.) Moreover, since corrections are linked to reports, there's never any confusion about which financial statement is current.

RealWorld's solid audit system is all the more surprising because the program is so flexible about account inquiries. Open ended, it does not require a monthly closing as the other two do, so you can make inquiries based on the entire fiscal year. If you need a safe and flexible general ledger, RealWorld's got your number.

Like RealWorld, Solomon III operates on a batch-processing system. It forces you to print a listing of all the transactions in a batch before they can be posted to the general ledger. Solomon III also requires a monthly closing, so account inquiries must be limited to the open period.

Reporting A good general ledger not only does the grunt work efficiently, it produces the financial statements you need to steer your business through rough waters. *Solomon III* takes top honors in this department.

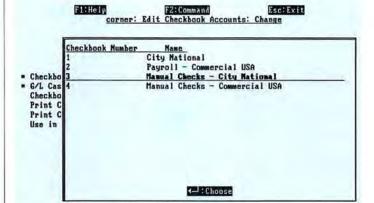
EXECUTIVE SUMMARY

Accpac BPI

General ledger, accounts receivable, accounts payable accounting modules

A good choice for neophytes and small cashbased companies, the BPI family boasts easy installation, simple menus, helpful templates, and a lot of function for a bargain price. Weaknesses include a sometimes bypassable audit trail, no support for Form 1099 in the accounts payable, and a limited se-

modules.	脚	6000	Stelle	1
Setup and installation		m		•
Data entry and validation				•
Reporting			•	
Auditing and security		•		
Overall value		THE		



BPI's reporting is generally good, though limited. Three automatic reports—balance sheet, income statement, and trial balance—can be printed as is or customized via the prompt-driven edit menu. However, BPI reports budget variances in a quirky way: 10 percent over budget appears as '110%' rather than the more common '+10%'. And you must set a report destination globally—another irksome feature, especially if you're playing around with a layout before printing it.

RealWorld's printer handling is the best of this bunch, and it boasts a clever coding system that automatically generates statements of changes in financial position. However, limited columnar flexibility can yield cluttered reports; tedious editing procedures further compromise RealWorld's usability. Give RealWorld credit, though, for supplying a handy automatic loan amortization schedule generator.

Solomon III offers 14 predesigned report formats as well as the widest range of customizing features. Budget reporting is especially comprehensive, with two distinct memo fields for each account and easily accessible percent-variance computations. You can customize Solomon III's default formats or define your own reports from scratch—tough

BPI's Selector is shown here in the process of adding a new checkbook (the program can support up to nine).

Process Add	A/P transacti	ons	HELTON ADVERTISING, INC.
	Voucher	912	
	1. Trans type	Regular	
	2. Vendor		X PRODUCTS
		Ter	ms: 2/18 NET 38
	3. P.O.#	94883	
	4. Dist date	9/15/88	
	5. Invoice 1	UG78374	11. Disc days
	6. Inv date	9/15/88	12. Disc date
	7. Inv amt	12,808.88	13. Disc pct
	8. Mon-disc	.88	14. Disc amt
			15. Disc acct
	9. Due days		13. Plac duct
		-	
	18. Due date		

Press F1 for automatic assignment of 89 through \$15

RealWorld's
Accounts Payable
module saves
keystrokes; entering <FI> at
this point will
plug default responses into the
next seven input
fields.

work, but the manual offers excellent support.

Consolidation All three general ledgers offer password protection. *RealWorld* and *Solomon III* provide the additional security of operation-level passwords that limit access to individual functions.

BPI limits consolidation to divisions and departments, and it won't handle separate companies. But both larger systems provide multicompany consolidation features. Real-World will combine only companies whose data bases coexist on the same hard disk; with Solomon III, you create an ASCII file for each company, then read in those files to create a file that combines all account balances but not the transaction detail.

With its functional journal templates, easy setup, and simpler interface, BPI General Ledger is the best bet for smaller businesses—but clear its nonbatch posting method with your CPA first. RealWorld offers competent, straightforward operation, flexible account inquiry, and an ironclad audit trail. Data entry is the weakest of the three, however, and its reports are the most difficult to design. With unlimited capacity, powerhouse reporting, and remote consolidation, Solomon III's general ledger is the obvious choice for larger, more complex business operations.

Accounts Receivable

All three accounts receivable packages offer capacious master files and handle basic customer types and billing arrangements—with Solomon III providing the most options and the largest capacity. In addition, they all print customer statements, as well as aging reports that show who's behind in their payments.

On the matter of invoicing, though, there's a sharp division. *BPI* assumes you'll be doing all invoicing within the accounts receivable module and gives you the tools to do it. *Real-World* and *Solomon III* offload invoice printing to separate modules. *Solomon III*'s customer data base is especially impressive, with fields for Telex and TRW numbers and multiple ship-to addresses in the master file, and a separate file for payment terms.

Menu Navigation BPI's accounts receivable module is certainly the easiest to use. Its menu is straightforward, and the custom journal prompts make life easier here, as they do in the general ledger. RealWorld's screens are Spartan but functional, and the program features a well-designed system for automatically entering default values.

EXECUTIVE SUMMARY

RealWorld

General ledger, accounts receivable, accounts payable accounting modules

The safest choice. An open-period system, Real-World supplies great account inquiry tools and stable, dutifully audited operation. The manual and menus favor jargon, though, and data entry is generally the most cumbersome of the three packages reviewed, as is reporting. A couple of extras may tip the scales for some users: loan amortization and sales analysis tools.

sales analysis tools.	THE	GOOD	Stell	1
Setup and installation			•	
Data entry and validation		•		
Reporting		•		
Auditing and security				
Overall value			•	

While Solomon III's snappy, efficient screens look great, they demand a long learning curve due to their heavily abbreviated field descriptions. Once you've got the hang of it, though, Solomon III offers some shortcuts. A handy "quick maintenance" feature, for example, allows you to add a new customer, change an address, or increase a credit limit in the middle of invoice entry.

Billing Cycles All three packages manage customer-specific billing cycles and payment terms, though BPI has the fewest options for applying discounts and finance charges. It is the only program that cannot compound finance charges, for instance. All three programs compute discounts for early payments; and except for BPI, all figure trade discounts automatically.

Reports In addition to the accounts receivable activity listings that serve as audit trails, all the programs produce full or partial listings of customer activity with year-to-date totals. And all three will break down

EXECUTIVE SUMMARY

Solomon III

General ledger, accounts receivable, accounts payable accounting modules

Extensive reporting, remote-site consolidation, and a terrific growth path make this the choice of many midsize businesses. Difficult setup is balanced by a good interface and classy manual. Though auditing and passwords provide basic protection, sometimes touchy operation means you'll need a rigorous schedule of backups.

sive and so is support.	爾	6000	Stelle	1
Setup and installation				
Data entry and validation	in			
Reporting				
Auditing and security	Till			
Overall value		117		

1 No	Descript Year-To-Date Inco	ion Whole \$ Parens one Statement (Y, N) H (Y, N) Y	
	er Acct Suh	Description	Sky Col S 1
IS		Cost of Goods Sold	
10	577777-777777 677777-777777	Gross Profit Total Operating Expense	1 2
12 - 13 -			
m -	987777-777777 987777-777777	Operating Income Other Income Other Expense	2 = 2
0 -	999877-77777	Met Income Before Tax Provision For Income Tax	

accounts receivable transactions by general ledger account.

An important key to managing receivables is the aging report, and *RealWorld*'s datesensitive data base shines here. With both *BPI* and *Solomon III*, producing the aging report requires some caution because the aging process (like a monthly closing) purges transaction detail. But with *RealWorld*'s open-period system, transaction details are not linked to purging and closing operations; you have independent control and can save transaction details as you see fit.

Tax Help If sales taxes and commissions are important considerations in your business, RealWorld may be your vendor. BPI currently doesn't offer any help with tax computation—though some features are slated for the next version. RealWorld, though, offers three tax percentage fields in the customer master file (one for state and two for local sales tax), computes sales commissions automatically, and can print a commissions-due report. Solomon III relegates all such functions to separate modules.

Here as with its general ledger, *BPI* requires users to be deliberate in maintaining hard-copy audit trails. On the upside, it's easy to use and includes invoicing capability. *RealWorld*'s module should be a hit with users who employ commission salespeople. But if your company is large and requires frequent analysis of customer activity, *Solomon III* will likely provide a better solution.

Solomon's powerful masking scheme for account numbers is illustrated here (note the entries in the "Acct/ Sub" columns). Combined with a well-designed chart of accounts, it allows you to quickly group account balances at any desired level of detail.

Date 06/08/88	Terra Firma Landscaping,	Rept 01.6
02-03-0007	Ratio Analysis As Of 06/08/88	Kept UI.o
	AS-01 00/00/00	
LIQUIDITY RATIO	s	
Current Ratio		2.18
Acid-Test Rat		1.67
Inventory Tur		7.62
Average Days		48.03
Days Sales Ir	Inventory	96.06
A/R Turnover		15.24
Average Age C	f Receivable	24.05
Days Of Sales	In A/R	48.10
Days In Avera	ge Operating Cycle	72.08
Days In Year-	end Operating Cycle	144.16
COVERAGE RATIOS	P T-1	
Debt To Equit	y Ratio	0.55
Times Interes	t Earned	0.00
DEBT RATIOS		
Debt Ratio		0.36
Equity Ratio		0.64
PROFITABILITY R	ATIOS	
Return On Tot	al Assets	0.48
Gross Profit	Margin	0.67
Net Profit Ma	rgin	0.40
Asset Turnove	r Ratio	1.20
Return On Own	ers Equity	0.72
Return On Lor	g Term Capital	0.54

Solomon's Ratio
Analysis report
is generated
automatically.
All you have to
do is assign
each account
to the proper
"ratio group"
when creating
your chart of
accounts.

Accounts Payable

With a competent accounts payable package, you should be able to specify recurring payments and vendor-specific payment terms. You want to be able to hold, select, and release vouchers for payment according to terms that you define. You should be able to print check registers and cash requirement reports with minimal effort. Finally, you'll need help producing IRS Form 1099.

Basic Payables Though its menus and journal prompts are nice, *BPI Accounts Payable* is a relatively weak product. Drawbacks include a confusing voucher-selection process and no automatic computation of trade discounts.

From voucher entry to payment, *Real-World* provides a very smooth payables system. Sensible defaults speed up data entry

chores, and you can institute hold-payment operations within the voucher selection process. Payment deferrals can be designated as temporary or permanent.

Solomon III's voucher handling isn't engineered quite so neatly, but it offers more versatility. For example, contractors and job shops will appreciate its facility for charging expenditures to particular jobs. Solomon III also tackles the tricky matter of expense account advances for employees. Moreover, any payment terms previously defined in the accounts receivable module will automatically carry to the accounts payable module, and vice versa.

Forms and Reports BPI Accounts Payable's most serious deficiency is that it offers no support for Form 1099—which may rule it out for businesses that use any kind of contract labor.

By contrast, *RealWorld* and *Solomon III* produce both hard-copy and on-disk 1099s. *Solomon III* goes beyond the basics by allowing you to distribute payments to any of the eight boxes on the official 1099 form; it also lets you change the threshold amount, do backup withholding, and handle transferee 1099s.

Reporting functions are otherwise evenly handled by all the programs: You can produce a cash requirements report, an orderly check register, and vendor lists with statistical analysis added, and you can break down accounts payable transactions by general ledger account.

Bug Report Solomon III's high-class accounts payable options might come to dust in your hands if you're not careful, though. I found one significant bug by trying to send a transaction batch to screen rather than to hard copy or disk as a proper audit trail requires. Solomon III doesn't just forbid the procedure—which would be fair enough—the entire program freezes. All you can do is reboot, risking a corrupted data base in the process. TLB technical support promised

that a fix was in the works, but no one could say when it would be shipped to users. To be fair, Solomon III's recovery system is excellent; you can replay keystrokes up to the point of the crash, thereby saving your work if not your time.

If you were choosing only an accounts payable package, wisdom would suggest *Real-World*. It's not as congenial looking as *BPI*, but it's a lot more capable. And there's no time bomb ticking away in an ambitious feature set, either, as there is in *Solomon III*'s accounts payable module. But most businesses don't live by accounts payable alone, so the decision is a bit more complex.

Projecting a Purchase

BPI's general ledger module offers outstanding value for the smaller, cash-based company. Easy to set up and use, its default real-time mode streamlines transaction entry. On the debit side, real-time posting might not sit well with more sophisticated users. Also, though BPI's accounts receivable is the only one of the three to include invoice printing, it has fewer options overall, and the accounts payable is weak indeed.

Solomon III mixes tremendous PC-based accounting power and capacity with a well-

designed interface. Reporting is versatile, and consolidation is outstanding. The Solomon III family includes lots of specialized modules, too. But it costs \$100 more per module than RealWorld, plus \$95 extra for the required System Manager module—and hefty fees for any customer support plan. More serious is the bug in Solomon III's accounts payable. It suggests another, hidden expense in Solomon III: a dedicated backup person.

RealWorld isn't an obvious choice, but it may be the best compromise for many small to midsize companies. Besides an unlimited capacity and a good feature set, RealWorld offers some attractive conveniences. Easier to install than Solomon III, it also requires far less disk space. Best of all, with a bulletproof audit trail system and no inclination to eat data, it's safe. And that's the real bottom line in accounting software.

Ralph Soucie is a CPA in Lake Oswego, Oregon, and a contributing editor for PC World.

WHERE TO BUY

Computer Associates

Accpac BPI

Int'l, Inc.
1240 McKay Dr.
San Jose, CA 95131
408/432-1727
List price: General
Accounting \$395, Accounts Receivable \$395,
Accounts Payable \$395,
U.S. Payroll \$395, Inventory Control \$395
Requirements: 512K,
haddals, DOS 3.00 or
later version

Technical support: \$125 per module for one year's unlimited toll-free phone support and free upgrades (\$195 for U.S. Payroll, which includes

tax table updates)

RealWorld Accounting System

RealWorld Corp. 282 Loudon Rd. P.O. Box 2051 Concord, NH 03302 800/255-1115 List price: General Ledger \$695, Accounts Receivable \$695, Accounts Payable \$695 **Ancillary modules:** Payroll \$695, Inventory Control \$695, Order Entry/Invoicing \$695, Professional Invoicing \$695. Sales Analysis \$350, Purchase Order \$695,

Check Reconciliation

\$230, JobCost \$695, Report Writer & Data Bridge \$695

Requirements: 256K, hard disk, DOS 2.10 or later version

Technical support: \$30 for first 15 minutes plus \$2 for each additional minute

Other support services: package support deals include \$175 per module for six months' unlimited phone support and free upgrades, or \$50 per module for six months' free upgrades only

Solomon III

TLB Inc. 1218 Commerce Pkwy. P.O. Box 414 Findlay, OH 45839 800/822-0444, 419/424-0422 List price: General Ledger \$795, Accounts Receivable \$795, Accounts Payable \$795 **Ancillary modules:** Payroll \$795, Purchase Order \$695, Order Entry/Invoicing \$695, Inventory Control \$795, System Manager \$95 Requirements: 512K, hard disk, 132-column printer, DOS 2.00 or later version

Technical support:

\$695 for one year's tall phone support, free software and documentation updates, and a monthly newsletter; \$495 for all of the above, except for manual updates

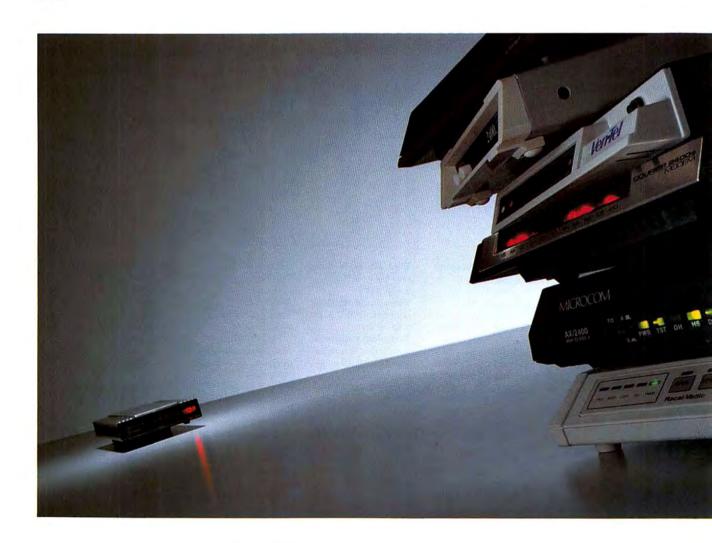
For more information, see Products Featured in This Issue.

Smarter Modems

Six midpriced 2400-bps modems take on the venerable Hayes Smartmodem 2400—

and prove there's more than one way to skin a standard.

Judy Getts



verything comes to those who wait," wrote one sage. But waiting is the last thing you want to do when you're shuttling massive spreadsheets, reports, or customer orders over the phone line to another computer. Of course, truly high-performance communications-in the form of a V-series 9600 modem —may be beyond your budget or application. But if you regularly exchange heaps of data with other PCs, need to link your local area network to the outside world, or simply want to speed up full-screen editing with a remote mainframe, a 2400-bps modem is an economical way to minimize your thumb twiddling. But should you follow that instinctive urge to buy a Haves Smartmodem 2400?

Not necessarily. Although Hayes virtually created the 2400-bps modem market, the \$599 Smartmodem 2400 isn't the cheapest or even the best game in town. For \$50 less, you can own Okidata's versatile, easier-to-configure Okitel 2400; for \$100 more, the feature-laden Microcom AX/2400 with fast built-in MNP error correction can be yours.

Nevertheless, the Smartmodem 2400 was the first game in town, and it's still the modem to beat-and to imitate. Most of the units examined here-the Cermetek 2400R. the Microcom AX/2400, the Okidata Okitel 2400, the Racal-Vadic Maxwell 2400VP, the USRobotics Courier 2400, and the Ven-Tel 2400 Plus-are cheaper than the Smartmodem 2400, and most offer roughly the same functionality and durability. The Microcom and the Racal-Vadic, however, include MNP error correction, which the Hayes lacks. All but the Okitel and the Courier matched the Smartmodem's stability over noisy lines. Not surprisingly, none of the modems were as Hayes compatible as the Hayes, but the Okitel came close, and all the reviewed units save the Courier offer synchronous transmission. However, few users will find this feature useful since most mainframes now support asynchronous dial-up calls.

To pinpoint their talents and defects, we subjected the modems to extensive automatic

redialing and answering, handled numerous PC-to-PC and PC-to-mainframe file transfers, and acted as the mouthpiece for an electronic bulletin board using RYBBS software. In addition, National Software Testing Laboratories (NSTL) calibrated the stamina of the modems over dirty phone lines and tested their compatibility with all 39 Haves AT commands and the key 13 S registers these commands control. Finally, NSTL auditioned the modems with Crosstalk XVI, Microsoft Access, Relay Gold, Smartcom II, and Softerm PC. The test results confirm that if you're shopping for a 2400-bps modem in the \$600-plus price range, the Smartmodem 2400 needn't be your first or even second choice.

The DIPs Stick

Configuring a modem can be a dream or a nightmare, depending on the technique used. Hayes made a lot of noise about the Smartmodem 2400's "innovative" software-based approach, which forces you to enter settings from the keyboard (using AT& commands) and store them in the unit's nonvolatile memory. Most users, however, find the process tedious and confusing and will welcome the Cermetek, USRobotics, and Ven-Tel modems, which wisely opt for simple DIP switches.

If your communications package specifically supports the Smartmodem 2400 (and not all do), software-configured modems such as the Okidata, the Racal-Vadic, and the Microcom are the easiest to install, since all you do is pick 'Smartmodem 2400 compatible' from a menu. Otherwise, be prepared for a long session, because none of these programmable modems supports the AT&V command, which displays all the modem's configuration settings at once. Instead, you will have to query the modem's registers one at a time.

Naturally, straightforward, well-organized user manuals greatly simplify setup, and both the Okidata and Courier modems are so

FEATURES EVALUATION

Midrange 2400-bps Modems Compared

Based on features, it's clear that the Hayes Smartmodem isn't the most powerful modem or the easiest to use.

Yes O No	Owid	Ratal-Vac.	USRobotic Maxwell L.	Nen.	Hayes Sm.		
· \atelogate or	aia	Na	Pol	10	1 3	1	
Yes \ \ \ \ \ \	2/	<u>.</u> / :	/ :	/ .	8 1	1	
	13	3	1	Out.	2	TO TO	
No \ >	3	18	10	2	2	1	1
Deficient \	1	1	13	100	3	1	1
Standard features	1	1	1	3	1	1	1
Price	\$545	5699	\$549	\$595	\$499	\$599	\$599
Error correction	0		0	•	0	0	0
Synchronous communications	•	•	•	•	0	•	
Status lights							
Power on	0		•	•	•	•	•
Off hook	0	•	•	•	•	•	
Data terminal ready	•	•	•	0	•	•	
Carrier detect	•	0	•		•	•	
Send/receive	•	•	•		•	•	
Auto-answer	0	0			•	•	•
Modem ready		0		0	•	•	
Setup and configuration							
DIP switches		•	0	0		•	0
EPROM settings	0	•	•	•	0	0	
Phone number storage	0	•	•	•	0	•	•
Log-on password protection	0	0	0	•	0	0	0
Controls							
Power switch		0	•	•	•	•	•
Speaker volume knob	•	91	•	•		0	0
Asynchronous/ synchronous switch	•	•	0	•	0	•	0
Speed switch	0	0	0		0	0	0
Voice/data switch	•		0	•	0	0	0

Accessible only with a screwdriver.

blessed. The most difficult modem to install is the Microcom, which is accompanied by a convoluted, techno-laden manual. (The manual does, however, explain how to configure a modem for specific communications programs.) Microcom exacerbates the confusion by allowing you to configure the modem with either DIP switches, Hayes AT commands,

or Microcom's proprietary set. This is one case where freedom of choice is a burden.

The Cost of Compatibility

Hours of toil and headaches await the modem buyer whose purchase is not Hayes compatible. A fully compatible modem would support all the Smartmodem's AT commands, which dictate how and when a modem answers a call, waits for a pause, goes on line, and so on. Keep in mind that not all AT commands are crucial. If a modem fails to recognize speaker-volume commands, it's an inconvenience; if the modem doesn't respond to a disconnect command, it spells serious trouble.

If you don't count partially supported AT commands and S registers, the Okitel is the compatibility champ, supporting 46 of the 49 settings. The Microcom is second with 42, with the Cermetek at the bottom recognizing only 30 commands.

Three of the modems sally forth with their own proprietary commands. The Courier offers a sprinkle of supplementary AT com-

EXECUTIVE SUMMARY

Okidata Okitel 2400

2400-bps modem



Reliable and solidly designed, the Okitel supports more Hayes AT commands than any modem examined. It has a full bank of status lights and an easily reached power switch. Al-

though it chokes on extreme line impairments, it's the best all-around

modem tested.

Tags Its Gags Heller

Standard features

Setup and configuration

Controls

Hayes compatibility

Noise tolerance

Overall value

Smartmodem AT Command Test

Central to a modem's Hayes compatibility is its adherence to the Smartmodem AT command set. NSTL tested the modems with every Smartmodem 2400 AT command, along with the most important S registers. This table lists only those commands and registers not supported by at least one modem.

\	Cem/	Micro 9	ALIA MATA	Baral Court	ISNO!	en i	4
T commands	Cermetek 2400R	Microrom AX/2400	Maxwell 2400	Courier Courie	usnabonics Nation	New-Tel 2400 Plus	uayes Smartmodem
R Reverse mode	0	•		0	•	•	•
@ Wait for silence	0	0	•	•	0	•	•
W Wait for second dial tone	0		•	•	Q 1		•
ATLn Speaker volume	0	0	•	0	0	0	•
ATM Speaker always off	0		•	•			
ATM1 Speaker on until carrier detected	0		•	•	•	•	•
ATM2 Speaker always on	0				•	•	
ATM3 Speaker on until carrier detected, except while dialing	0	•	•	•	•	•	•
ATYn Long space disconnect		0			0		
AT&Cn DCD control	0				0	0	
AT&Dn Response to DTR change	0	•		•	0	0	
AT&F Restore factory configuration	0		•	•	0	0	
AT&Sn DSR control	0	0	•	•	0	0	
AT&V View active configuration	0	0	0	0	0	0	
AT&Wn Store active configuration	0	€2	⊖2	⊖2	0	0	
AT&Zn=x Store telephone number	0	•	•	⊕3	0	€4	•
registers							
S1 Ring count		•	•	⊖5	⊖5	⊖5	
S2 Escape code character	•			0	•		
S6 Wait time before blind dialing		•	•	06	•	•	
S7 Wait time for carrier/dial tone	•	•	•	0	•	•	
S8 Pause time for comma			•	00	•	•	
S9 Carrier detect response time	0	•	0	0	⊖7	•	
S10 Delay between carrier loss and hang-up	0	0	•	•	•	•	
S18 Test timer	0	0	•	•	0	•	
S25 Time to detect DTR change	0	●8		○ 9	0	0	•

● Yes ○ No ● Deficient

By default, W command is interpreted as a comma (2-second pause).

² Modem can store only one configuration profile in nonvolatile memory, not two; AT&W1 not supported.

^{3 15} phone numbers can be stored using extended nonstandard commands.

⁴ Modem can store only one phone number, not four; supports AT&Z, but not AT&Z1, AT&Z2, or

^{5 &#}x27;Ring count request ATS1?' always yielded 000, despite number of rings actually received.

Modem consistently waited 1.5 seconds less than time (n) specified by ATSr=n command.

When ATS9=100 and ATS7=15, modem terminated the call before a connection could be established; raising the value of register S7 from 15 to 30 resulted in a successful connection.

When ATS25=250&D1, DTR had to be dropped for at least 3.5 seconds (instead of 3 seconds) before it was recognized by the modem. When ATS25=250&D2, DTR had to be dropped for at least 4 seconds (instead of 3 seconds) before it was recognized by the modem.

When ATS25=250&D1, a 1-second drop in DTR caused the modem to return to the command state instead of staying on line. When ATS25=250&D2 and &D3, a 1-second drop in DTR caused the modem to lose the carrier and return to the command state.













Hayes watch out! Clockwise from top left, 2400-bps modems from Okidata. Microcom, USRobotics, Cermetek, Ven-Tel, Racal-Vadic.

mands like AT>, which redials a number, and ATKO, which displays the amount of time spent on line. The Microcom and the Racal-Vadic go one step further, offering complete home-brew command languages that can take the place of the AT set or be slipped one command at a time into an AT string. However, these renegade command sets are mostly redundant.

But AT commands are only part of the compatibility picture. A modem might support every AT command and register, yet have problems with certain communications packages because of one or more minute hardware deviations, such as the data terminal ready (DTR) response time. So it's no surprise that NSTL's real-world software tests flushed out some flaws. For example, the Okitel, the Microcom, and the Courier ran all five test programs faultlessly. Yet the venerable Hayes stumbled over voice/data switching with Relay Gold-as did the Ven-Tel. The Racal-Vadic likewise refused to switch from voice to data when Smartcom II was loaded. But these are relatively minor stumbles. The real klutz was the Cermetek, which fell flat on its face and refused to work with Smartcom II altogether.

Signal to Signal

To gauge each modem's mettle in the face of telephone line snarls, NSTL hooked up the

reviewed units to the TAS 1000 telephone line simulator developed by Telecom Analysis Systems. NSTL tested the modems in both originate (calling) and answer modes with error correction turned off. (The rankings are generally the same in either mode. As for error correction, the better a modem can zap on-line gremlins in the first place, the better the overall throughput, no matter what protocol is used.)

The modems were pitted against the three most common impairments—white noise, phase jitter, and amplitude jitter-at settings that recreate a telephone line at its worst. The result: The Microcom, Cermetek,

EXECUTIVE SUMMARY

Microcom AX/2400

2400-bps modem

The gadget-packed AX/2400 suffers from a steep price and murky documentation, yet its compatibility, fortitude in the face of line noise, and MNP error

correction make

1/2	100	Talle	/2
			•
•			
	•		
		•	
		•	
		•	
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EXECUTIVE SUMMARY

USRobotics Courier 2400

2400-bps modem

The elegantly designed Courier is the pick of the litter for bulletin boards, offering a low price and acceptable software compatibility. However, line-noise handling when initiating

calls is poor.	3 14	100	18th	/
Standard features	1	•		
Setup and configuration	VIII			•
Controls	112			2
Hayes compatibility				
Noise tolerance				
Overall value	To Yang	ÜİS		(

Racal-Vadic, and Ven-Tel turned in performances every bit as good as the Smart-modem 2400's. The Okidata nearly made it into the first circle, but it did have problems with extreme levels of white noise.

In answer mode, the Courier handled the impairments with amazing aplomb, but it fared poorly in originate mode. For example, when it called over a noisy line (19:1 signal-to-noise ratio), nearly half the transmitted blocks of data contained errors, while the other modems ran error-free. Small wonder the Courier is a favorite of BBS operators, who mostly receive calls.

Modems on Parade

Not all 2400-bps modems are created equal, and some are better in certain situations. The following minireviews examine the modems in descending order of overall value.

Okidata Okitel 2400 Strong on essentials, a breeze to set up and use, the Okitel will be welcome to tyros and turbos alike. Faced with sundry communications services and software, the Okitel never lost its cool. Fac-

tor in the unit's near-perfect Hayes compatibility, five-year warranty, and reasonable \$549 price, and the Okitel clearly is the Best Buy of the group.

The Okitel's front panel strikes a nice balance between austerity and overkill. It sports a full set of indicator lights, a crystalclear speaker, and a conveniently placed on/ off button and speaker-volume dial.

The Okitel's AT compatibility is superb—
it's the only modem reviewed that religiously supports register S25, which sets the timing of the modem's response to the DTR signal.
Modems that don't support this register in strict Hayes fashion sometimes can't hang up with some communications programs.

On the minus side, the Okitel's inability to connect when confronted with extreme line noise may give pause to those in areas with lousy phone lines. And while the Okitel's manual is comprehensible, it lacks an index and specific instructions on configuring the modem for major packages such as *Crosstalk*. Okidata's technical support is not exactly user friendly, either—persistent redialing is necessary to get through, long periods on hold are common, and not all company representatives are well versed in the product.

EXECUTIVE SUMMARY

Racal-Vadic Maxwell 2400VP

2400-bps modem

The feature-rich Maxwell is resistant to line noise and offers MNP error correction. But the modem is hampered by mediocre Hayes AT support and poor

Standard features

Setup and configuration

Controls

Hayes compatibility

Noise tolerance

Overall value

Microcom AX/2400 Black and sleek like Darth Vader's answering machine, the AX/2400 will command the respect of anyone in the throes of gadget lust. Its wealth of features, speedy class 4 MNP error correction (as well as the slave class 3), respectable Hayes compatibility, and line noise tolerance place it in a class above its tested competitors. If you frequently link up with other MNP modems and you like the extras, the AX/2400 is for you. Some of the nicer extras include an error status light, a front-panel voice/data button, and the ability to store nine phone numbers and display them on screen. A special plus for unattended communications: The modem hangs up after a specified period has passed without data transmission.

But be forewarned that the Microcom is not for novices. Setup involves choosing one of two poorly documented configuration methods (AT mode or Microcom's SX equivalent using either DIP switches or software commands); running an inscrutable initialization sequence that involves setting the speed of the PC's serial port (an unnecessary step, as it turns out); and paddling through the unit's muddled manual. Five will get you ten that you'll be dialing technical support within an hour of unleashing the beast from Sty-

EXECUTIVE SUMMARY

Ven-Tel 2400 Plus

2400-bps modem

The 2400 Plus easily fends off line noise and offers reasonable Hayes compatibility. Yet, hard-to-reach DIP switches and a penchant for misdialing diminish the

model's appeal.

Standard features

Setup and configuration

Controls

Hayes compatibility

Noise tolerance

Overall value

rofoam. Luckily, the company's support staff is willing and able to assist.

As with most Microcom modems, other inconsistencies crop up. The modem lacks such staples as an on/off switch and carrier-detect and auto-answer status lights. The speaker practically brays, and you need a screwdriver to adjust the volume. The other key omission: support for the AT@ command, which pauses the modem during dialing. Before you buy this sleek machine, make sure it's compatible with the office PBX running the phones.

USRobotics Courier 2400 The Courier 2400 has a lot going for it—but only half the time. Impressive stamina in answer mode makes it a superb choice for BBS operators, but so-so support of the AT command set and difficulty originating calls over noisy lines make it hard to recommend for general use. Of particular concern is its lack of support for the ATY command, which enables a modem to send a break signal upon disconnect or to disconnect upon receiving one, as required by some mainframes to end a session. Synchronous support is also absent.

Still, the Courier is a sweet deal. It runs straight out of the box with little fussing, works with every tested communications program without fail, and costs only \$499. A full bank of large, clearly marked status lights is right up front, and the on/off switch and speaker volume knob are within easy reach. DIP switches are tucked into the modem's belly alongside a chart of switch settings and the AT command set. Even better, the manual makes sense, it's thoroughly indexed, and USRobotics' technical staff is quick and accurate.

Racal-Vadic Maxwell 2400VP Like Othello, the Maxwell 2400VP is richly endowed but fatally flawed. It does a good job of weathering line noise, and its built-in class 3 MNP error correction and ability to store 15 phone numbers are pluses. But mediocre Hayes AT support and sloppy documentation place the unit fourth in overall value.

NSTL TEST REPORT

2400-bps Modems

As these tests show, the Hayes Smartmodem 2400 has plenty of competition. (Note: In duplicate originate-mode tests, the modems achieve the same rankings—except for the Courier, which comes in last.)

Signal-to-white-noise ratio

pairment level	7:1	8:1	9:1	10:1	11:1	12:1	13:1	14:1	15:1	16:1	17:1	18:1	19:1
Cermetek 2400R	_	_	100	100	98	80	54	23	10	4	0	0	0
Hayes Smartmodem 2400	_	-	100	100	160	83	48	14	7	0	0	0	0
Microcom AX/24001	_	_	=	100	98	84	45	18	5	2	0	0	0
Okidata Okitel 2400	_	_	_	_	_	_	_	-	_	_	-	=	0
Racal-Vadic Maxwell 2400VP1	_	_	100	100	100	81	56	32	6	2	1	0	0
USRobotics Courier 2400	41	12	1	0	0	0	0	0	0	0	0	0	0
Ven-Tel 2400 Plus	_	_	_	100	99	87	53	14	6	0	0	0	0

- = No connection

Amplitude iitter

mpairment level (in percent)	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23
Cermetek 2400R	100	99	99	98	100	98	98	87	81	69	54	47	44	34	22	10	10	0	0	0	0
Hayes Smartmodem 2400	100	100	100	99	100	96	95	- 86	83	72	59	53	38	24	20	9	4	5	0	0	0
Microcom AX/24001	100	100	100	100	99	96	93	91	81	73	64	53	40	32	17	8	9	6	2	1	0
Okidata Okitel 2400	100	100	100	98	99	97	93	95	80	78	63	42	41	32	28	13	6	5	2	1	0
Racal-Vadic Maxwell 2400VP1	100	100	99	98	97	94	94	88	90	78	59	45	43	31	14	9	10	2	4	0	0
USRobotics Courier 2400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ven-Tel 2400 Plus	100	99	100	100	95	98	93	92	85	68	65	47	47	31	23	16	6	6	4	0	0

Phase jitter

mpairment level (in degrees)	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	2
Cermetek 2400R	100	99	99	100	100	97	92	94	84	9.1	75	67	59	49	42	23	17	20	11	10	2	4	1	(
Hayes Smartmodem 2400	100	99	99	100	98	98	96	94	95	82	77	59	60	49	35	29	18	18	10	5	0	0	0	-
Microcom AX/24001	100	100	100	100	100	99	99	91	89	86	72	66	59	48	42	30	25	17	9	9	5	1	1	
Okidata Okitel 2400	100	100	100	99	96	99	98	96	91	86	78	77	63	54	42	31	16	17	9	8	4	1	0	
Racal-Vadic Maxwell 2400VP1	100	100	100	98	100	95	94	92	87	84	75	65	45	57	29	23	16	20	11	6	5	2	0	ı
USRobotics Courier 2400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ven-Tel 2400 Plus	100	100	100	100	100	97	94	91	93	87	74	65	59	48	35	20	24	16	14	11	6	3	0	

More errors

Less errors

NSTL tested each modem's ability to securely transmit data over noisy telephone lines using the TAS 1010 VoiceBand Channel Simulator. The system includes the Network Simulator, which mimics public and leased lines, and the Modem Test Unit, which automatically runs desired data back and forth between the test modem and a control Hayes Smartmodem 2400 and colculates resulting data transmission errors. In these tests, 10K simulated test files in 100-byte blocks were re-

ceived by each examined modem and the block errors measured and reported. All tests were performed in answer mode. Starting values for the key impairments tested—white noise, amplitude jitter, and phase jitter—were based on AT&T Bell Labs' 1982–1983 End Office Connection Study. White-noise impairments ranged from 7:1 to 19:1. An impairment was lessened one step at a time to determine the point at which a modem could correct all the errors in a transmitted block. (In the Cermetek 2400R white-noise test, for example, at the 13:1 signal-to-noise ratio, an average of 54 out of every 100 blocks received contained errors. The error rate dropped to 0 at 17:1.)

Amplitude jitter tests were conducted in the same manner. The intensity of the impairment ranged from a maximum of 43 percent of amplitude jitter to 23 percent. Phase jitter intensities spanned 43 degrees to 20 degrees.

Note: The impairments encountered on average phone lines are much lower, and these modems should have no difficulty communicating under normal circumstances. The average signal-tonoise ratio is 34:1; amplitude jitter is 4 percent; and phase jitter, 8 degrees.

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

¹ The unit's built-in MNP error correction was turned off for all line tests.

EXECUTIVE SUMMARY

Cermetek 2400R

2400-bps modem

The 2400R offers a respectable range of features and good line-noise tolerance. On the other hand, it stalls on *Smartcom II*, suffers from weak Hayes compatibility, and plods through

AT commands.	福	800	Stell	/
`	1)	-	1	1
Standard features		•		
Setup and configuration		•		
Controls			•	
Hayes compatibility				
Noise tolerance			•	
Overall value				1,1

The pros and cons of the Maxwell's front panel cancel each other out. Press a button and you can take the modem on or off line, switch between voice and data, set for automatic redial, change transmission speed, or set diagnostics in motion. Unfortunately, Racal-Vadic's membrane buttons are not very responsive, and the dim status lights force you to squint. The modem also lacks two essentials—an on/off switch and a data terminal ready light.

By the numbers, the Racal-Vadic appears to offer sufficient Hayes AT compatibility. But the omissions are critical. The unit doesn't support the ATR command, which puts the modem in answer mode after linking up with originate-only modems. Its S2 register cannot be modified, essential for preventing BBS callers from putting the modem into command-state limbo. It also lacks S9, used to adjust carrier-detect response time. The company's technical support is superior, and a good thing too, considering that the user manual lacks an index and pertinent setup information.

Ven-Tel 2400 Plus The Ven-Tel is another case of pros and cons offsetting one another. On one hand, it offers a complete bank of status lights (plus a button that dials a stored number), respectable line-noise tolerance, and reasonably good software and AT command compatibility. The \$599 price is a tad high, though, considering the Ven-Tel's design flaws and performance glitches. (A better deal might be the company's 2400-33, Ven-Tel's class 5 MNP-based modem, for only \$649.)

There's no way to adjust the volume of the scratchy-sounding speaker, and setting DIP switches means prying the modem apart and pulling out a circuit card. Worse, during a week of on-line trials, the modem misdialed phone numbers twice. Furthermore, the unit's synchronous mode is almost useless because the modem adheres to the Bell 212A standard instead of the more popular Bell 201 standard. The manual is peppered with ill-considered advice and suffers occasional command syntax errors. Technical support is adequate, but of the callback variety—you call them, they call you back later.

Cermetek 2400R The 2400R handles line impairments with relative ease, but its abysmal AT command, S register, and software compatibility make it a risky choice. The limitations and inconsistencies can be maddening. For example, the modem sometimes issues a VOICE message when a line is actually busy and for some reason takes three times longer than the other tested modems to respond to AT commands.

The 2400R also fails to support the ATW command (which forces the modem to wait for a second dial tone before it dials the rest of a number—a feat required by some long-distance carriers) or AT commands that control the speaker—a pity, since the modem lacks a volume control knob. If you're running data out over some phone systems or long-distance carriers, the Cermetek may not be the best bet either—it lacks the S10 register, used to adjust the delay between the loss of a carrier and the modem's hanging up.

In use the 2400R is a mixed blessing. It features large status lights, a clear speaker, and front-panel buttons for voice/data switching and answering or hanging up. On the downside, you have to jimmy a plastic faceplate with a screwdriver to get at the DIP switches. The modem lacks carrier-detect and auto-answer status lights, and, unlike the other modems reviewed, it has no grounding prong on its electrical plug to safeguard against short-circuiting.

A Modem by Any Other Name

Not all of the modems reviewed here can match the Hayes, but two products are clearly superior. If you're looking for a top-notch, general-purpose modem—and you cherish ease of use above flashy features—the Okidata Okitel 2400 offers an amenable mix of reliability, good AT command support, and simplicity. If you want whiz-bang features and solid compatibility, and your on-line correspondents use MNP error-checking modems, the Microcom AX/2400 is the best bet.

If you run a BBS (and only answer calls), it's no contest: the USRobotics Courier 2400 is this critic's choice. The Racal-Vadic, the Ven-Tel, and the Cermetek are not recommended, based on various problems with compatibility, reliability, and/or features. When stacked up against the Smartmodem 2400, the members of this trio clearly do not offer enough added value.

And added value is the name of the game. The Smartmodem 2400 still looks pretty good when run through the NSTL gauntlet. It takes noisy lines in stride, and as long as the communications software world revolves around the Hayes standard, you can't lose. You certainly won't get fired for buying Hayes. But if you buy a 2400-bps modem from Okidata or Microcom (or even USRobotics) for the right job, you just might get a promotion. ●

Judy Getts is a contributing editor for PC World.

WHERE TO BUY

Cermetek 2400R

Cermetek Microelectronics 1308 Borregas Ave. Sunnyvale, CA 94088-3565 408/752-5000 List price: \$545 Warranty: one year parts and labor via original distributor Extended warranty: none Technical support: unlimited phone support, toll-free number outside California, M-F 8-5 Other support services: none

Courier 2400

USRobotics, Inc. 8100 N. McCormick Blvd. Skokie, IL 60076 800/342-5877, 312/982-5010 List price: \$499 Warranty: two years parts and labor via original distributor Extended warranty: \$15 for two years Technical support: unlimited phone support, toll-free number, M-F 8:30-5 Other support

services: two bulletin board systems: Ubu, a Fido board where SYS-OPS can order products (312/982-5092), and USRobotics Information Services, a generalusage BBS with press releases (312/982-5274)

Maxwell 2400VP

Racal-Vadic 1525 McCarthy Blvd. Milpitas, CA 95035 800/482-3427, 408/432-8008 List price: \$595 Warranty: two years parts and labor via original distributor Extended warranty: \$16 per month, 24-hour emergency exchange policy available for \$125 a year for modems under warranty, \$240 out of warranty **Technical support:** unlimited phone support, no toll-free number, M-F 6-5

Other support

services: none

Microcom AX/2400

Microcom, Inc.

1400 Providence Hwy.
Norwood, MA 02062
800/822-8224,
617/762-9310
List price: \$699
Warranty: one year
parts and labor via
original distributor
Extended warranty: \$50 a year,
emergency replacement
\$75
Technical support:
unlimited phone support,
no toll-free number,
MA E 0.7

M-F 8-7
Other support
services: none

Okitel 2400

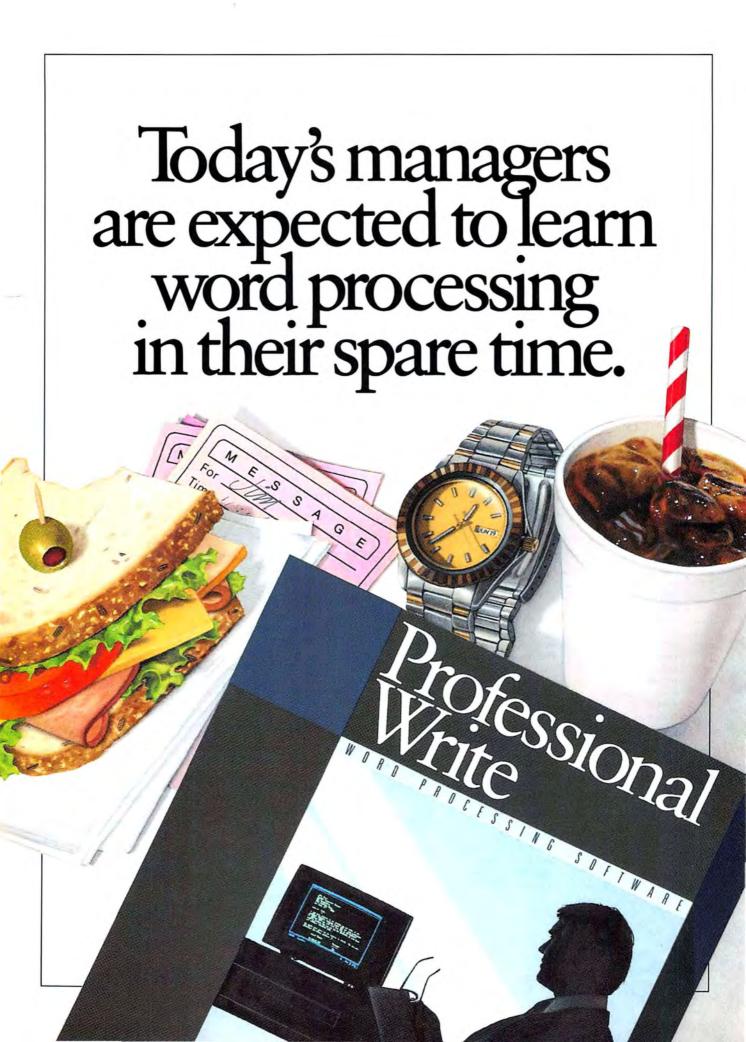
Okidala 532 Fellowship Rd. Mount Laurel, NJ 08054 800/654-3282, 609/235-2600 List price: \$549 Warranty: five years parts and labor via original distributor Extended warranty: none Technical support: unlimited phone support, toll-free number, M—F 9–8

Other support services: none

2400 Plus

Ven-Tel, Inc. 2121 Zanker Rd. San Jose, CA 95131 408/436-7400 List price: \$599 Warranty: five years parts and labor via original distributor **Extended** warranty: none **Technical support:** unlimited phone support, toll-free number, M-F 8-5 Other support services: none

For more more information, see Products Featured in This Issue.



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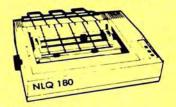
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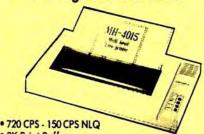
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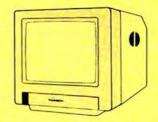
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THE HARDWARE SHELF

144 ALR FlexCache 20386, Dell System 310

Both machines perform on a par with the Deskpro 386/20, and both undercut the Compaq's price. But for overall value, only one is a true contender.

160 Microsoft Mouse, IBM Personal System/2 Mouse, Logitech Series 2 Mouse, Mouse Systems PC Mouse

If you're a mouse user, you know the importance of ergonomics. *PC World* puts four PS/2 mice to work and finds a big difference in the way they look and feel.

168 Microcom AX/9624c

For people with high-powered communications needs, here's an easy-to-use modem that transmits at top speed. This 9600-bps screamer works with modems from every bps range.

174 GridCase 1520

The GridCase pushes some laptop boundaries: It's a battery-powered 286 machine with a superb display and plenty of room to expand. The trade-offs? It's big, expensive, and its battery lasts less than an hour.

ALR FlexCache 20386

20-MHz 80386-based computer

PROS: High performance, large drive capacity, good full-speed 32-bit RAM capacity, ESDI controller

CONS: Poor construction

Dell System 310

20-MHz 80386-based computer



PROS: High performance, ESDI controller, low price

CONS: Current low ceiling on 32-bit RAM, large footprint

Good ideas in PC design travel fast, and when they're seized on by a smart competitor, the copycat machine often sells for much less than the original. The Advanced Logic Research (ALR) FlexCache 20386 and the Dell System 310 mirror the Compaq Deskpro 386/20's ground-breaking architecture, but they both beat the 386/20's retail price by substantial margins.

Like the Deskpro 386/20, the FlexCache and the System 310 complement a 20-MHz 80386 CPU with dual buses, memory caching, and a speedy ESDI hard disk controller. The crucial common denominator among these three systems, however, is an Intel 82385 memory cache controller. In all three cases, the 82385 manages a 32K cache of very fast (35ns) static RAM, enabling the CPU to access memory with no wait states while managing traffic between the separate memory and I/O buses (see "Deskpro Pushes the Limit," *PCW*, February 1988).

The 80386/82385-based architecture coupled with an ESDI hard disk yields some of the fastest performance figures around. Because the designs of the FlexCache and the System 310 so closely resemble the Deskpro 386/20's, these three entries run neck and neck—surely not enough of a speed differential on which to base a buying decision.

The pricing competition, however, is no dead heat. Naturally, the Deskpro 386/20 tops the list. A unit with 2MB of RAM, a 130MB ESDI hard disk, a 1.2MB floppy drive, a 101-key keyboard, and a VGA board and monitor works out to \$11,346. A System 310 offering a 150MB ESDI hard disk and an otherwise identical configuration is, unbelievably, more than \$4500 cheaper. ALR doesn't offer VGA graphics yet, but when you figure that a store-bought VGA board/ monitor combination will run you between \$800 and \$1000, a FlexCache with all the System 310's goodies should cost you around \$8390-about \$1900 more than the Dell machine.

Available only through dealers, the Flex-Cache is likely to be available at a higher discount than the System 310; otherwise, the only possible justification for the FlexCache's higher price is its under-the-desk tower chassis, which offers greater device capacity. The FlexCache can hold one full-height and five half-height devices (three of which are externally accessible), compared to the System 310's total of five (two externally accessible) half-height bays. Both machines have two 8-bit slots, but the System 310 has six 8/16-bit slots as opposed to the FlexCache's four.

RAM expansion is a key issue for multitasking and other memory-hogging activities, and here—temporarily, at least—the FlexCache wins the day. The FlexCache comes with 2MB of 32-bit RAM on the motherboard, expandable to 10MB via boards that fit in a special 32-bit slot pair. A victim of today's RAM shortage, the System 310 currently tops out at 4MB of 32-bit RAM. Dell claims that when it finally gets its hands on 1-megabit chips, the machine will support 16MB of full-speed 32-bit RAM.

When you're done with performance and expandability, a matchup between these two machines isn't a comparison, it's a bloodbath. Shoddy is the only word for the FlexCache's construction. The worst failing is that the inner chassis—which holds the drives, the power supply, and the motherboard—is loosely attached to the casing. A tower

should have more integrity than a desktop unit, not less; knock into the FlexCache with your swivel chair, and you could conceivably crash the hard disk! In all fairness, a second unit wasn't as shaky, but it still relied on a single screw-on bracket to affix one whole side of the chassis.

The cut corners don't stop there. The faceplate is held on only by pressure and, depending on the unit you get, can easily fall off. The 1-inch-square indicator panel around the keylock is made of glossy paper. Perhaps the cleverest trick is that the "32-bit slot" is actually two standard 16-bit slots; you get full 32-bit memory access, but the expansion board is really two boards side by side. And in what must be one of the most disingenuous engineering ploys of all time, the power switch is behind a little door on the machine's backside. Security, right? Maybebut it looks like a way to use an off-the-shelf power supply not designed for a tower; the plastic well for the switch was even cut with a hacksaw to fit.

The Dell System
310 (left) and
ALR FlexCache
20386 race as
fast as Compaq's
Deskpro 386/20
—but the 310 is
a smarter
investment.



Happily, there's little to criticize about the System 310's construction. Its casing (the same one used for Dell's Systems 200 and 300) isn't too attractive, but both the box and the inner chassis look solidly put together. The motherboard is well designed and of a piece; by contrast, the FlexCache puts its brains—the 82385, the 80386, the 80387 socket, and the 32K memory cache—on a daughterboard that fits in the motherboard's 80386 socket. This kludgy but functional design is a quick way to upgrade an off-theshelf 80386 motherboard to Deskpro 386/20—like power.

When subjected to the new PC World
Crash Test, the FlexCache had more compatibility problems than its rival. With
Microsoft Word 4.0, the program printed
italics as underlined text; with Publisher's
Paintbrush 1.03, neither on-screen nor hard-

copy underlining appeared. The FlexCache's difficulties with Windows/386 were more serious: The Windows/386 print spooler works only after you get a 'Cannot write to LPT1' error message and you cancel the print job; even worse, trying to multitask Professional Write and SuperCalc leads to either an error message or a locked-up system. The System 310's compatibility snags were limited to Publisher's Paintbrush. Large images could not be rotated, and attempts at installing the program's expanded memory driver kept the system from rebooting.

Both machines use a Phoenix Software setup program. The System 310's configuration is initialized and changed via software, while the FlexCache relies heavily on DIP switches. As far as warranties are concerned, there's no contest: Dell offers a year's free on-site support within the continental United States from Honeywell Bull;

INTRODUCING THE PC WORLD CRASH TEST

Compatibility testing is like fishing. You can spend the day methodically looking all over the lake, even in places where fish are unlikely to be. But if you're smart, you'll concentrate on the areas where experience says you're likely to catch something.

National Software Testing Laboratories (NSTL), PC World's independent testing service, has at our request used its extensive experience in systems compatibility testing to develop an exclusive PC World Crash Test. Years of conducting specially commissioned compatibility benchmarks—requiring scores of programs and hundreds of hours for each system—have helped NSTL's testers become as shrewd as practiced anglers who know which techniques yield the biggest catch. The Crash Test involves executing a select battery of program functions, all of which have a track record of exposing compatibility problems.

Continuing in the tradition of both PC World and NSTL, the Crash Test is entirely application based; all of the testing is performed using popular software, not pseudo-scientific BIOS test programs with little bearing on realworld computing. The Crash Test software list will change as the market changes, but currently NSTL will run all PCs through a gauntlet of 272 functions using the following 12 widely used programs: Microsoft Word 4.0, Microsoft Excel 2.0, Microsoft Windows 2.3 (replaced by Windows/386 2.03 when testing 80386 PCs), dBASE III Plus 1.10, Paradox 2.0 (replaced by Paradox/386 2.0 when testing 80386 machines), 1-2-3 release 2.01, Freelance Plus 2.0, Publisher's Paintbrush 1.03, Smartcom II version 3.0, Crosstalk XVI (at 2400 bps), SideKick 1.56, and IBM PC-DOS 3.30.

The tests uncover critical problems: the failure of a machine's video adapter to perform correctly in all modes, a keyboard that doesn't send the proper signal for a key combination intended to invoke some function of a memory-resident program, or a BIOS that's not quite compatible. NSTL runs all tests at

a system's highest clock rate and uses the version of DOS that the manufacturer supplies with the machine. Print tests use IBM's Graphics Printer; communications tests employ a Hayes Smartmodem.

What will these tests tell you? At the least, they'll give you an idea of which of the 12 benchmark programs are likely to run without any major problems on the system reviewed. Beyond this, PC World's writers and editors will explain the implications the results have for, say, a display-related crash, or how you can minimize compatibility problems from copy-protected software. By applying this analysis to your buying decision, you'll benefit from some of the sharpest, most exhaustive compatibility benchmarks in the industry.

Naturally, even if a system passes the Crash Test with flying colors, there's no guarantee that packages not included in the test suite will also run. But then, at noon on a sunny day in a lake full of motorboats, you might still catch a fish. — Eric Knorr



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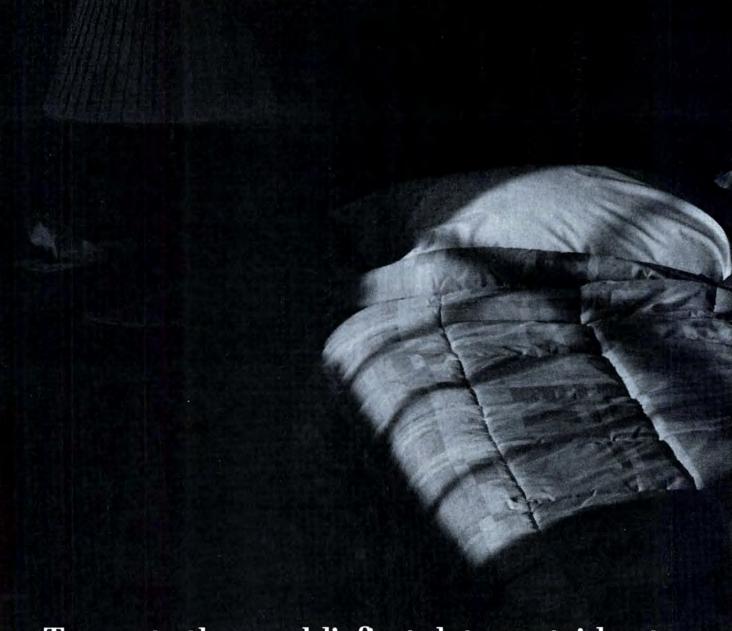
We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the

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Lotus Symphony 2.0



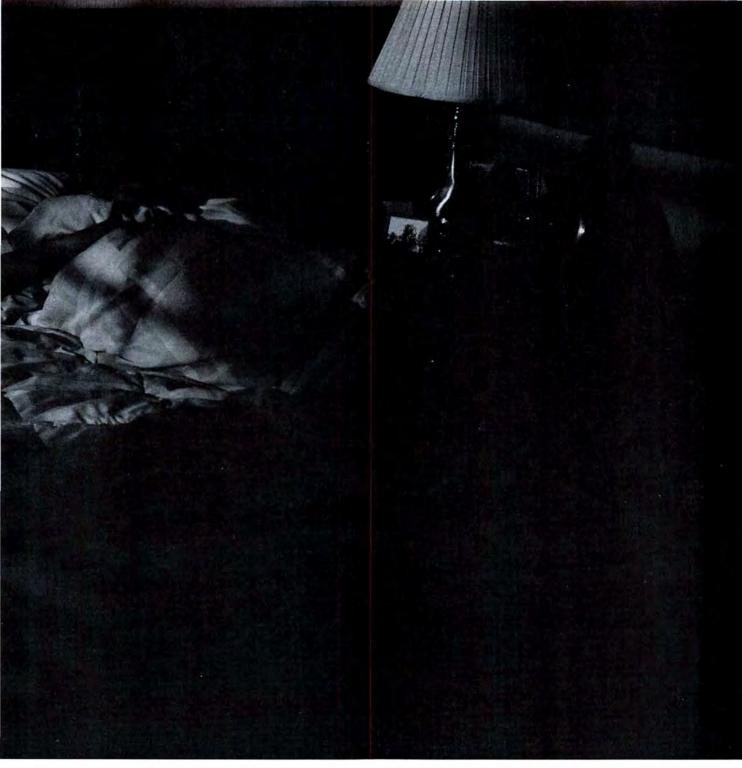
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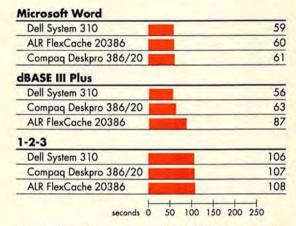
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NSTL TEST REPORT

Dell System 310 and ALR FlexCache 20386

Similar memory architectures result in very similar performance from the Dell 310, ALR FlexCache, and Compaq Deskpro 386/20.



The ALR and Dell machines were tested with 4MB of RAM; the Compaq unit was tested with 5MB of RAM. The Dell had a 90MB hard disk installed, the ALR a 150MB hard disk, and the Compaq a 130MB drive. Both the Compaq and the Dell were tested using a VGA adapter, while the ALR had an EGA adapter. All machines used the Intel 82385 memory cache controller to support 32K of 35ns cache memory.

Microsoft Word 4.0

A Microsoft Word macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

dBASE III Plus 1.1

The dBASE III Plus test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. Without disk-caching software, the random access speed of the hard disk is a significant factor; with disk-caching software, the speed of reading sequential sectors becomes more important.

Dell System 310	240
ALR FlexCache 20386	247
Compaq Deskpro 386/20	249
utoCAD	
Compaq Deskpro 386/20	52
Dell System 310	53
ALR FlexCache 20386	60

1-2-3 2.0

In this benchmark, a 1-2-3 macro executes a series of recalculations using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and no disk access, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0

The Microsoft C benchmark measures the time to compile and link XUSP, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

AutoCAD 9

In this benchmark, a three-dimensional sample drawing is retrieved and displayed using AutoCAD's EGA driver. The zoom function is used to display the drawing from various perspectives; then the full drawing is printed. The results of the benchmark depend primarily on the speeds at which the processor and coprocessor operate and at which memory is accessed. The performance of the display adapter and the hard disk also have some effect.

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

ALR provides a one-year warranty on parts and labor, but you must ship the machine back. Both machines come with disk caching software, and Dell even throws in a copy of *Microsoft Windows/386*. Dell offers its own version of OS/2, while ALR claims the Flex-Cache is compatible with IBM's OS/2 (a claim we were unable to verify at press time).

ALR has been getting a lot of press lately, thanks to a number of firsts. ALR was the first to announce an 80386 computer, the first to clone the Deskpro 386/20's architecture (a mere three months after Compaq shipped the 386/20, thanks to the fast-and-dirty daughterboard), and the first to announce a DOS-based 25-MHz 80386 PC. However, first obviously doesn't mean best; with its poor construction and less-than-rock-bottom price, the FlexCache 20386 is clearly inferior to the System 310.

Although Dell is hardly squeaky clean itself—reportedly, some of the company's machines have had trouble with RF emissions the System 310's generous on-site repair plan, clean design, and solid construction





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Winner, Editor's Choice, PC Magazine, May 1988



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PC Tech Journal. December 1987

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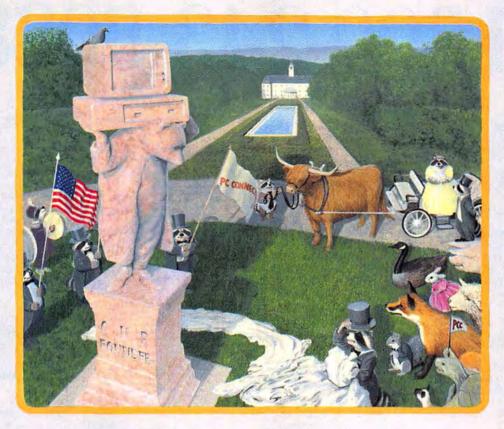
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FEATURES EVALUATION

20-MHz 80386 Systems

The 2MB System 310 lists for \$1900 less than a similarly configured FlexCache Model 150 but has less memory and storage expansion capability. However, the 150's three fewer free expansion slots and questionable quality control tip the scales toward the 310.

	E .	9
	AIR Hexcathe	Dell System 310
Standard features Price 1	\$8390	\$6499
CPU	80386	80386
Clock speed	20 MHz	20 MH
Built into motherboard	20 mile	ZU mii
Parallel ports	0	1
Serial ports	0	2
Floppy disk controller	0	0
Video adapter	0	0
Coprocessor support	20-MHz 80387	20-MH 80387
32-bit memory capacity		
Amount shipped with basic unit	2MB	1MB
Maximum installable	10MB	4MB
Expandability		
8/16-bit expansion slots	4	6
8-bit expansion slots	2	2
Maximum number of half-height drives	7	5
120MB or larger hard disk available from manufacturer	•	•
Slots occupied	3	2
Ergonomic design		
Front-panel reset button	0	0
Front-panel on/off switch	0	0
Front-panel keyboard socket	0	0
ROM-based setup software	0	0
Tilt-and-swivel monitor	€2	•
Compact footprint	•	0
Complete documentation	•	•

[●] Yes ○ No ● Deficient

² ALR does not sell monitors; dealer supplied.

add up to greater reliability. The 4MB limit on 32-bit RAM is a serious drawback, but one that Dell plans to remedy soon. This caveat aside, the Dell System 310's high performance and low price make it one of the best 80386 buys on the market. —*Eric Knorr*

WHERE TO BUY

FlexCache 20386

Advanced Logic Research, Inc. 10 Chrysler Irvine, CA 92718 714/581-6770

List price: Model 60 with 1MB of RAM, 60MB hard disk, 1.2MB floppy drive, one serial and one parallel port, 101-key keyboard \$5990; Model 100 with 100MB hard disk \$6490; Model 150 with 2MB of RAM and 150MB ESDI hard disk \$7490; Model 300 with 2MB of RAM and 300MB ESDI hard disk \$9990

Accessories: 1MB 32-bit memory board pair (4MB capacity) with one serial and one parallel port \$1450; 1MB 32-bit memory board pair (4MB capacity) with 4MB RAM Pack Set \$5200; 20-MHz 80387 math coprocessor \$1199; EGA board \$399; 1.44MB floppy drive \$225; 40MB tape backup \$990, 150MB tape backup \$1890

Warranty: one year parts and labor Extended warranty: none Technical support: no toll-free number, M—F 8—10

System 310

Dell Computer Corp. 9505 Arboretum Blvd. Austin, TX 78759 800/426-5150

List price: with 1MB of RAM, 40MB hard disk, 1.2MB floppy drive, VGA board and monitor, one parallel and two serial ports, 101-key keyboard \$4299; with 90MB ESDI hard disk \$5099; with 150MB ESDI hard disk \$5599; with 322MB ESDI hard disk \$7599

Accessories: 1MB 32-bit SIMM \$900, 2MB 32-bit memory board \$1799; 20-MHz 80387 math coprocessor \$800; 1.44MB floppy drive \$200; 40MB tape backup \$400, 150MB tape backup \$900; Dell MS-OS/2 \$325

Warranty: one year on-site service from Honeywell Bull

Extended warranty: varies with configuration

Technical support: toll-free number, M–F 7–7

For more information, see Products Featured in This Issue.

¹ Prices based on a configuration of 2MB of RAM, 1.2MB floppy drive, 150MB hard disk, VGA board and monitor, parallel port, serial port (the System 310 has two), and 101-key keyboard. AIR does not sell VGA graphics hardware, so the price of a VGA adapter and monitor was estimated at \$900.



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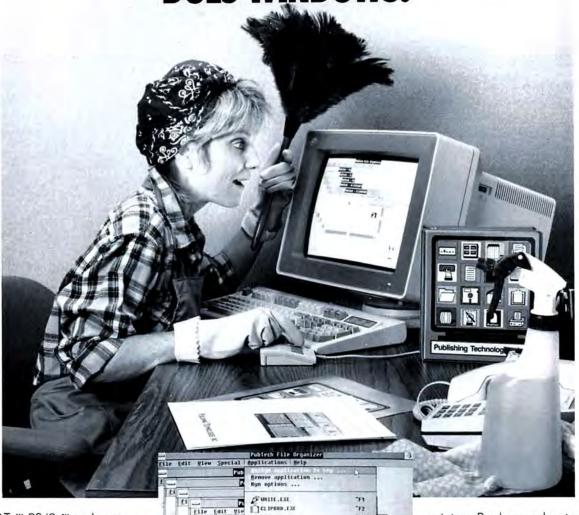
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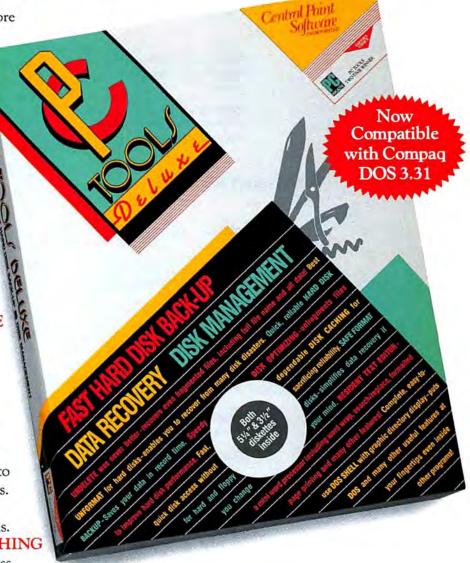
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Microsoft Mouse

PS/2 mouse



PROS: Excellent feel, very good tactile and aural feedback, powerful bundled software

CONS: requires clumsy adapter box

IBM PS/2 Mouse

PS/2 mouse

PROS: Good feel, tapered shape fits medium-size to large hands, inexpensive

CONS: Buttons stiff and narrow, poor aural feedback, no added-value software, no lifetime warranty

Logitech Mouse

PS/2 mouse

PROS: Good tactile and aural feedback

CONS: Buttons are hard to reach, boxy shape may feel uncomfortable to

Mouse Systems PC Mouse

PS/2 mouse

PROS: Optical mechanism, durable in dusty environments, three buttons

CONS: Hard to move, requires mouse pad, poor tactile feedback

• K, you're expecting mouse jokes, so let's get them over with. In this review, four new PS/2-compatible rodents—from IBM, Microsoft, Logitech, and Mouse Systems—go whisker-to-whisker to find the best combination of durability, software compatibility, ease of maintenance, overall value, and ergonomics. Because "feel" is necessarily subjective, I asked two fellow Mouseketeers—a man with large hands and a woman with small ones—to provide their impressions as well. While there were some differences of opinion, the testing team found unanimously that the Microsoft Mouse felt best.

As they line up at the gate for the *PC World* Squeak-Off, we can see that all four mice share some characteristics. All are compatible with software designed for use with the best-selling Microsoft Mouse. All are capable of detecting approximately 200 units of motion per inch, giving them the same overall responsiveness. All attach to a PS/2's pointing device port. All but the IBM mouse are also available in serial port and bus versions for AT-bus machines, but the former use up a serial port and the latter require an empty expansion slot.

So what sets these creatures apart from one another? For one thing, some look and feel much better than the others. For another, they come with different software packages. For a third, they feature different operating mechanisms.

The IBM, Logitech, and Microsoft mice contain a small rubber ball that rotates against two rollers to translate movement into digital data your PC can understand (for tips on good mousekeeping, see "Eight Common Problems [and How to Solve Them]," PCW, January 1988). Since the ball picks up dust as it rolls, it requires occasional cleaning. Mouse Systems' mouse uses an optical sensor that will presumably stay cleaner, but it requires a special pad.

Microsoft's original mouse was the mouse that roared; its metal roller ball made it sound like you were zooming a Mattel Hot Wheels car across your desktop. Its successor (which costs \$150 to \$200 with various software packages) has been totally redesigned. It's as quiet as the critter it's named for and features two feather-touch, hair-trigger buttons that are a delight to use.

The Microsoft Mouse's unique convex top and its smooth, all-white surface have caused some to liken it to a bar of Dove soap. The mouse fits your hand comfortably, and your fingers seem to fall naturally onto its large buttons. The left button is bigger than the right, which enforces the notion of a "primary" button—the one that you'll press most often. The microswitches under the buttons produce authoritative clicks when pressed, and the testing team agreed that this unit

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PS/2 mice from Logitech, IBM, Mouse Systems, and Microsoft (clockwise from top left) share many admirable traits, but our test team voted Microsoft best. provided the best aural and tactile feedback.

One of the few complaints that can be leveled against Microsoft's mouse is that it requires a cigarette pack-size adapter for use in a PS/2. What's worse, the adapter's connector was loose and required some cable jiggling to operate reliably.

Microsoft sells its mouse with three flavors of software. The \$150 package includes *PC Paintbrush*, a color paint program authored by Z-Soft. The \$175 offering provides Evolution Computing's *EasyCAD*, an entrylevel CAD program. And \$200 gets you *Microsoft Windows 2.03* and Z-Soft's *PC Paintbrush for Windows*.

All three software packages include *Mouse Menus* software, which adds pop-up menus to 11 popular applications such as *WordStar* and 1-2-3 that weren't designed with mice in mind. Overall, these grafting attempts aren't particularly effective. They don't support all commands, and they force you to learn a new way of interacting with programs you've probably already mastered. But if you're willing to overlook their shortcomings, the pop-up menus do offer a way to use your mouse with older applications.

If Microsoft's mouse looks like a bar of Dove, IBM's \$95 mouse looks like a Dove Bar. Big Blue's mouse tapers inward to a narrow, rounded end, giving it a striking resemblance to the sinful chocolate/ice cream confection. Its rounded corners and tapered shape earned high marks from the two male Mouseketeers. The female team member considered it a bit too plump for her hands.

The IBM mouse has two narrow buttons that wrap around the front like the grill of a late-fifties Jaguar. Unfortunately, they require too much pressure, don't provide enough aural feedback, and forced one tester to arch his digits in order to press the buttons at all. Nonetheless, the good overall feel of the IBM mouse earned it a second-place ranking from the testing team.

For its part, IBM doesn't go in for any added-value software deals. Like Henry Ford's Model T, which came in any color as long as it was black, IBM's mouse comes with any software package you want as long as it's a mouse device driver.

The Logitech Series 2 Mouse (\$95) is the boxiest of the bunch. Its sharp corners and odd indentations make it less comfortable to hold than its smoother, more streamlined competitors. The buttons offer good tactile and aural feedback, but the two large-handed members of the team thought the buttons should have been located closer to the front.

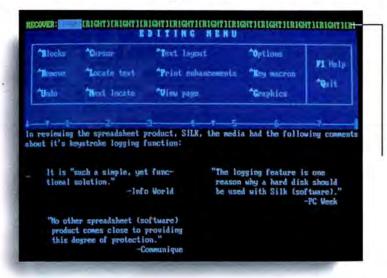
At the low-end, \$95 price, Logitech includes a package of utilities that add pop-up mouse menus to applications like 1-2-3 and WordStar. They are similar to Microsoft's pop-ups—for better and for worse.

In addition, Logitech offers three package deals that get you a mouse plus software to feed it. The \$149 Logipaint Set includes a Logitech color paint program; the \$179 Publisher Package buys Software Publishing's PFS: First Publisher desktop publishing program; and the \$189 LogiCADD package includes Generic Software's Generic CADD.

Mouse Systems' optical PC Mouse (\$149) requires a special pad with a fine grid of dots that reflect infrared light onto a sensor on the mouse's underside. Mouse Systems claims optical mice are more reliable than the roller-ball variety because they contain fewer moving parts. That's splitting whiskers. Unless your desk is in a woodworking

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FEATURES EVALUATION

PS/2 Mice

Microsoft's mouse scampers away with honors for "feel" and runs neck and neck with Mouse Systems' PC Mouse and Logitech's Series 2 Mouse in additional features.

1	= \	E 8	E \ 23	
tandard features	Microsoft Mouse	Sories & Mouse	pc Mouse	Systems Systems
Price	\$150	\$95	\$95	\$149
Number of buttons	2	2	2	3
Operating mechanism	roller ball	roller ball	roller ball	optical
Requires mouse pad	0	0	0	•
etup and installation				
Compatible with Microsoft Mouse driver	•	•	•	•
Available for				
PS/2	•	•	•	•
PC AT bus	•	0	•	•
Serial port	•	0	•	•
Complete documentation	•	•	•	•
dditional features				
Mouse driver	•	•	•	•
Interface for nonmouse programs	01	0	•	•
Utilities	Q 1	0	•	•
Painting/drawing	01	0	O 1	Q 1
Other software	01	0	O 1	0
rgonomic design				
Good overall feel		•	•	0
Easy to move	•	•	•	0
Easy button operation	•	0	•	•
Good aural/tactile feedback on button push	•	0	•	•
Convenient button location		•	0	Q 2

[●] Yes ○ No ● Deficient

shop, a mechanical mouse ought to outlast your computer. Apparently Logitech and Microsoft agree; their mice, like Mouse Systems', are backed by lifetime warranties. (IBM's is guaranteed for only one year.)

Even if Mouse Systems' durability claims are valid, none of us liked the idea of being forced to find space for a mouse pad on our desktops. Furthermore, because of its felt feet, the PC Mouse is hard to move.

The PC Mouse is also the only one of the four to offer three buttons. If you use programs that support three buttons, that's great—but very few do; in most cases, the middle button just gets in the way. (Many of Mouse Systems' pop-up menus do use the third button.) And while the buttons provide adequate aural feedback, they have a mushy feel that makes double-clicking difficult.

The basic package includes pop-up, memory-resident utilities similar to those from Logitech and Microsoft—with similar drawbacks as well. A better value might be the \$179 package, which includes Autodesk's *AutoSketch* entry-level CAD program.

As the contenders head back to their holes, it's clear that the winner of the Squeak-Off is the new Microsoft Mouse. The testing team unanimously preferred its shape and button response and loved its looks—not to mention its impressive software packages.

IBM's mouse placed second. It is competitively priced but includes no extra-value software and no lifetime guarantee. The Logitech mouse placed a very close third. The Mouse Systems optical PC Mouse, with its compulsory pad, stiff resistance to movement, and mushy buttons, finished last.

But none of these ratings are carved in cheese. Mice, like keyboards and monitors, are subject to personal preference. One person's mouse may be another's rat, so test drive a few before you buy. —Jim Heid

WHERE TO BUY

IBM Personal System/2 Mouse

IBM

Information Systems Group 900 King St.

Rye Brook, NY 10573

List price: \$95

Warranty: one year parts and labor Technical support: through dealer

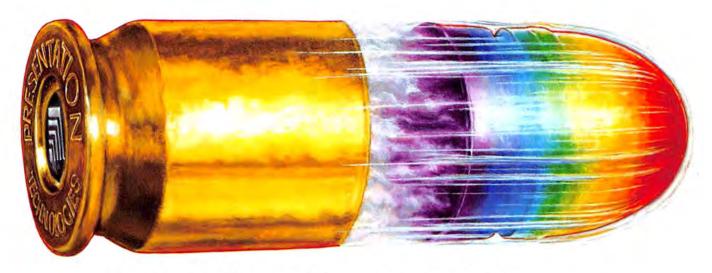
Logitech Series 2 Mouse

Logitech U.S.A. 6505 Kaiser Dr. Fremont, CA 94555 415/795-8500

List price: with pop-up menu software \$95, with pop-up menu software and Logipaint \$149, with pop-up menu software and PFS: First Publisher \$179,

Optional; see Where to Buy for prices.

² Third button can get in the way on applications that support only two.



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For more information, see Products Featured in This Issue.

Microcom AX/9624c

9600-bps modem

PROS: Reasonable price, compatibility with other modems, built-in error correction and data compression

CONS: Slow to accept software commands

The vision of an easy-to-operate high-speed modem—at a relatively low price—beckons business users like some telecommunications treasure of the Sierra Madre. The first 9600-bps units were astronomically expensive, cranky, and needed an identical twin at the other end of the line for hardware error checking. Now more capable units are appearing on the market, typified by Microcom's external AX/9624c. If Cheaper, Faster, Easier! is the motto hanging above your computer system, this unit might well be the find of the year.

Introduced in 1985 at \$1799, the AX/9624c dropped this spring to \$1299—a price that places it roughly in the middle of the range

for high-speed modems. It delivers a familiar package of features: hardware error correction, data compression, and automatic fall-forward/fallback speed adjustment to find and use the fastest possible transmission speed for given line conditions. What makes this modem a standout is its ease of use, reliable performance, painless interface with various software packages, and broad compatibility with other 1200-, 2400-, and 9600-bps modems.

The AX/9624c employs Microcom's MNP class 6 protocol, which provides hardware-based error checking with any modem (high speed or low) that shares any class of the MNP protocol. Although no single protocol currently dominates the high-speed modem market, a growing number of manufacturers, including DEC, Multitech, USRobotics, Ven-Tel, and Codex, offer 1200-, 2400-, and 9600-bps modems that support MNP—giving the AX/9624c a wide range of error-checking compatibility. Unfortunately, it can't perform error checking with the Hayes V-series modems or with modems using the V.32 modulation standard.

The AX/9624c also includes a hardware-based data-compression scheme—but it works only with modems based on Rockwell's V.29 chipset (such as Multitech's Multi-Modem series). When both MNP error checking and hardware data compression are used, the AX/9624c can exchange data with fully compatible modems (such as the Multi-Modem 696E) at throughput approaching 17,000 bps.

The modem is about the size of a thick hardcover book. It has a built-in speaker and two front-panel buttons that toggle between voice and data modes and asynchronous/ synchronous modes. Indicator lights keep the user apprised of operating parameters. Two DIP switches set parameters like auto-answer, but parameters can also be set with familiar Hayes AT commands. A rechargeable battery retains settings for 30 days in case of power failure.

NSTL tests show the AX/9624c running neck and neck with the identically priced Hayes V-series 9600. It performs substantially faster than Racal-Vadic's \$995 9600VP



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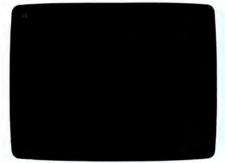
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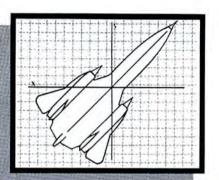
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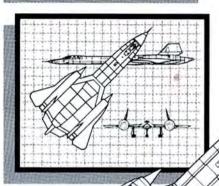


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NSTL TEST REPORT

Microcom AX/9624c Modem

Microcom's 9600-bps AX/9624c runs a hair slower than Hayes's V9600—but leaves Racal-Vadic's 9600VP far behind.

Clean line

Text file Hayes V9600 17,222 17,007 Microcom AX/9624c 8974 Racal-Vadic 9600VP Spreadsheet Hayes V9600 13,692 Microcom AX/9624c 10,612 Racal-Vadic 9600VP 7572 Graphics Hayes V9600 11,507 Microcom AX/9624c 10,957 Racal-Vadic 9600VP 7712 Random Hayes V9600 9314 9094 Microcom AX/9624c Racal-Vadic 9600VP 7551 bits per second 0 20,000

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

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 phone lines. To arrive at the proper set-

Dirty line

Text file	
Microcom AX/9624c	17,114
Hayes V9600	16,602
Racal-Vadic 9600VP	9023
Spreadsheet	
Hayes V9600	12,821
Microcom AX/9624c	10,623
Racal-Vadic 9600VP	7547
Graphics	
Hayes V9600	11,038
Microcom AX/9624c	10,985
Racal-Vadic 9600VP	7714
Random	
Hayes V9600	9096
Microcom AX/9624c	9004
Racal-Vadic 9600VP	7553
bits per second 0	20,000

tings for each line type, we used the 1982–1983 AT&T Bell Labs End Office Connection Study, which measured ten impairments such as white noise, signal loss, amplitude jitter, and phase jitter on 6500 predivestiture long-distance phone lines. A clean line had a maximum white-noise level of 30 decibels (db); an average line, a level of 32 db; and a dirty line, 35 db.

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

and Microcom's own AX/9600 Plus (which is \$300 cheaper than its speedier brother).

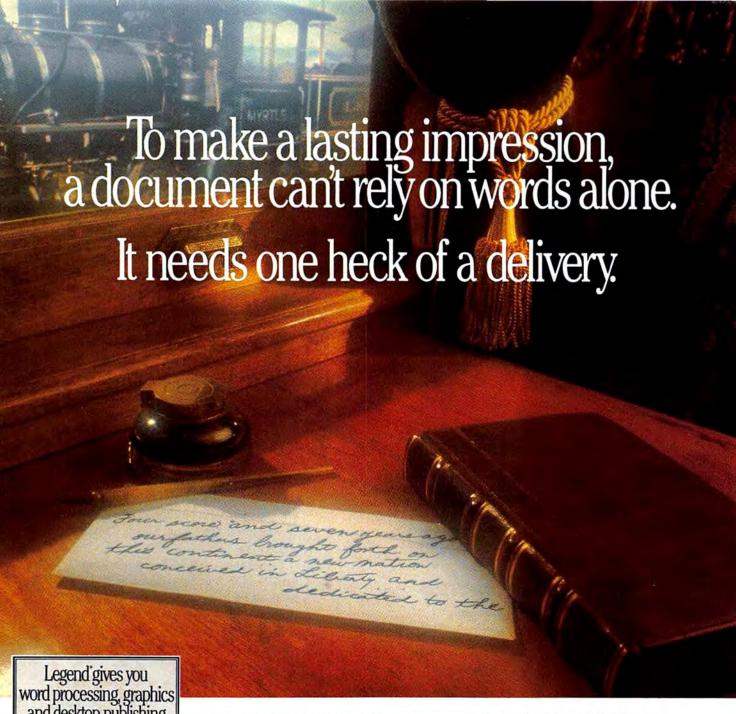
Setting up the AX/9624c is a snap. Within half an hour of unpacking the modem and skimming the manual (which, unfortunately, seems designed for telecommunications experts rather than first-time users), successful connections had been made with a variety of bulletin boards, stand-alone modems, and a Novell network. File transfers between the AX/9624c and a different brand of modem, with each running a different software program, worked smoothly at 1200 and 2400 bps.

The AX/9624c easily accommodated *Carbon Copy*, *PC-Talk III*, and *Pereline* telecommunications software, and unlike with

some finicky high-speed modems, configuring it to work with these packages was quite straightforward. The modem handled automatic speed switching flawlessly; even when software and hardware were set to 9600, it downshifted smoothly when it logged on to a 2400-bps BBS. Upon hanging up, it switched back to its default 9600 mode.

The AX/9624c's only major drawback is that it occasionally seems slow in accepting basic commands from telecom software. Perhaps this is because of its sophisticated autoswitch circuitry.

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LEGEND

ness of the AX/9624c, moving up to a 9600bps machine doesn't make sense for everyone. In a year or so, probably, prices will drop, major telecom services like GEnie and CompuServe will offer 9600-bps nodes, and one high-speed protocol will get the nod from the majority of modem manufacturers.

In the meantime, for corporate users transmitting volumes of data daily, and power users who feel vaguely uncomfortable at only 2400 bps, the Microcom AX/9624c is a smart investment with an immediate payoff: lower phone bills and fewer employee hours spent staring at a telecom screen. —J. T. Johnson

WHERE TO BUY

Microcom AX/9624c

Microcom
1400 Providence Hwy.
Norwood, MA 02062
800/822-8224, 617/762-9310,
617/762-5125 (technical support)
List price: \$1299
Warranty: one year
Extended warranty: none
Technical support: no toll-free number, M—F 9—5
For more information, see Products
Featured in This Issue.

GridCase 1520

AT-compatible laptop

PROS: 10-MHz 80286 CPU, highly readable display, RAM expandable to 8MB

CONS: High price, slow hard disk, short battery life

The GridCase
1520 is one of
the first 80286based battery
laptops, but at a
\$3495 starting
price it's a costly
speedster.



The GridCase 1520 is one of the first battery-powered 80286 laptops to reach the market—and it also offers unusually large memory expansion capacity. The combination makes it a breakthrough machine in a world of (mostly) 640K, 8088-based battery laptops. Unfortunately, its brief 45-minute battery life and long case (15 by 12 inches) make it less than ideally suited for airplane computing or operations away from a wall plug.

The 13-pound (18 pounds with case, modem, and charger) GridCase is a long, low, black racer built around a 10-MHz one-waitstate 80286 and 1MB (expandable to 8MB) of 120ns RAM. Several configurations are available, starting as low as \$3495. The unit reviewed here is a top-of-the-line system with a gas plasma display, 1MB of RAM, a 20MB hard disk, a 1.44MB 31/2-inch drive, an 80287 math coprocessor, DOS 3.21 and Crosstalk in ROM, and a 2400-bps internal modem. Unfortunately, this hotshot system will run you a hefty \$7205. Worse yet, don't bother looking in the discount houses; the GridCase is available only through authorized dealers at 29 locations in the United States, Canada, and Europe.

Predictably, the GridCase delivers top performance. It would probably do even better if not for its relatively slow, 78ms 20MB hard disk. While the Grid actually leads the pack in NSTL's CPU-intensive 1-2-3 benchmark, it performs poorly in tests like dBASE III Plus, where disk access is critical. The optional 40MB hard drive is much faster (29ms), but installing it leaves no room for even one floppy-reducing you to using the serial port to get data in and out of the machine. Alternatively, power users with time-consuming, disk-intensive tasks may want to bypass the hard disk altogether and exploit the GridCase's unusually large RAM capacity by setting up a RAM disk to run these applications.

The most striking feature of the high-end GridCase is its spectacular, red-on-black, 10-inch-diagonal gas plasma display. This high-contrast CGA-compatible display can be read easily under virtually any lighting conditions. Of course, at \$995 it's not cheap—but if price

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FEATURES EVALUATION

The GridCase 1520 Laptop

The GridCase 1520 checks in at roughly the same price as Toshiba's no-battery 3200—if you allow for the Grid's modem, coprocessor, and ROM applications. The Grid is lighter and can accommodate more RAM—but it is slower and has a smaller hard disk.

	Gridtare 1520	Toshiba 3200
Standard features	1	
Price	\$7205 1	\$5799 2
CPU	80286	80286
Clock speed	10/6 MHz	12/6 MHz
Weight	13 lbs.	19 lbs.
Screen type	gas plasma	gas plasma
Battery life		
With minimum hardware	1—2 hours	●3
With modem, expansion RAM, etc.	45 minutes	●3
Coprocessor support	80287	80287
Memory capacity		
Amount shipped with basic unit	1MB	1MB
Maximum installable	8MB	4MB
xpandability		
8/16-bit expansion slots	04	1
8-bit expansion slots	04	1
Maximum number of floppy drives	2	1
40MB or larger hard disk available from manufacturer	•	•
irgonomic design		
Front-panel reset button	0	0
ROM-based setup	0	0
Complete documentation	200	

[●] Yes ○ No ● Deficient

is an object, you can choose either of two lower priced backlit LCD options.

As might be expected, the power requirements of the hard disk, modem, and gas plasma display reduce the GridCase's battery life to a frustratingly brief 45 minutes. (You

can get 2 hours of battery operation from a low-end LCD configuration.) Few battery-saving options are offered; power to the hard disk cannot be turned off with either hardware or software. An optional external battery pack (\$175) will keep a fully loaded system running for about $2\frac{1}{2}$ hours, but it weighs three times as much as the in-board battery pack.

The GridCase parks its hard disk heads after 5 seconds of inactivity, but it still requires users to make sure the "in use" light is out before turning the computer off—or disk and/or data damage may occur. Running out of battery power during a read/write will have the same nasty effect. A fail-safe system (like the one used by Toshiba and NEC, which parks the heads whenever the power is switched off or the battery fails) is needed.

On the other hand, a number of small touches are pleasing. ROM chips containing DOS 3.21 and *Crosstalk*, which slip into either of two internal sockets, are available from Grid. The battery bay provides easy access to proprietary slots that can hold an array of optional modules such as a VGA controller and a PC-compatible five-slot expansion chassis. Documentation is clear and complete. And although the 72-key keyboard is crowded, its feel is acceptable.

The GridCase survived NSTL's software compatibility Crash Tests with moderate success. No problems were reported with DOS 3.30, dBASE III Plus, Excel, 1-2-3, or Crosstalk XVI. Major problems turned up with Freelance Plus and Publisher's Paintbrush (in both cases the mouse refused to work), Smartcom II (among other things, you could not place an outgoing call), and SideKick (the program could not be removed from memory).

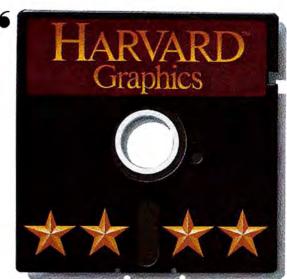
The GridCase's short battery life and over-long profile make its "laptop" classification slightly honorary. If you can live without a battery and don't mind toting another 6 pounds, you can get a 12-MHz 80286-based Toshiba 3200 with a fast (38ms) 40MB hard drive and a gas plasma display for roughly the same base price. Still, for those who must have battery capability, the GridCase's

¹ Price based on 1MB RAM, 1.44MB 3½-inch disk drive, 20MB hard disk, 2400-bps modem, 80287 coprocessor, parallel port, serial port, RGB video port, 600 by 400 gas plasma display, 72-key keyboard, DOS 3.21 and Crosstalk in ROM, battery, charger.

Price based on 1MB RAM, 720K 3½-inch disk drive, 40MB hard disk, parallel port, serial port, RGB video port, 640 by 400 gas plasma display, 85-key keyboard, DOS 3.21 on disk. (Modem, coprocessor, ROM applications not included.)

³ The Toshiba has no battery.

⁴ PC-compatible expansion chassis available.



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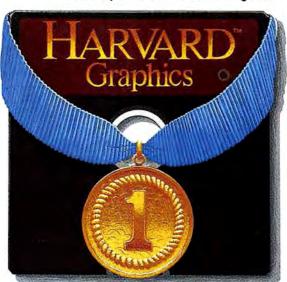


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NSTL TEST REPORT

GridCase 1520

The GridCase 1520 beats two AT-compatible desktop PCs in processor-intensive 1-2-3 benchmarks, but its slow hard disk drags it into last place in the other benchmarks.

Microsoft Word ALR Dart-40 181 Acer 910 183 GridCase 1520 201 **dBASE III Plus** ALR Dart-40 338 Acer 910 343 733 GridCase 1520 1-2-3 264 GridCase 1520 265 Acer 910 ALR Dart-40 266 Microsoft C Acer 910 689 ALR Dart-40 689 GridCase 1520 813 seconds 0 200 400 600 800 1000

All machines were tested running at 10 MHz and without disk cache. The ALR and the Acer each had 44.5MB hard disks. The GridCase was tested with a 20MB hard disk and 1MB of RAM (640K conventional).

Microsoft Word 4.0

A Microsoft Word macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on rocessor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

dBASE III Plus 1.1

The dBASE III Plus test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

1-2-3 2.01

In this benchmark, a 1-2-3 macro executes a series of recalculations using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and no disk access is required, the results depend almost entirely on rocessing and memory access speeds.

Microsoft C 5.0

The Microsoft C Submitted and link XUSP, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

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

high-speed CPU, expandable RAM, coprocessor support, and fabulous display offer AT-compatible desktop power to laptop users who can pay the high price. -John Diebold

WHERE TO BUY

GridCase 1520

Grid Systems Corp. 353 Sacramento #1120 San Francisco, CA 94111 800/222-GRID

List price: with 1MB of RAM, two 1.44MB 31/2-inch drives, parallel port, serial port, RGB video port, backlit yellow LCD screen, 72-key keyboard, battery charger \$3495; with 1MB of RAM, 1.44MB 31/2-inch drive, 20MB hard drive, 80287 coprocessor, parallel port, serial port, RGB video port, 2400-bps internal modem, 600 by 400 gas plasma display, 72-key keyboard, DOS 3.21 and Crosstalk in ROM, battery charger \$7205

Accessories: backlit blue LCD screen \$295, plasma screen \$995; 2MB RAM \$595, 4MB RAM \$2395, 8MB RAM \$4695; 20MB hard disk \$1175, 40MB hard disk \$1675; 1200-bps modem \$395, 2400-bps modem \$595; 80287 math coprocessor \$495; DOS 3.21 in ROM \$200, Crosstalk in ROM \$250; external 360K 51/4-inch floppy drive \$395; internal battery pack \$70, external battery pack \$175; battery charger \$90; external numeric keypad \$165; carrying cases \$60, \$120, \$150; PC-compatible five-card expansion chassis \$1295: VGA video controller expansion cartridge \$695

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For more information, see Products Featured in This Issue.

Eric Knorr is a senior editor for PC World. Jim Heid is a contributing editor for Macworld and Publish! magazines and the author of Power Windows (Microsoft Press, Redmond, Washington, 1988). J. T. Johnson is a professor of journalism at San Francisco State University. John Diebold is a marine geophysicist specializing in computer analysis of seismic data.

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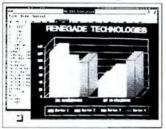
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JR MOTHER

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Which is a minor problem for some folks who are playing computer games on company time. Renegade 386™ may run them at speeds far too fast for human reactions.

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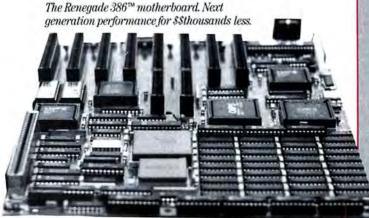
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THE SOFTWARE SHELF

184 TM/1 3.0

If you do financial consolidation and analysis, TM/l's multidimensional data-base-cum-spreadsheet can add new dimensions to your work.

186 ProComm Plus 1.1

ProComm's grown up, but it hasn't forgotten its shareware roots. Just \$75 buys nifty features and rapid file transfers.

192 Ize 1.0a

This elegant program is top-drawer when it comes to organizing masses of free-form text.

194 Professional DeskMate 1.01

Tandy has created an easy-to-use integrated package and operating environment for \$150, but business users won't be impressed.

198 Symphony 2.0

Although fans of the integrated package will be pleased, Symphony hasn't really changed enough to make a difference.

TM/1 3.0

Multidimensional data base

PROS: Very fast analysis and consolidation, data independence, flexible importing, identifies data by name, RAM stingy

CONS: Weak graphics, poor printer support, expensive

Anyone who analyzes business data with 1-2-3 must occasionally yearn to escape the confines of a row-and-column matrix. A spreadsheet simply can't answer a question like, How did the Detroit office's May sales compare to midwestern sales in September? Yet with Sinper Corporation's TM/1, you can get the answer in seconds.

TM/I (the letters stand for Tables Manager) is a powerful multidimensional data base with a spreadsheet front end you use to analyze, display, and update data. Data is entered or imported into tables and is labeled by name—not by cell address. What Sinper calls dimensions are lists of these labels. Using names prevents input errors and makes referring to the data items clear and convenient—considerable advantages.

Although *TM/1* is sometimes perceived as a stacked spreadsheet à la *Boeing Calc*, it's closer to—but more powerful than—a program like *VP-Planner Plus* (see *The Software Shelf, PCW*, May 1988). You can define up to eight dimensions for any one table and work with up to 128 tables in a single worksheet. Unlike most spreadsheets, *TM/1* employs a virtual memory scheme that lets you use a table containing up to 4 million cells or 32MB worth of data. The \$795 program is a specialist's tool, and an office might well have 2 analysts using *TM/1* while another 50 happily run 1-2-3.

TM/I's multidimensional structure makes it perfect for analyzing the kinds of business questions that involve that extra variable or two. For example, if the owners of a whole-sale carpet business wanted to analyze 12 months' sales by carpet type—a two-dimensional problem—they could easily do it with 1-2-3. But try to consolidate this kind of data from ten stores, and you're up to three dimensions. How about cross-referencing major customers? That's another dimension. Want to add forecasts versus actuals? Even such commonplace business problems can make 1-2-3 look like a glorified abacus.

When you first load TM/1, its main menu offers a choice between worksheets, tables, or dimensions. If you're starting from scratch, you first define the dimensions. The carpet store example has three dimensions: the kinds of carpet, the months, and the stores. The months dimension would list the elements Jan, Feb, Mar, and so forth, but you could also include the element First Quarter and define it as the sum of those months-a trick that makes totaling values and making consolidations easy. Each list of such dimension elements

is saved in a separate file.

Next, you create a data table. You select the dimensions you want to use (carpet types, store locations, and so on) from a list of dimension files you've created. Once the structure of the table is defined, you enter or import the data. *TM/1* accepts data in *dBASE*, DIF, .WKS, .WK1, and ASCII formats, and the powerful Process command cleverly assigns it to the proper location in the data table.

Finally, you turn to the worksheet to view and analyze the data. For example, a worksheet might contain a view of the New York store's sales of different carpets by month. By picking the element 'Atlanta', you instantly get the same information for the Atlanta store. And by changing row or column dimensions (or both), you get a completely dif-

ferent slice of the data. Since this is a spreadsheet, you can insert formulas that calculate totals or make comparisons. But worksheet cells can also contain TM/1 data base functions. Because the data doesn't actually reside in the worksheet, TM/1 provides up-to-date figures in every view.

For such a powerful program, *TM/1*'s graphics support is surprisingly crude, and printer



support is simply nonexistent. Moreover, if you're a 1-2-3 veteran, you'll have to change your mind-set and keyboard habits to get the most out of *TM/1*. But if your job entails consolidating and analyzing data, *TM/1* is an excellent supplement to the classic two-dimensional spread-sheet. —*Paul Lichtman*

FEATURES EVALUATION

ProComm Plus 1.1

While not as feature laden as the far more expensive Crosstalk Mk.4, ProComm Plus has a respectable set of useful options.

12 40 12 8 mm			
Features	brocomm bins	Smarttom III	Crosstalk Mk.A
List price	\$75	\$249	\$245
RAM required	192K	512K	256K
Terminal emulation			
πγ	•	•	•
VT 100/102/52	⊖ ²	•	•
ANSI	•	•	•
IBM 3101	•	0	•
Error-checking protocols ¹			
Kermit	•	•	0
XMODEM	•	•	•
CRC XMODEM	•	•	•
YMODEM	•	•	•
CompuServe Quick B	•	0	•
Proprietary	0	0	•
Miscellaneous			
On-line text editor	•		•
Auto-capture buffer	•	•	•
Script language	•	•	•
Predefined scripts	•	•	•
Remote operation	•	•	•
Number of multiple sessions	1	2	15
Background file transfer	0	•	•
Temporary exit to DOS	•	•	•

● Yes ○ No ● Deficient

This is a partial list.

² No VT 100 support.

TAA/1 2.0

WHERE TO BUY

TM/1 3.0

Sinper Corp. 8901 Tonnelle Ave. North Bergen, NJ 07047 800/822-1596, 201/662-7999

List price: \$795, evaluation copy \$49.95

Requirements: 256K, DOS 2.00 or later version

Not copy protected

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ProComm Plus 1.1

Communications package



PROS: Fast, powerful script language; handy optional menu system; inexpensive

CONS: None

There's one lesson successful marketers learn: Don't mess with a winner. Yet the makers of *ProComm* have turned that classic shareware communications program into a finely tuned package worthy of corporate communications.

In creating *ProComm Plus*, Datastorm Technologies has done more than merely turbocharge *ProComm 2.4.2. ProComm Plus* adds four extra protocols and five more terminal emulations, an expanded script language and help system, and an optional menu system that is particularly helpful for new and occasional users.

Even *ProComm* loyalists will be pleased with the improvements. *ProComm Plus* lets users access multiple 200-number dialing directories and records a batch of information on each call: the date of the last call, protocol, terminal emulation, script file used, and so on. You can even mark several numbers in a directory and have *ProComm Plus* automatically dial them in order.

If you hate driving a program with forgettable keystroke combinations, fear not. Press a changeable hot key, and *ProComm Plus* displays a well-designed 1-2-3-style menu system that gives you entrée to all the program's functions. ASPECT, *ProComm Plus*'s script language, has been expanded to include six mathematical functions and the abilities to open and write to files and to set screen colors. PCEdit, a handy text editor for creating scripts, includes 21 built-in keyboard macros of frequently used ASPECT keywords.



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THE QUALITY GOES IN BEFORE THE NAME GOES ON

NSTL TEST REPORT

ProComm Plus 1.1

ProComm Plus is a bit faster than its predecessor ProComm 2.4.2 and often beats Crosstalk Mk.4 and Relay Silver.

Protocol

CRC XMODEM

ProComm Plus	16.2
Relay Silver	16.9
Crosstalk Mk.4	17.0
ProComm	18.7
	_

Kermit

Kermir	
Relay Silver	18.2
ProComm Plus	21.6
ProComm	22.6
Crosstalk Mk.4	24.4
seconds 0 5	10 15 20 25

No protocol

. 1	8 16 24	+1	
Relay Silver	-		38.4
Crosstalk Mk.4			31.9
ProComm	The same		30.5
ProComm Plus			25.9

¹ Program failed to perform this benchmark.

All tests were performed on a pair of IBM PC XTs connected by a null modem cable. Tests consisted of the transmission of a 10K file at 9600 bps. Prior to testing, each hard disk was formatted and DOS 3.20 was installed in its own directory. A CON-FIG.SYS file was then created in the root directory, specifying FILES=20 and BUFFERS=25. Finally, the communications program was installed in its own directory according to the manufacturer's in-

Protocol/error

CRC XMODEM

ProComm Plus	35.4
ProComm	41.8
Crosstalk Mk.4	59.5
Relay Silver	201.7

Kermit

Crosstalk Mk.4	44.
ProComm Plus	46.
ProComm ¹	
Relay Silver ¹	
Relay Silver	

seconds 0 40 80 120 160 200

Protocol/delay

CRC XMODEM

and sunopen	
ProComm Plus	. 90.1
ProComm	93.5
Relay Silver	93.8
Crosstalk Mk.4	94.1
Kermit	
ProComm Plus	26.4

 ProComm
 29.2

 Crosstalk Mk.4
 30.9

 Relay Silver
 108.6

seconds 0 20 40 60 80 100

structions. 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. In tests using protocols, each program was run with CRC XMODEM and Kermit. Although these protocols are not universal standards, most communications programs support them. The proprietary protocol included with each was also tested.

Protoco

The program transmitted a 10K text file at 9600 bps with CRC XMODEM and Kermit.

No protocol

The program was set to display each character as it was echoed from the host (remote echo).

Protocol/error

A 10K 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.

Protocol/delay

For this test, characters were delayed approximately .5 second between computers.

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

ProComm Plus runs a bit faster than its shareware relative and in NSTL tests did well against such established programs as Relay Silver and Crosstalk Mk.4.

For all the changes, Datastorm hasn't altered the look or feel of *ProComm*, and that's a real plus. Tinkering with a hit is always risky, but Datastorm has taken a good shareware package and made it better.

-Daniel J. Rosenbaum

WHERE TO BUY

ProComm Plus 1.1

Datastorm Technologies P.O. Box 1471 Columbia, MO 65205 800/626-2723, 314/474-8461

List price: \$75

Requirements: 192K, DOS 2.00 or later version

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Technical support: 60-day moneyback guarantee; free support for 90 days or 5 calls, M—F 9—5; extended support \$40/month for 10 calls, \$75/

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31-JUL-58 3091 Volume Discount cut Tax at 7.5% ng and Handling 311.74 598.80 110.00 488.80 719.93 Lokeville Assembly Plant Supervisors \$55 June 1988 555 177.56 542.32 1,490.10 | Mary Ellison

Samuel German

Andrew Jensen

Jennifer Thompson

Supervisor Jensen

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Form Letters

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Invoice Date: June 12, 1888 Order Number: 32212 Date of Order: 10-Jun-88 Ship Via: U.P.S. Payment Terms: Net 30

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Circle 181 on reader service card

year for 20 calls; no toll-free number Other support services: GEnie forum (Datastorm), company BBS For more information, see Products Featured in This Issue.

lze 1.0a

Text data base manager



PROS: Easy to use, automatically generates outlines of text data bases, easily imports data

CONS: No mouse support, keyword outlines aren't cross-referenced

In the now-sprawling field of personal information managers, Persoft's *Ize* is the one that finds the needle in the haystack. It's neither a personal planner like Valor's *Info-XL* (see *The Software Shelf, PCW, August 1988*) nor an outliner/project manager like Symantee's *GrandView*. Instead, *Ize* stores masses of free-form text—articles, letters, worksheets, whatever—and lets you quickly find and retrieve them.

Ize's appetite for text is nearly insatiable. You can create as many text bases as disk space allows, each holding up to 32,000 texts (Ize lingo for records) of up to 32K each. Text can be typed in directly or imported in formats ranging from Microsoft Word to 1-2-3. Unlike traditional data managers, Ize doesn't require structured records or impose stingy record-size limits. Ize's WordStar-like

ProComm Plus comes with mini phone directories for such cities as Atlanta, Chicago, and Boston. The screen displays settings, parameters, and scripts.

NAME	HUMBER DAND PLD S.D. SCRIPT
1 BOSTON AREA BBS SYSTEMS	1200 N-9-1 F
2	1288 N-8-1 F
3 Alpha Software	1 617 229-2915 2480 N-8-1 F
	1 617 494-2985 1288 N-8-1 F
5 Base 10	1 617 721-7368 2400 N-8-1 F
6 BCSNET Host	1 617 964-2546 2480 N-8-1 F
7 BINEX II	1 617 326-8259 2488 N-8-1 F
8 Bionic Dog	1 617 964-8069 1200 N-8-1 F
9 BIX	1 617 861-9767 1200 N-8-1 F
19 Blue Line	1 617 721-1688 2480 N-8-1 F
DIALING: Bald Eagle	LAST CONNECTED ON: 887/887/80
	TOTAL COMPLETED CALLS: II
SCRIPT FILE:	WAIT FOR CONNECTION: 45 SECS
CALL RESULT:	PAUSE BETWEEN CALLS: 4 SECS
PASS NUMBER: 1	TIME AT START OF DIAL: 86:58:1999
ELAPSED TIME: 5	TIME AT START OF THIS CALL: 06:58:20P

text processor even has enough formatting power to polish letters or reports. You can make *Ize* RAM resident at a minimum cost of 300K or run it with other applications under *Windows/386* or *Desqview*.

Using *Ize* is simply a matter of entering text and picking keywords. When you create a new text, you're greeted by an empty work area with a few function key definitions listed at the bottom; a keystroke gets you a set of pulldown menus. There are no restrictions on what you put in a record, but you must pick at least one keyword before saving it. If you have too many files to tag, you can even create keyword lists that *Ize* applies automatically to incoming texts, such as downloaded CompuServe files. And though a text base is by definition unstructured, Persoft wisely lets you resort to fixed-length fields and fields defined by type when appropriate.

Getting information out of *Ize* is nearly as easy as putting it in. To find an article on arms, Saudi Arabia, and Brazil, for example, run a keyword, full-text, or fuzzy-keyword search. *Ize*'s keyword search will display a list of the texts it finds, in descending order of frequency of keywords found. Scanning the keywords will usually give you a pretty good idea of which article you're after. If not, you can quickly browse through the articles themselves.

You can also omit search terms, in which case *Ize* will automatically outline the entire text base and generate a list of keywords, with the number of texts containing each keyword displayed in curly brackets. Keywords, unfortunately, aren't cross-referenced. Although a full-text *Ize* search is the most time-consuming, it's still surprisingly fast. On a 12-MHz AT with a 34ms hard disk drive, a search for a single word in a 370K text base took only 6 seconds.

One of *Ize*'s more ingenious features is a hot-link capability that gives you access to other applications and links information in those files to an *Ize* text base. Finally, *Ize*



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```
Outline of "arms"
         Saudi arabia
             Egypt sale Israel tanks >
            Export brazil libya embargo iraq
             Treaty miclear missiles
       B. China
           Iron
             a. Persian gulf united embargo nations >
             b. United states sales imag soviet !
          Israel missiles trade >
          1. Weapons stinger !
             Jets knowit I
       D. Pakistan missile veapons nuclear .
       E. Seinte infinissiles treaty >
F1Help
```

FSNew F6MxtLnk F7Bruse F8Bktrk F9Search F18Menu

When Ize searches one of its text bases, it automatically generates an outline of the items it finds, with their attached keywords. You can view a record or flip through the items one by one.

lets you print ranges and records-even groups of records-on a wide variety of printers.

Good though it is, Ize would benefit from mouse and network support, password protection, and file encryption. (Persoft promises the last two will be available soon.) But even without those additions, Ize is a polished, elegant program. Anyone who must store and retrieve large amounts of text will find it invaluable. -Patrick Marshall

WHERE TO BUY

Ize 1.0a

Persoft 465 Science Dr. Madison, WI 53711 608/273-6000 List price: \$445

Requirements: 512K, DOS 2.00 or later version; hard disk recommended Not copy protected

Technical support: unlimited, no tollfree number, M-F 8:30-5

Other support services: quarterly newsletter to registered users For more information, see Products Featured in This Issue.

Professional DeskMate 1.01

Integrated package

PROS: Easy-to-use, consistent interface; integrates graphics and text; users can toggle instantly to one external application; NETBIOS compatible

CONS: Modules are feature poor, worksheet can't import 1-2-3 files, no charting function, uses proprietary file formats, no cut and paste to external applications

In some ways, Tandy's Professional Desk-Mate is a good-news/bad-news story. Behind a lively graphics interface swarms a host of applications that PC novices can run right out of the box: word processor, file manager, spreadsheet, telecommunications, and drawing modules, plus a calendar and other useful accessories. All modules are run from pulldown menus triggered with a mouse or with function-key program prompts; user responses appear in Windows-like dialog boxes. Screen display is fast, and the program runs in only 384K RAM.

Tandy even gives you a rudimentary operating environment: Users can hot-key between Professional DeskMate and one external program such as 1-2-3. If you install the package on a NETBIOS-compatible LAN, your work group gets E-mail, multiple calendars, and shared calendaring. Finally, the price is right: Professional DeskMate costs just \$149.95 and is bundled free with Tandy's MS-DOS/BASIC package, which sells for \$119.95.

The bad news is that even rookies will soon outgrow the modules, which all use proprietary file formats. As an integrated package, Professional DeskMate pales beside such competitors as Ability Plus or Microsoft Works (see The Software Shelf, PCW, November 1987 and March 1988). And although Professional DeskMate qualifies as an operating environment, it won't compete with Windows or Desqview. You can't run two DOS applications at once or cut and paste data between an external application and Professional DeskMate. The program's

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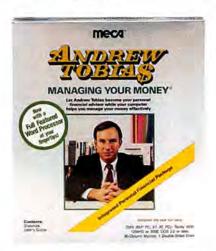
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- Check Writing and Printing
- Cash Forecasting

- Accounts Payable
- Accounts Receivable
- Balance Sheet
- Tax Planning
- Budget vs. Actual
- Expense Accounts

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FEATURES EVALUATION

Professional DeskMate

When pitted against Microsoft Works and Ability Plus, Tandy's Professional DeskMate looks pretty small-time.

\ 0.5	1 5 E	1	
\mathred Mar	Works 1.03	TO HOS	
\	198	. /	8-
Word processor	-	1	2
Spelling checker	0	•	•
Maximum document size	52K	Δ	270K
Headers/footers	0	•	•
Indicates formatting on screen	•	•	•
Justified printing	0	•	•
Automatic page numbering	0	•	•
Background printing	•	0	•
Mail merge	0	•	•
Merges graphics with text	•	•	•
Data base			
Maximum file size (in records)	32,000	4096	65,000
Maximum fields per record	22	256	32,000
Maximum text field size (in chars.)	1020	78	72
Reads/writes DIF	0	•	•
Reads/writes ASCII	•	•	•
Searches/sorts on multiple fields	0	0	•
Boolean searches	O1	•	•
Headers/footers	•	•	⊕2
Spreadsheet			
Maximum number of rows	99	4096	9999
Maximum number of columns	99	256	702
Maximum cell width (in chars.)	77	79	72
Maximum number of windows per screen	1	4	2
Reads/writes ASCII	•	•	•
Reads/writes .WKS and .WK1	0	•	⊕3
Reads/writes .DBF	- 0	0	•
Wild-card searches	0	•	•

\	で を		
preadsheet	Works 1.03 Professional Professional	asoH.	my plus 1.01
Background calculation	•	0	•
Supports mouse	•	•	0
Supports math coprocessor	•	0	•
Generates charts	0	•	•
Spooler	€4	0	0
Macro capability	0	•	•
elecommunications			
On-line text editor	0	0	0
Terminal emulation			
VT 100/102/52	•	⊕5	0
ANSI	•	•	0
Error-checking protocols			
Kermit	0	0	0
XMODEM	•	•	•
Auto-capture buffer	•	0	•
Script language	0	0	•
Aiscellaneous			
Freehand drawing	•	0	0
Task switching	•	0	•
Calculator	•	0	0
Calendar	•	0	•
Clipboard	•	0	0
Note pad	•	0	0
Phone list	•	0	0

Yes ○ No Deficient Limited by available RAM

work-group features may appeal to the smallbusiness market, but *Professional DeskMate* is really suitable only for home use.

At press time, Tandy had plans to split Professional DeskMate into two parts, to be released this fall. A \$99 DeskMate will have upgraded versions of the stand-alone programs in Professional DeskMate. The workgroup features—with some additions—will be available in a separate package, to be called *Workgroup Companion*.

For people who hate the DOS prompt, Professional DeskMate provides both a treestyle directory of files and modules or a more conventional grouping of tiled windows, each devoted to a module. As with Windows, you cut and paste data between modules with a clipboard.

Accepts NOT but neither AND nor OR.

² Headers only.

^{3 .}WKS only.

On local area network.

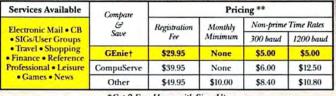
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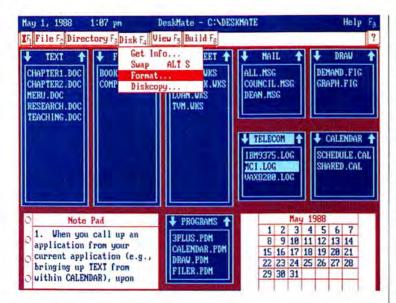


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In DeskMate's
"desktop" layout, any of the
main modules
can be called up
and run from its
own window. In
Telcom, for example, a keystroke lets you
automatically
dial and log on
to MCI Mail.

If calling up applications is easy, getting real work out of them is another matter. *Professional DeskMate*'s word processor automatically reformats paragraphs as you type and displays underlining and boldface characters, but it can't do mail merge, mix single- and double-spacing in a document, or even print justified text. The worksheet is the size of a putting green—99 rows by 99 columns—and it can't create graphs or import 1-2-3 or any other worksheet files.

The communications module can be run with log-on scripts and offers automatic redial and a host mode, but it's clumsy: You must post commands individually to a submenu, then press <Ctrl>-E to execute them. The most capable module is probably the file manager.

On a LAN, *Professional DeskMate* displays some interesting work-group features. Sending E-mail is a simple point-and-shoot operation, and the program lets users post events on a common work-group calendar as well as schedule events on any combination of individual calendars. *Professional DeskMate* can also link users to a remote printer and control the flow of print jobs.

Professional DeskMate's future should be interesting. The program has been licensed to vendors such as 3Com for use as a network interface, and Tandy claims that Symantec

and Electronic Arts, among others, will be writing *Professional DeskMate* applications. Still, if you're in the market for an integrated package, consider the alternatives. If proprietary file formats don't matter, *Microsoft Works* lists for only \$50 more and provides heftier modules and a terrific disk-based tutorial. If *dBASE* and *1-2-3* are office staples, check out Alpha Software's *AlphaWorks*, a \$195 package slated for summer release. And as environments for off-the-shelf software, *Windows/386* and *Desqview* are the best bets around. —*Dennis Dykstra*

WHERE TO BUY

Professional DeskMate 1.01

Tondy Corp. 1700 One Tondy Center Fort Worth, TX 76102 817/390-3700

Not copy protected

List price: \$149.95, or bundled free with Tandy MS-DOS/BASIC, which costs \$119.95

Requirements: 384K (512K for the shared work-group calendar), DOS 3.20 or later version

Technical support: free support from local Radio Shack stores or from Tandy; M–F 8–5, extended support \$60 (six problems, with no limit on time or number of calls)

Other support services: workshops and on-site training available For more information, see Products Featured in This Issue.

Symphony 2.0

Integrated package

PROS: More efficient memory use, faster processing, minimum recalculation feature, not copy protected

CONS: Spreadsheet lacks background recalculation, no dynamic links between worksheet and graphics

There's only one reason to buy old wine in a new bottle: You like the old wine. The latest version of *Symphony*, the *premier grand cru* of integrated software, has dropped copy protection and gained some useful features, but it won't make anyone abandon *Framework* or *Enable*. Registered *Symphony* users, however, will find the modest upgrade fee well worthwhile.

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Daytime Phone Computer make and model

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Dow Jones News/Retrieval

From Dow Jones & Company, Inc.

The information that powers today's business:



Symphony 2.0 includes preconfigured settings for its telecommunications mode. This one facilitates connection with the Dow Jones News/Retrieval service.

Symphony 2.0 still needs 384K RAM, but it uses memory more efficiently. In the spreadsheet, for example, text, format commands, range names, and anything unlikely to be recalculated are stored in expanded memory. A second option recalculates only cells that have been changed. The Symphony data base now allows 256 fields per record instead of the former 33 and is easier to use. In Form mode, for example, you can edit, insert, delete, and move fields without having to switch to the Sheet module. Network fanciers can lock out other users while working on a shared worksheet.

Symphony's weakest link has always been its minimalist word processor. Version 2.0 adds a clipboard, wild-card search and replace, automatic paragraph reformatting, and keystroke-saving "accelerator keys." On a color monitor, text attributes like underlining and boldface appear in color, and you can now choose them from a menu instead of the command line. The program has also gained a speedy 80,000-word spelling checker and an intuitive, 32-level outliner module that is smoothly integrated with the word processor. Version 2.0's communications module provides preconfigured log-on settings for CompuServe, Dow Jones News/Retrieval, MCI Mail, and The Source-a boon, since earlier versions forced users to write their own log-on scripts.

Symphony remains the default standard for integrated software in the corporate world, especially among power spreadsheet users. Version 2.0's improvements are welcome, but Symphony still lacks decent graphics, background recalculation, an expanded macro language and macro debugger, landscape printing, and a spooler. If you like old wine, this one ages well. But if you want a real Symphony upgrade, wait for the next vintage. —Stephen A. Blumenthal

WHERE TO BUY

Symphony 2.0

Lotus Development 55 Combridge Pkwy. Combridge, MA 02142 617/577-8500

List price: \$695; updates from version 1.1 or 1.2 \$95, from 1.0 or 1.01 \$150 Requirements: 384K (512K with spelling checker), DOS 2.00 or later version

Not copy protected

Technical support: unlimited, no tollfree number, M–F 8:30–8; extended support \$150 (renewal \$75), includes toll-free number and quarterly newsletter

Other support services: Compu-Serve Application Services BBS (Go Lotus)

For more information, see Products
Featured in This Issue.

Paul Lichtman is a writer and 1-2-3 consultant in Millburn, New Jersey. Daniel J.
Rosenbaum is a former UPI reporter and the author of WordPerfect Advanced Techniques (Que, Indianapolis, Indiana, 1987).
Patrick Marshall edits the Commentary Page of the Oakland Tribune. Dennis Dykstra is a professor at Northern Arizona University in Flagstaff, as well as a freelance writer and software developer. Stephen A. Blumenthal is a corporate/government-relations attorney in Sacramento, California, and a contributing editor for PC World.



DacEasyTM Accounting. More Than 400,000 Growing Businesses Worldwide. DacEasy Accounting leads the industry as the number one selling, award-winning program Two-time winner of PC World's World Class Award and PC Magazine's Editor's Choice, DacEasy Accounting recently was named InfoWorld's Product of the Year. Again and again, DacEasy proves that it makes a difference.









Since its introduction in 1985, DacEasy Accounting, feature for feature, has won acclaim as the leader in accounting software. Now Version 3.0 features a new interface with transaction-oriented pull-down menus that makes it think like you think as a business person rather than an accountant. Readily installed with five quick questions, your business accounting is operating within 10 minutes! Choose the predefined Chart of Accounts that are tailored for service or inventory-based businesses, or modify. All seven modules (General Ledger, Accounts Receivable, Accounts Payable, Inventory, Billing, Purchase Order and Forecasting) are fully integrated. Data posted once is automatically posted to all other related modules saving you time and ensuring accuracy as well.

DacEasy Accounting's strength is its capability for generating reports that provide you with fast information and ultimately better management decisions.

In fact, it provides you with more than 700 reports and "what if" forecasting scenarios based on three-year historical information - great for projecting expenditures and revenue. And, in addition to the program, you'll find the 460-page documentation is written for ease of understanding with helpful hints, screens and examples.



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Naturally, out of the best-selling accounting program grew the need for related business programs such as DacEasy Payroll. The 3.0 version also features a new intuitive design, pull-down menus, flexible pay periods, current federal and state tax tables, automatic withholdings. printing of checks, W-2's and 1099 forms, and much more. It's no wonder DacEasy is the world's best-selling payroll and personnel management program!

Also new for 1988 is DacEasy Graph+Mate, a RAM-resident program that interfaces with DacEasy Accounting or Payroll. Its easy graphic reporting features pie charts, line charts, bar charts, stacked-bar charts and perspective bar charts. Plus custom file viewing, macros, pop-up calculator and notepad, and more make it the ideal companion.

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To order DacEasy™ Accounting, Payroll and Graph+Mate by mail send \$99.95 (each), BonusPack \$199.95 to Dac Software (address below), (Plus \$7.50 Shipping/Tx residents add sales tax/\$17.50 shipping outside U.S.)

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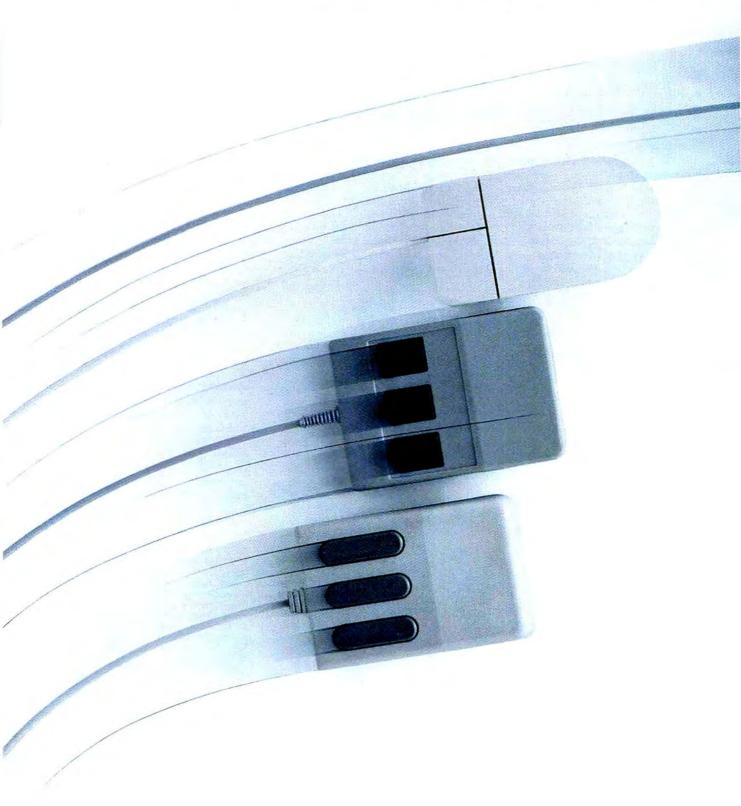
(In Canada, Call 519-747-9633)

Dac Software

17950 Preston Road • Suite 800 • Dallas, TX 75252

rey Back Guarantee: Unconditional guarantee on all products bought directly from Dac Software (less shipping charges). Minimum Hardware Requirements: IBM PC or 100% compatibles. drives, 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 (384K for Graph-Mate). Trademarks: IBM, PC-DOS, MS-DOS. DacEasy is a trademark of Dac Software, Inc., 17950 Preston Road, Suite 800, Dallas, TX 7525-2540. 5.25° & 5.5° disks available. Copyright = 1988, by Dac Software, Inc., 17950 Preston Road, Suite 800, Dallas, TX 7525-25740. 5.25° & 5.5° disks available. Copyright = 1988, by Dac Software, Inc., 17950 Preston Road, Suite 800, Dallas, TX 7525-25740.

Key Tronic announces A satisfaction guarantee



an end to the rat race. makes you the winner.



Let's face it. With so many different mice on the market, making the right choice has been a confusing decision.

But not anymore.

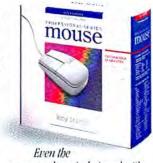
Because now Key Tronic introduces the Professional Series™ Mouse, the mouse that's backed by an unbeatable satisfaction guarantee. If you are not completely satisfied for any reason, return it to Key Tronic for a replacement. Or your money back.

With a guarantee like that you really can't lose. What's more, everything about this mouse is designed with your satisfaction in mind. Take

getting started, for example. Key Tronic's documentation is written in clear and easy-tofollow English — instead of

"computerese."

If you have any questions at all, however, a trained expert is only a phone call away. Key Tronic's toll free support line makes it that easy.



mouse package is designed with your satisfaction in mind.

What about compatibility? No problem. The Professional Series Mouse works with IBM PCs, XTs, ATs* and most compatibles. And Key Tronic's menuing software makes just about any application — from desktop publishing to

spreadsheets — faster and easier.

The mouse has even been carefully designed to fit the contour of your hand — a benefit

> that translates into less fatigue, greater productivity, and a lot more enjoyment.

No other mouse package offers so many reasons to be satisfied. Top it all off with the satisfaction guar-

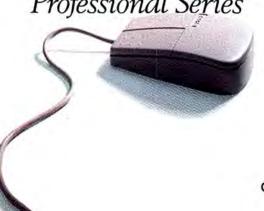
antee, and it's sure to be the mouse you'll reach for first.

So celebrate the end of the mouse rat race. Contact your local Key Tronic dealer or call 1-800-262-6006. In Washington state, call (509) 927-5515. Then

> find out more about the mouse that's guaranteed to make you a winner.

key tronic

Professional Series®



Circle 99 on reader service card

TO BUY, TO LEASE?



Although more expensive than buying a system outright, leasing a PC offers some unique advantages.

"I've been bloodied in this business," cries Wayne McFarland, president of WWC, Inc., a media promotion agency in Pasadena, California.

He started buying personal computers when CP/M was the only kid on the block and has suffered through three changeovers in technology—as DOS replaced CP/M and IBM PCs gave way first to XTs and then to ATs. McFarland recalls with little fondness scores of nonbillable hours spent figuring out what new equipment to buy and how to set it up.

Happily, those days ended a year ago when, during yet another search for systems, a WWC employee happened upon a lease-only store, Use 'R Computers, in Torrance, California.

For McFarland, computer leasing is a hedge not only against technological obsolescence but also against depreciation expenses and computer breakdowns. For \$108 a month per machine, he leases two 640K Epson AT compatibles, each with a 30MB hard disk drive and a monochrome monitor. When his lease expires in two years, he can purchase the systems for \$199 each—for a total price of \$2791 per unit—or turn them in and lease new equipment. So much for obsolescence.

Instead of having to make a capital outlay (especially now that the investment tax credit has been abolished), McFarland has a comfortable cash cushion and writes off his fixed lease payments as an operating expense. So much for depreciation.

And McFarland is freed from service worries. "It's in the leasing company's interest to make sure the equipment is running," he observes. Although McFarland's two systems originally had controller board problems, Use 'R Computers fixed them both within 36 hours. It took seven weeks to find and solve a similar problem in equipment that McFarland once bought from a full-service dealer. Now an ardent convert, McFarland says he'll never buy another PC outright.

Of course, leasing also has its drawbacks. It's usually much costlier to lease than to buy, and only a careful examination of your computing needs and circumstances will determine whether it's the way to go. McFarland, for example, passes the monthly lease payments along to his clients as expenses. Such benefits make leasing the obvious choice for him.

Ronnie Gunnerson

dealers and vendors.

Lease-only operations like Use 'R Computers are springing up all over. Even IBM and Apple have established third-party leasing divisions to compete with the Studebaker-Worthingtons of the world. "So many companies are concerned about technical obsolescence that vendors and resellers alike are now offering leasing to attract a larger share of the corporate marketplace," says Jocelyn Young, an analyst with the Dallas research firm Future Computing.

The introduction of 80386-based machines and IBM's PS/2 line have raised the interest in leasing even further. Many users are confused by changes in bus architecture and unsure of the long-term implications for the new 80386s and Microsoft's OS/2, says Robert Armstrong, manager of General Electric Computer Service's rental marketing program in Atlanta. More people are choosing to try before they buy. Even those who know what they want and are willing to pay for it often end up with short-term leases simply because the product isn't available from dealers yet, he adds.

Flexibility Is a Strong Point

The decision to lease rather than buy often depends on the size of the lessee. While small-business owners make their own lease/purchase decisions and can act on the spot, department managers in large companies often spend months waiting for higher-ups to OK their purchase proposals. Interim leasing often appeases management and in some cases can win approval for a previously denied purchase.

At Landis & Gyr Powers, a Northbrook, Illinois, manufacturer of automatic temperature controls and building-management systems, the approval process takes anywhere from six weeks to six months, according to Sam Wilson, manager of technical training. To ramp up for a special project in 1985, Wilson resorted to computer leasing, and he's been renting computers and peripherals ever since. He often leases equipment after a purchase request has been turned down, then he tracks his productivity gains and ultimately wins approval to buy.

Other companies use a similar strategy. They lease computers at year's end when their allocation for capital expenditures has dried up, then roll over into a purchase at the start of the new fiscal year. At firms like Talman Home Federal Savings in Chicago, leasing has become the norm rather than the exception. "Our cost-justification studies consistently favored leasing, and now we have a lease-only policy," says Senior Buyer Betty Murdock. "Writing off the lease payments to operating expenses, plus the ability to upgrade, makes it cost-effective for us."

Uncle Sam Offers Leasing Incentives

With tax reform, Congress unwittingly provided another reason to lease. Not only has the loss of the investment tax credit discouraged capital expenditures, but the new alternative minimum tax (AMT) actually encourages leasing, according to New York attorney Marisa Manley.

Intended to prevent taxpayers from whittling their taxes down to zero, the AMT slaps a 20 percent tax on a chosen few deductions called "tax-preference items." Included among these deductions is a portion of the accelerated depreciation that Congress mandated for many kinds of equipment, including computers, put into use after 1986.

If you don't own equipment, however, you don't generate depreciation deductions, so you decrease your exposure to AMT liability. So managing the AMT, Manley says, is another reason for some companies to lease. Note, however, that the AMT affects only a tiny percentage of tax returns.



Computer
leasing is a
hedge not
only against
technological
obsolescence,
but also against
depreciation
expenses and
computer
breakdowns.

DREMORES WIL



Leasing is much costlier than buying, and only a careful examination of your computing needs will determine whether it's the way to go.

Two Ways to Lease

Trends aside, computer leasing isn't for everyone. How do you decide? Understanding the leasing process is the first step. There are two types of leases—operating and financial. Under an operating lease, you rent the equipment for a period extending anywhere from several weeks to several years, usually with the intention of returning it when you're done. Monthly payments are much higher than under a financial lease, which is designed as a financing vehicle for purchase.

Under an operating lease, the lessor picks up the cost of delivery, installation, maintenance, and service. There's an important caveat, too: Should you decide to roll over the rental into a purchase, you'll probably pay far more for the equipment than if you had chosen a financial lease.

American Computer Rental in Fountain Valley, California, offers a fairly standard rollover program. Half a customer's rental fees accrue toward purchase of leased equipment should he or she decide to buy it. If so, American Computer Rental expects to cash out right away. "The customer pays whatever balance is due or it is still considered rent," explains President Mike Score.

Based on a retail price of about \$6000, American Computer Rental will lease an IBM AT with a 30MB hard disk drive, 640K of RAM, and a color monitor for \$480 per month. "Assuming a 12-month rental, the total is \$5760. Half of that, \$2880, would apply toward the purchase price at the end of the rental period," explains Score.

To buy the \$6000 system, the customer has to come up with another \$3120. Add that to the \$5760 already spent on rent, and the total purchase price is \$8880. Of course, these calculations ignore possible cash-flow considerations.

Equipment rented under an operating lease typically is not new. Richard Wall, a microcomputer specialist in the research and development division of Pillsbury Company in Minneapolis, regularly rents computers under an operating lease while waiting for purchase fulfillment. He always rents with an option to buy, but he's never exercised that option. "You get an out-of-date computer that's got quite a few miles on it," says Wall. "It doesn't look like a very good deal."

Financial Leases Are for Buyers

Unlike operating leases, financial leases are usually set up to facilitate a purchase of state-of-the-art equipment. You simply string out payments over most of the computer's useful life. The purchase is fully amortized; that is, the total of the monthly payments equals the full price of the leased equipment. However, under the terms of a financial lease, you're on your own for service and maintenance just as though you'd bought the system. Manufacturers' warranties apply, of course, but to cover any additional repairs, you must buy a service contract, which costs about 10 percent of the purchase price per year.

A characteristic financial lease from The Computer Factory, a New York-based computer dealer with 45 stores, spans three years, with a 10 percent residual buy out at the end.

"The 10 percent option means that there is no set price on the equipment until the end of the lease," explains Vice President of Sales Russell Madris. "At that point you negotiate the price with the leasing company to decide whether you want to keep the equipment or let it go."

A standard 10 percent residual buy out would be 10 percent of your total lease payments. For example, leasing \$6000 worth of equipment for three years at an interest rate of 10 percent would yield a \$7800 lease cost; you could buy the equipment for another \$780, or a total of \$8580. This is only about \$300 less than the cost of the operating lease cited earlier, but the benefit is in the longer payment term—three years instead of one.

Another alternative is a *closed* lease where a dollar buy out is determined at the start. "Typically you pay more for a dollar buy out than you do for the 10 percent option," explains Madris. "Most of our customers are going for the option. We try not to even offer buy backs."

Depending on prevailing interest rates, using a financial lease may be a less costly way to acquire equipment than a bank loan. As Studebaker-Worthington's Weiss explains, "Once the lease is written, the monthly payment on the

Many Ways to Pay—Which Is Best for You? Here are examples of leasing and purchasing costs for a namebrand 286 system that retails for about \$6000. Operating lease' Financial lease² Length of lease 12 months 36 months Cost per month \$480 \$232 Total lease price \$5760 \$8352 Typical buy -out option \$3120 \$600 Total purchase price \$8880 \$8952 Cost per year \$8880 \$2984 Source: American Computer Rental ² Source: Businessland

lease is fixed. Bank loans, on the other hand, are often tied to variable interest rates, so your payment can increase substantially."

Before You Sign That Lease

Three years ago, when Keven Wilder launched Chiasso, her contemporary home- and office-design store, not many retail stores in Chicago used computers as cash registers. For Wilder, leasing computers made the transition less risky.

Wilder is currently reconfiguring her system to handle multistore locations, and she intends to lease computers again "because, once more, we aren't certain it will work." She plans to use a financial lease with service fees added to the monthly payment. But she won't settle for the first lease she's offered. Wilder shops diligently

for the best deal and recommends that anyone interested in leasing do the same.

"Leases can be negotiated," she says. "There's a wide range of prices and terms. A lot depends on how hungry the dealer is."

As Jim Beekhuizen of Use 'R Computers warns, "The decision to lease and the type of lease you choose depend on your company's internal rate of return and your tax position. Speak to your accountant before entering into a lease."

Ronnie Gunnerson is a frequent contributor to PC World.

Spreadsheet users often have more ideas about how to use their program than time to implement those ideas. Fortunately, there is probably a 1-2-3 template for every purpose under heaven.

30 TEMPLATES FOR 1-2-3

Mary Campbell

good 1-2-3 template can provide an instant solution to a problem that might otherwise eat up hours or days of your time. Most templates are adaptable, self-contained packages with a specific focus, such as taxes or investment planning. They come with at least a short description of the model and occasionally with elaborate documentation; some display the necessary instructions on the worksheet itself. Well-designed templates apportion an area of the worksheet for your input and don't require that you modify formulas to change your assumptions.

In this guide, we have grouped the templates loosely by category. Many could be listed in more than one; for example, those that offer both tax and accounting help. And we've included a grab bag of miscellaneous templates that don't fit easily in any other category but offer novel applications for 1-2-3. We note which version of 1-2-3 each requires and whether it is compatible with such other spreadsheets as Quattro, Surpass, Symphony, Twin, VP-Planner Plus (VPP), and Words & Figures (W&F).

While they can be a godsend for the harried, templates shouldn't replace common sense. If you find that a template can't return a known result, for example, look for an error in the formulas. Some 1-2-3 experts distrust "black box" answers on principle and prefer to design their own models. But for those of us with neither the time nor the inclination to do so, a well-built template is as welcome as a top-of-the-line calculator.



TAX TEMPLATES

Unless you're a tax preparer, developing your own tax templates is seldom worthwhile. After a year's use, you'd only have to revise them for next year's tax laws. Because software developers can sell thousands of copies of their templates, they're able to offer them at a reasonable price.

Executive Federal Tax Template

A remarkably complete template that can help you do your federal taxes, this package calculates and prints forms 1040, 2106, 2119, 2441, 3903, 4562, 4972, and 6251 and schedules A, B, C, D, E, and SE. (1A, 2.x; Symphony)

Tax: Help!

P.O. Box 324, Central Park Stn. Buffalo, NY 14215-0324 716/631-3370

List price: \$14.95

Tax Ease This combined offering of state and federal tax templates comes in individual and professional versions. Federal templates include 28 tax forms. A series of macros lets you import data, create multiple copies of forms, and create a refund window. (IA, 2.x; Quattro, Twin, VPP)

Park Technologies

P.O. Box 1317 Clifton Park, NY 12065 800/423-3189, 518/877-5881

List price: \$69.95

Totaltax A tax template that calculates income and payroll taxes for business owners and their business entities. The accompanying 120-page manual lists 60 ways the small-business owner can legally reduce taxes. (1A, 2.x; VPP)

Research Press

4500 W. 72nd Terr. Prairie Village, KS 66208 913/362-9667

List price: \$195, demo copy \$5

VMC EasyTax These tax preparation and planning templates support 18 different tax forms including 1040, 1040-ES, and schedules A, B, C, D, E, R, and SE. (separate versions for 1A, 1.0, 2.1; 2.1 version works with Quattro, Symphony, Twin, VPP)

Valley Management Consultants

3939 Bradford Rd. Huntingdon Valley, PA 19006 215/947-2507

List price: \$89

A B C D

1
2
3
4

FINANCIAL ANALYSIS/PLANNING MODEL TEMPLATES

A wide variety of financial analysis and planning products can help you evaluate internal and external corporate performance. Some are comprehensive, all-in-one packages, while others focus narrowly on a single area, such as cash-flow forecasting.

12-Month Cash Flow Budget If you need to automate the cash flow for a small business, you may find this template useful. The 12-month projections include estimated and actual variances above and below budget. (2.x)

Strategic Management Systems

1720 S. Bellaire St. #802 Denver, CO 80222

303/756-4273

List price: \$45

Cash-Flow Forecaster Plus This program helps you analyze a company's cash position. You can project sales, expenses, and taxes or age your receivables at various intervals. An optional consolidation module is available. (1A, 2.x)

Bryley Systems

P.O. Box 144 Berlin, MA 01503-0144 617/838-2021

List price: \$99.95, with consolidation module \$129.95

unique template sifts the information in a company's financial reports and grades the company's strength on a numeric scale. The package includes an

Commercial Credit Matrix This

grades the company's strength on a numeric scale. The package includes an example to help novices and a 40-page booklet, "Analyzing Financial Statements: Quick and Clean." (1A, 2.x; VPP)

Books on Business

Box 313 Buena Park, CA 90621 714/523-0357

List price: \$69

Develop Your Business Plan 2.0

A combination 1-2-3 template and worksheet to guide a business owner through the detailed planning needed to create a professional business plan. Worksheets, charts, graphs, and a 150-page book of advice will help with this difficult task. (1A, 2.x; Quattro, Symphony, Twin, VPP, W&F)

Infoplan

155 Forest Ave. Palo Alto, CA 94301 800/336-5544, 415/325-3190

List price: \$69.95

FinCalc A combined template and 1-2-3 add-in for time value of money and cash-flow analysis. (2.x; Quattro)

Spreadsheet Solutions

c/o Margolin, Winer, and Evens 600 Old Country Rd. #430 Garden City, NY 11530 800/634-8509, 516/487-1424

List price: \$62.95.

Loan Qualifier Mortgage bankers and real estate professionals can use this template to prequalify a client for a loan. You can also calculate a seller's net proceeds and produce comparative loan printouts and qualification specifics. Requires minimal input. (1A, 2,x)

Financial Microware

P.O. Box 40 Cupertino, CA 95015 408/446-5639

List price: \$99

MAPS for Businesses A comprehensive set of financial analysis and fore-casting templates, this package includes a historical analysis model for entering one to six sets of financial statement data, a long-range forecasting model with a horizon of 5 to 11 years, and a short-range forecasting model for up to 12 months. These highly sophisticated templates produce cash-flow, summary, impact analysis, and financial-diagnostic reports. (2.01)

Management Advisory Services

2401 4th Ave. Seattle, WA 98121-1436 206/441-0500 **List price: \$**495

Professional Corporate Financial

Planning Models Six templates designed to support the financial planning requirements of corporate managers in the manufacturing, marketing, and service sectors. The templates include Planning models for three-month, five-year, and eight-year horizons; a Production Planning model for up to five product lines; and a Venture Analysis model designed to evaluate new venture opportunities. Models are as large as 400K. (1A, 2.x; Symphony)

Stephen Archer Associates, Inc.

31 Chestnut Hill Rd. Stamford, CT 06903 203/968-1156

List price: \$295



INVESTMENT TEMPLATES

Many investors already use 1-2-3 to record their investment transactions. The templates selected for this section go a step beyond record keeping and help you plan investment strategy.

Market Action Timer Investment

Software Want advice on when to buy and sell stocks and mutual funds? With this template you'll need only 15 min-

utes a week to update closing values for the Dow Jones Industrials, the S&P 500, and a few of the other popular indexes. (1A, 2.x; Quattro, VPP)

Tempo Investment Products

2014 N. Saginaw #1230 Midland, MI 48640 517/631-4818

List price: \$89

Risk Analysis Template Evaluation

A risk-analysis template to assist with risk-management decisions in capital investment projects. The template helps you evaluate the impact of uncertainties and their potential effect on your projections. It lets you selectively reduce risk to increase the return on investment. A cash-flow model with 32 items is also included. (1A, 2.x)

Productivity Computing Services

1625 Waverly Rd. San Marino, CA 91108 818/281-7079

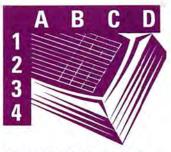
List price: \$385

Ryan Investment Planner Although designed to help plan investments for clients, the *Ryan Investment Planner* can also be used by individual investors. Its 18 investment categories cover everything from stocks to gold, and the program projects a five-year plan. Use the built-in tax rates or override them with your own entries. (2.x)

Ryan Software

901 N. Broadway North White Plains, NY 10603 914/682-9227

List price: \$249



ACCOUNTING TEMPLATES

While a large business would probably use a stand-alone system to handle accounting information, a well-designed 1-2-3 template can meet the needs of a smaller firm. And both can benefit from some of the more specialized applications designed to supplement regular sources of accounting information.

APS This set of 75 audit templates for compiling audit papers supports both standard forms and customized working papers. The set covers the entire auditing process, from engagement preparation to the final report. A scaled-down \$495 version without consolidations or supporting work schedules and tools (for engagement budgeting and statistical sampling) is available. (1A, 2.x)

Professional Services Microsystems

370 17th St. #1350 Denver, CO 80202

303/825-0461

List price: \$895

APS Fixed Assets A tool for CPAs to document fixed-asset accounting records. The system provides four types of schedules: depreciation; property additions; property disposals; and property, plant, and equipment schedules. (1A, 2.x)

Professional Services Microsystems List price: \$195 **Capital Financial Templates** A set of 21 templates covering loan calculations, amortization, and yield calculations. It includes calculations for balloon payments and ten different amortization schedules. (2.x)

Capital Enterprises

P.O. 716

West Springfield, MA 01090-0716 413/739-8231

List price: \$31.95

Checkbook and Shoestring

Accounting Individuals and small businesses can use this template to manage their checkbooks and pettycash balances. It prints checks (writing the amount in words as well as figures), a checkbook register, a petty-cash report, an invoice listing, vouchers, and a summary report that can be used for job costing. (1A, 2.x)

Audi Electric

34643 Allegheny Ct. Fremont, CA 94536 415/791-6994

List price: \$49

Check Writing Manager This template prints checks and keeps a record of disbursements. It handles payroll checks for up to 30 employees while maintaining withholding and salary information. (1A, 2.x)

RD Software

18 Briarcliff Ave. Poughkeepsie, NY 12603 914/462-1879

List price: \$99

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Mary Campbell is a writer, consultant, and computer trainer in Gates Mills, Ohio. Her most recent book is Using Agenda (Osborne/McGraw-Hill, Berkeley, California, 1988).

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Ten Graphs (and How to Use Them)

An expert shows you by example how to create accurate, forceful graphs.

You'll also find solid tips for avoiding graphical "ducks."



Richard Scoville ust like a clear piece of writing, a good data graph strives for transparency. Instead of calling attention to itself, it focuses the viewer's attention on the meaning of the data. A well-designed graph can help you understand a complex situation, then present your conclusions with precision and impact.

Spreadsheets such as Quattro and Excel and presentation graphics programs like Harvard Graphics and Freelance Plus offer great flexibility in the choice of graph type, plus many design options. But this profusion of options can result in confusing, unintelligible graphs. What follows are practical guidelines for selecting the proper graph type and suggestions for making a graph communicate clearly.

Choosing the Right Graph Type

Graphs are intended to answer questions. Some graphical questions are very simple—Who's biggest?—while others are subtle and complex—How does average daily temperature affect electricity consumption? The first step in selecting a graph format is to phrase the data question precisely.

Most business and scientific graphs answer just four basic types of data questions. To compare proportions and relative amounts (Who's biggest?), use a pie chart (FIGURE 1), a horizontal bar chart (FIGURE 2), or a data table (FIGURE 3). To show trends (How do things change over time?), use a column chart or a line graph (FIGURES 4 and 5). Showing what's typical or exceptional calls for a histogram, a cumulative percent chart, or a box



FIGURE 1: The simplest graph format, the pie chart, answers simple questions about proportions—such as: Which company holds the biggest market share? Which region sold the most last year? The message in this pie chart is, Whileaway is biggest; we're number two.

Pie charts serve best as presentation tools, to support an established conclusion when viewing time is brief. "Exploding" one of the slices adds emphasis. For clarity, put slice labels next to the slices, not in a legend. Including percentages or values in the labels adds a bit of detail to the interpretation. Avoid 3-D effects and visual puns such as pies in the form of tires or watches; such ornamentation makes it more difficult to judge the relative sizes of the slices. Pie charts should contain at most five or six slices; for more, use a horizontal bar chart (FIGURE 2).



FIGURE 2: Choose the horizontal bar chart instead of the pie chart to illustrate close comparisons between parts. This graph accommodates 13 companies without visual clutter and shows exact quantities in addition to proportions. In FIGURE 1, judging the difference in size between Spin-A-Wheel and Daydream Designs is difficult; this graph reveals it to be about 2 percent.

Arranging the bars from largest to smallest emphasizes Whileaway's domination of the market. Use a single color or fill pattern for all bars; to emphasize one bar, select a contrasting fill pattern. Inserting grid lines helps the viewer take measurements; keep them light so they don't overpower the data. To compare items that have several variables, use a series of horizontal bar charts with similar scales.

plot (FIGURES 6, 7, and 8). To present correlations (How well does one thing predict another?), use a multiplot chart (FIGURE 9) or a scatterplot (FIGURE 10).

Your selection of graph type should also depend on the situation. If your viewer is sophisticated and interested in analyzing the subject matter, select a complex graph format to illustrate subtle relationships. If you are making a presentation, trying to persuade a busy or skeptical viewer to buy, endorse, or approve something, then choose the simplest graph that supports your arguments.

Graphical Clarity

Edward Tufte, in his lively treatise on graphical excellence, *The Visual Display of Quantitative Information* (Graphics Press, Cheshire, Connecticut, 1983), characterizes certain truly terrible graphs as "ducks," in honor of a butcher shop built in the shape of a giant duck. A duck graph is primarily decorative; whatever message it communicates is purely accidental to its design.

Most of Tufte's suggestions for producing good graphs reduce to one principle: *Simplify*. Tufte suggests that, within reason, we maximize the amount of ink devoted to data and minimize everything else: titles, frames, fill patterns, comments, decorations, and fake 3-D effects.

One final suggestion: Test your graph on a typical viewer. After a period of scrutiny, a good analysis graph should elicit some intelligent questions. For presentation graphs, if your subject takes more than 3 seconds to get the point, then either the graph is too complicated, or it's a duck.

Richard Scoville, Ph.D., is director of training for the Computer Gallery in Research Triangle Park, North Carolina.

Fritterware Market Share, 1987 American Fritters Still Number 2!

	Millions of Units	Market Share
Whileaway, Inc.	83.0	49.9%
American Fritters	21.5	12.9
Procrastivision	14.1	8.5
Spin-A-Wheel, Ltd.	7.8	4.7
Daydream Designs	6.2	3.7
Redundaware	6.0	3.6
Useless Software	6.0	3.6
Other	4.8	2.9
Triple-X Research	4.0	2.4
Pinball Programs	4.0	2.4
Silly Systems	4.0	2.4
Int'l Moronics, Inc.	2.5	1.5
Doodleware	2.5	1.5

FIGURE 3: Don't forget that you can present quantitative comparisons very effectively with a simple numerical table. For purposes of analysis, a data table is preferable to a pie chart or horizontal bar chart because it can present many more facts. Unlike FIGURE 2, this table provides figures for the number of fritter units sold as well as for market share.

Generally, data tables rely on the viewer's initiative to extract the important points. Phrase graph and table titles in headline style, and be sure they contain an active verb. With large tables, use horizontal grid lines about every five rows to help lead the eye across the table. Avoid vertical lines, and eliminate anything not directly related to the data.

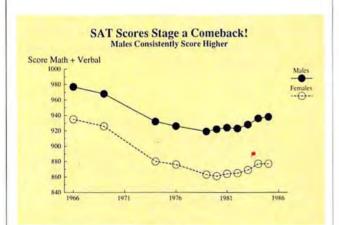


FIGURE 5: Line graphs, like column charts, answer questions about trends but can support an unlimited number of data points. Use a line graph to represent continuously variable measurements, like temperature, scores, or price. During analysis you might place many lines on the same graph; once you establish your conclusion, eliminate all but the lines that support it. Distinguish multiple lines by color or line pattern. Use symbols to mark individual measurements that are unevenly spaced. For multiple comparisons in reports and analyses, use a series of line graphs with consistent scaling. To plot the rate at which things change, use logarithmic scaling instead of linear. Linear scaling might show, for example, that U.S. population has been rising steadily since 1790; logarithmic scaling would illustrate that the rate of growth has gradually declined.

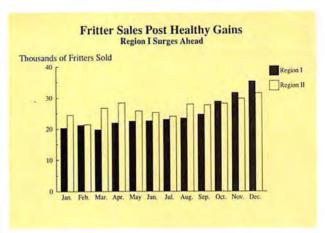


FIGURE 4: Column charts answer questions about trends (changes in a measurement over time), for example, Has the average fuel economy of U.S. autos increased since 1970? or, Will production continue to increase next quarter? Use column charts for a relatively small number of equally spaced data points. To compare trends for more than one category—such as monthly sales for two regions—you can use a clustered column chart as shown here. But keep the number of clusters small, and limit the number of bars in each cluster to three or fewer. For analysis, you might include several variables; for presentations, select just two that support your point. Place the vertical axis title above the axis; never turn the title sideways. Remember, columns suggest a countable quantity, like unit sales; for continuous variables (speed, weight, time), use a line chart.

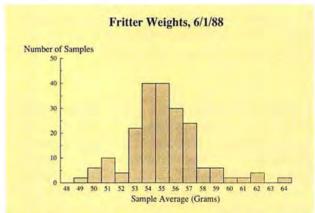


FIGURE 6: Histograms show what is typical and what is exceptional: What is the typical readership of a newsmagazine? How many households earn more than \$50,000 per year? A histogram is a column chart where the horizontal axis shows a measurement scale divided into bins. The height of the columns represents the number of measurements (observations) occurring within each bin. The shape of the histogram reveals the distribution of measurements along the scale.

This graph shows the distribution of weights of 200 samples of a product. The graph clearly shows the most common sample weight (54 to 55 grams) as well as the exceptional cases. The more measurements the better; as the number of observations increases, you can smooth the shape of the graph by using a finer measurement scale.

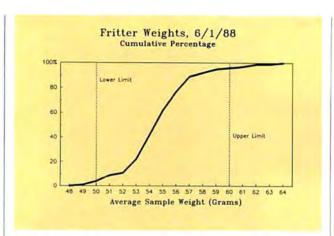
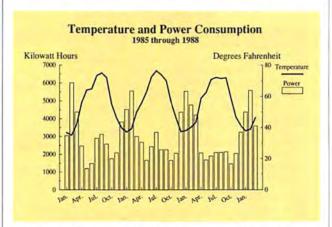


FIGURE 7: The cumulative percent chart (an ogive curve) is a line graph that shows the percentile values of a distribution, where 50 percent of the observations fall below the 50th percentile (the median), 75 percent below the 75th percentile, and so on. Shown here is a cumulative percent graph of fritter weight data. Reading the graph horizontally yields the percentile levels; reading vertically tells what proportion of the product falls above or below a given value. The dotted lines represent the minimum and maximum tolerable fritter weights; the curve shows that 4 percent of the product is below the minimum weight and 5 percent above the maximum. This type of chart is recommended only for sophisticated analytical viewers. For presentations, formulate conclusions using this graph, then present a simple pie chart or data table to show important values.



FIGURES 9 and 10: Graphs can be effective in revealing the correlations between events—the degree to which one event can be predicted from another. To visualize the correlation between two trends (Is hotel occupancy rate affected by distance from an airport? What is the relationship between stock prices and interest rates?), plot the data for each on the same graph. This approach requires a graph with two vertical axes, as shown in FIGURE 9. If both sets of data consist of countable quantities (units), use a clustered column chart; for two continuous variables, produce a multiline graph; for one of each, use a line-column chart.

In FIGURE 9, a line-column graph shows the relationship between electricity consumption and average temperature. Power consumption rises when the temperature is low (heating) and when it is high (air condition-

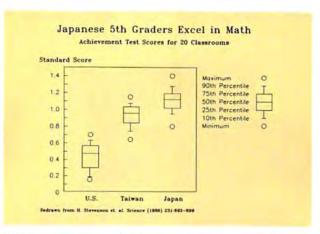
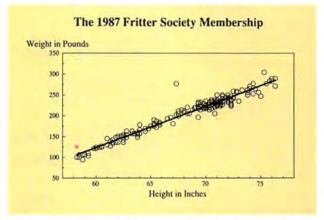


FIGURE 8: Box plots are a relatively recent statistical invention of the renowned numerical analyst J. W. Tukey. They provide an efficient way to visually compare the distributions of two or more groups of observations. This box plot compares the mathematics achievement scores of 20 Japanese and American fifth grade classes. Each box extends from the 25th to the 75th percentile. The line inside the box is the 50th percentile. The "tails" of the boxes extend to the 10th and 90th percentiles; observations beyond these are plotted individually. The box plot vividly shows the group differences: Notice that the lowest-scoring Japanese class had higher scores than the highest U.S. class. Use box plots whenever you need to compare two or more distributions—to find out if they differ and, if so, to illustrate which has the greatest typical values.



ing). In this graph, plotting the data over several years shows the cyclical nature of the relationship; plotting data for a single year would reduce the impact of the correlation.

A scatterplot shows the correlation between two distributions. FIGURE 10 shows the height and weight of 200 individuals. Height is plotted on the horizontal axis, weight on the vertical; each observation appears as a circle. The pattern of circles reveals the degree of predictability between height and weight. If all the circles fell on a straight line, our certainty would be absolute; the more circular the pattern of points, the less certain the relationship. To compare a correlation across groups, plot the points for each group with a different symbol. In a dense scatterplot, use logarithmic scaling to stretch out the distributions and separate points.

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CONSUMER WATCH

Advice and information for the computer consumer

The latest and greatest in scams is to rip off consumers through clever telemarketing schemes.

Here's an overview of the most common tactics—and how to avoid them.

Anita Amirrezvani

The \$1 Billion Heist

Congratulations, you've just won a free personal computer. All you have to do is purchase \$50 worth of stationery personalized for your business. May I take your order?

I'm calling to give you the opportunity to stock up on photocopying supplies before we raise our prices. I don't have your file in front of me—what brand is your photocopier?

Hello. Your company has been selected because of its excellent credit rating to qualify for a free laser printer. Would you give me your credit card number so I can verify it?

Every year, consumers and businesses lose nearly \$1 billion to telemarketing scams, according to the Federal Trade Commission (FTC). Using sales pitches like the ones described, smooth operators convince thousands of otherwise intelligent consumers to release their credit card numbers for fraudulent charges or to purchase inferior business products in order to qualify for too-good-to-be-true prizes.

Between 1982 and 1988, the FTC brought 25 federal court cases against telemarketing companies, recovering about \$25 million for consumers. But that's a drop in the bucket compared to what's lost every year.

Small businesses have been especially vulnerable to con artists who claim an affiliation with

the companies' usual office supplier, according to California deputy attorney general Jerry Smilowitz. In a recent spate of cases, telemarketers have offered what sounds like a good deal-a discount on a product like toning fluid for a photocopier-before a big price increase. But when the merchandise arrives, it's inferior or actually much more expensive than usual. The FTC has settled three such cases, distributing in one instance \$300,000 among ripped-off consumers.

Scams seem to come in waves, so if you know about typical tactics it's easier to avoid them. According to Marsha Goldberger. director of the standards and practices division of the Council of Better Business Bureaus, one common con is to offer companies a fabulous prize in exchange for making a relatively small purchase, such as imprinted business stationery. But the socalled prizes may actually be junk. For example, "a PC turned out to be a hand-held calculator," says Goldberger.

Savvy managers say it makes sense to be wary of unsolicited telemarketing calls. "Vendors try to get to us any way they can, but I'm resistant to buying cold over the phone," says Naomi Karten of Karten Associates, a training firm for information center managers in Randolph, Massachusetts. "I wouldn't rule out (continues) buying from a telemarketer, but I'd certainly want to see some printed information first."

Karten points out that it's extremely easy to get swept up in a sales pitch: "My husband got an unsolicited call recently about subscribing to an on-line data base service. He's usually pretty short on the phone, but before I knew it he was giving out his credit card number." When Karten alerted him, he wisely stopped in midsentence and asked for printed material, just in case.

Other managers say they're reluctant to purchase PC products from unfamiliar sources. "I tend not to put a lot of credibility in organizations that cold-call me and then sound like they're reading off of a list," says Chris Wong, eastern director of business services for real estate consulting firm Marshall & Stevens. Having received calls from both hardware and software suppliers, Wong says, "Sometimes they'll ask me what I have on order and offer to price out the order for me, but they usually can't match the deal I've already gotten. Besides, I don't want to jeopardize the relationship I have with my vendor just to shave off a few dollars."

Of course, plenty of honest, value-conscious telemarketers ply their wares by phone. Dell Computer Corporation, for example, is famous for the success of its telemarketing operation, which Dell spokesman John Ellet describes as "a group of highly trained sales and support people who mostly respond to leads and do very little cold calling." Similarly, software companies like

Computer Associates and Symantee say their telemarketing staffs rely on lists of qualified leads, such as current customers.

In contrast, fraudulent telemarketing companies tend to operate out of a "boiler room"—an
office packed with phones, desks,
and hustling salespeople—and to
make unsolicited calls in every
state but their own. "Most telemarketing companies won't call
in their own backyard," says California deputy attorney general
Smilowitz. "If they did, people
could show up on their doorstep
wanting to blow up their offices
or punch out their lights." Legal
crackdowns would be easier, too.

As it stands, a fraudulent telemarketer can easily move across state lines when the heat is on. According to a speech by FTC chairman Daniel Oliver, "the typical telemarketing scam will operate for 6 to 18 months and then disappear-to be reborn, perhaps, at some other address with a different sales pitch and another scam." To stamp out this kind of fraud, the FTC and the National Association of Attorneys General (NAAG) have created a joint national data bank of consumer complaints. "The data bank lets you see patternswhere a company's been, where it's going, and who's already investigating any complaints about it," says Elena Boisvert, business regulation counsel for NAAG.

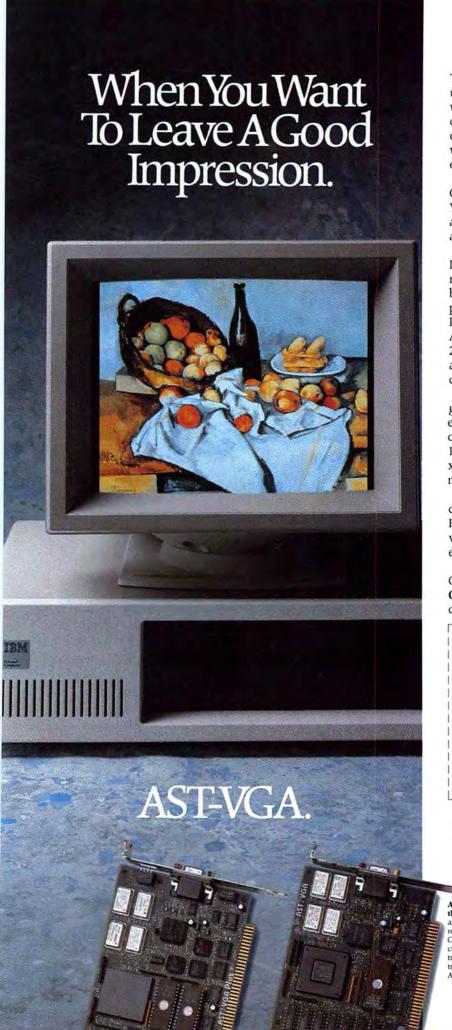
Strict telemarketing laws are now on the books in Florida and California. According to Dick Brown, consumer complaint analyst for Florida's division of consumer services, it's illegal for salespeople to make unsolicited calls to Florida residents whose phone numbers are unlisted or who have paid for an extra line in the phone book that says "no

phone sales." Moreover, within the first 30 seconds of a call, Florida telemarketers must identify themselves and ask if the potential customer wants to hear a sales presentation.

Meanwhile, a 1987 California law requires certain types of telemarketers to register with the state; for example, those that initiate sales calls and plan to distribute prizes that require a purchase. These companies must provide detailed information, including the names of their owners; a description of whether any of the company's employees have been convicted of fraud or have filed for bankruptcy; and copies of the sales script.

Still, the best way to avoid scams is through common sense, not laws. "We advise people never to give their credit card numbers out over the phone for 'verification' purposes," says California's Smilowitz, "Never deal over the phone with companies you don't know. If you're determined to go ahead with a purchase, use a credit card. But if you don't receive your order after 30 days, don't waste time repeatedly calling the company send a complaint to your credit card bank."

Business owners should be sure to "designate one or two people to be in charge of supplies so that your company isn't dealing with unknown suppliers," says the BBB's Goldberger. "If you get an unexpected shipment, don't pay for it unless you're sure it's something you've ordered." Ask for printed brochures so you can gauge a company's professionalism. And if an unfamiliar business refers you to satisfied customers, be wary of false tes-(continues)



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timonials. For good measure, check the Better Business Bureau and the local attorney general's office for any outstanding complaints.

For more information on phone scams and how to avoid them, consult the following free brochures: Avoiding Telemarketing Fraud and Advertising Specialty Products from the Council of Better Business Bureaus, 1515 Wilson Blvd., Arlington, VA 22209; and Credit and Charge Card Fraud from the FTC, Public Reference Branch, Washington, DC 20580.

SHOP TALK

Texas Mail-Order Blues

I ordered a computer for my business from Clone Component Distributors of America (CCDA) in January. A cashier's check of \$1560 was enclosed with the order. The company claims to have shipped two computers via UPS, but neither has arrived, and the company has refused to refund my money. CCDA has also refused to answer any correspondence or return any phone calls.

Lynne H. Johnson Oak Ridge, Tennessee

Editor's note: In April, Consumer Watch forwarded Ms. Johnson's letter, along with several other complaints, to Dallasbased CCDA but elicited no response. On June 1, the Texas attorney general's office filed a lawsuit against the company. At press time, CCDA and its president, Ed Ramirez, were put under a temporary restraining order that prohibits them from accepting orders, placing advertising, or hiding money. "We filed the lawsuit to protect con-

sumers and preserve assets," says Assistant Attorney General Juliet Romero.

On June 10, CCDA filed for bankruptcy reorganization, according to Romero. The case number is 38833554SAF11. If you have a claim against the company, send your complaint to U.S. Bankruptcy Court, 1100 Commerce St., Dallas, TX 75242-1496 (214/767-0814) and to Office of Attorney General, 714 Jackson #700, Dallas, TX 75202 (214/742-8944). The attorney general's office will mail out updates on the case.

What's New?

In March I ordered a Fast88 PC accelerator for \$89 and a set of nine DRAM chips for \$60 from Bulldog Computer Products in Martinez, Georgia. When I received the order, the Fast88 package looked like it had been opened, and it lacked a warranty registration card. Four of the DRAM chips were damaged: Three had bent legs, and one had about half of its metal legs cut off.

When I called, Bulldog customer service manager Maurie West said she would send me a warranty card for the Fast88. She also told me I had paid for "pulled" DRAM chips, meaning chips that had been removed from circuit boards. I explained that I thought I was ordering new products and that I expected to receive new chips in place of the four damaged ones. West said she would mail the chips that day.

Eleven days later I got a note saying the warranty card for the Fast88 had been back ordered. The replacement chips arrived the same day, but three of them were in worse condition than the first set. After I sent the company a complaint letter, I got a call from West, who said I could either get a credit for the chips or send them back with an extra \$2 each in exchange for new chips.

Arthur L. Hirdler Houston, Texas

Bulldog Computer Products responds: Mr. Hirdler's dissatisfactions, we feel, are not due to our error. When Mr. Hirdler called he was made fully aware of what he was receiving and how much it cost.

Still, we let Mr. Hirdler know how to easily resolve his dissatisfactions. He can either exchange the items and pay the difference, or return the items and receive a full credit.

Maurie West Customer Service Manager

Don't Believe Everything You Hear

When I purchased a Datavue Spark portable computer from Olden Computers in New York City, I was told by the salesman that I would be able to upgrade the nonbacklit screen to a backlit one for \$125, once backlit screens were available. The salesman is now long gone. Datavue says it was never company policy to upgrade screens for \$125, while Olden says that this boils down to a policy change by the manufacturer.

The nonbacklit screen is not adequate except under perfect conditions. Had I known I would be stuck with the nonbacklit screen, I would not have bought the Spark.

Peter Kreutzer New York City (continues) Acer
910
&
710

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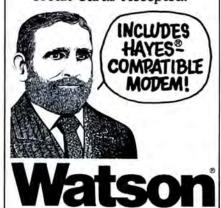
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Natural MicroSystems Corporation

Circle 63 on reader service card

Editor's note: In a telephone interview, Datavue general manager Linda Kotula said that there was never a screen upgrade program for the Spark and that the \$125 backlit screen was available only at the time of purchase. Meanwhile, in a call to Olden Computers, manager Carl Thompson said, "I wasn't here at the time, but I have full confidence that my salespeople are providing customers with correct information."

Consumer Watch receives many complaints from readers who feel they've been misinformed about products. The safest policy, of course, is to get any promises in writing.

Shareware Snag

I was recently introduced to the shareware concept and ordered *PC-Write* for \$75. Quicksoft returned my check and refused my order due to a price increase to \$89. Granted, I had based my order on an old ad for the program, but there was no mention of price expiration. I would like to know what Quicksoft has done to halt the spread of disinherited versions of *PC-Write*.

Allyn Uptain Rockford, Alabama

Quicksoft responds: Shareware distribution is relatively new, and we are still getting the bugs out. Because we encourage copying and sharing, we have no way of knowing who (besides our registered users) is giving out copies, let alone requiring that they give away copies of the current version.

We do provide a release date now on the first screen, so users have some idea if the information is current. The idea of a price disclaimer, like "prices subject to change," is a good one, and we will put that in the next version. By the way, this price increase, which took effect in October 1986, was our first in five years.

Bob Wallace President

PC Plaudits

Recently I purchased an AST 286 Premium and then decided to upgrade to DOS 3.30. I called AST Research and charged the purchase to my credit card. Ten days later, I unexpectedly received a call from AST asking if I still wanted to cancel my order for the DOS upgrade.

I said no and asked what was going on. The AST representative explained that someone had called and ordered a circuit board using my name and charge card number. When she verified the address on my previous order, the caller said he wanted to cancel that order and have the new order sent to a different address.

AST declined to take the order and immediately called me to verify the new instructions.

Thanks to AST, I was able to put a stop on my credit card before any fraudulent charges were posted to my account—and probably prevented several thousand dollars in bogus charges.

Larry E. Jones Herndon, Virginia

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●



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THE UPGRADE PATH

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A hotshot turbo board for the PC, a universal floppy controller, and more

Robert Luhn

AT on a Board

The company calls it "exceptional" and the "next generation" in 80286 speed-up boards for the PC. That may be a tad self-serving, but Personal Computer Support Group's (PCSG) 12-MHz Breakthru 286-12 is nonetheless a relatively painless and effective speed fix for your PC, XT, Compaq portable, or other 8088based clone. You just pull out your computer's aged 8088, replace it with a special plug connected to the Breakthru 286, pop the half-length card into any slot (including the XT's notorious eighth slot), and that's about it. No software drivers to fuss with and, better still, you don't kiss off the RAM already installed in the system-something not many turbo board vendors can claim. The board can be toggled between 4.77 MHz and 12 MHz from the keyboard, includes an 80287 socket and a 16K cache of zero-wait-state RAM, and comes with a copy of Lightning, a highly rated disk-caching utility (see "Cache on Demand?" PCW, September 1987). The best part: The Breakthru 286 is only \$595.

Take the usual steps for such an upgrade: Park the PC's hard disk if it has one, turn off the system, unplug all external cables, remove the PC's cover, and ground yourself before touching any component. Tools of the upgrade: a small flat-blade screwdriver for securing the board, needle-nose pliers for setting jumpers, and a chip puller for



The simple PC turbo board—just plug the Breakthru into a slot and connect it to the vacant 8088 socket.

the 8088. (PCSG supplies a chip puller, but the head is too thick to fit easily between the 8088 and its socket without damaging two nearby capacitors. For the surest grip, buy a tweezerlike chip puller with tiny hooks at the end of each tine.) Budget at least half an hour for the upgrade and follow the illustrated "Detailed Installation Instructions" in the Breakthru's user manual; the "Quick View" section is terse and recommended only for expert upgraders.

(continues)

To evict the 8088, remove any expansion boards and cables that are in the way, swivel the PC around so the disk drives are to the right, and locate the 8088 just to the left of the power supply. Ground yourself and hook the chip puller around each end of the chip, not the socket base. Place two fingers on top of the chip to prevent it from blasting out of its socket, and gently rock the puller back and forth as you pull up. Repeat the procedure if an 8087 is installed next door, and put the chips in the supplied protective box.

Because the 8087 socket generates "noise" that can interfere with the Breakthru's operations, you must fill the socket with a special plug. Before you install the plug, however, make sure its pins aren't bent. If a single pin is awry, you can realign it with the needle-nose pliers; if an entire row bends inward, use the pliers; if the row leans away from the chip, take the chip and place the row flush on a table with pins parallel to the surface and press down as you rock the chip forward. The errant row should straighten up.

Orient the plug so the end labeled "PIN 1" is closest to the backplane, and carefully line up the plug's pins with the proper holes in the socket. Press down evenly with two fingers on the plug, and it should sit right down.

Now take the Breakthru board and place it on top of its antistatic wrapper. If you're upgrading a PC or an XT, you need only move the first three jumpers on the JMP1 block at the top left corner of the board to indicate installed system memory. (If you're upgrading an 8-MHz

PC clone or adding an 80287 to the Breakthru board, two other jumpers elsewhere on the board must be set.) The jumpers are packed together on the block like sardines, so pull the first three off with your fingernails or the needle-nose pliers, then slip them over the appropriate pins as shown in the manual.

Connecting the Breakthru to the 8088 socket is pretty simple, but don't try to juggle the board in one hand while you manuever the attached plug into the socket. Pop the ribbon cable off the Breakthru, put the board aside, make sure the pins on the plug at the other end are straight, and tamp the plug into the socket. If the cable is a little stiff, you can bend it out of the way-but don't twist or fold it. Finally, reattach the cable to the Breakthru board, plop it into a free slot, screw it to the backplane, and reassemble the PC.

A quick lap around the track shows that the Breakthru 286 does indeed turn your PC into an AT-and then some. For example, a Breakthru-equipped XT with IBM's original slugabed 65ms 10MB hard disk matched or outperformed an 8-MHz PC AT with a 40ms 30MB hard disk every time, from recalculating a 1-2-3 worksheet to reformatting a 150K WordStar document to finding all the prime numbers less than 10,000 with a compiled BA-SIC program. The Breakthru 286 may not be a "next generation" product (whatever that is), but it's as simple as turbo boards get.

WHERE TO BUY

Breakthru 286-12 Personal Computer Support Group (PCSG) 4540 Beltway Dr. Dallas, TX 75244 800/544-4699 List price: \$595, 8-MHz version \$395

Warranty: one year parts and labor, 60-day money-back guarantee

Extended warranty: none

Technical support: unlimited phone support, no toll-free line, M-F 8-7, S 9-1

Other support services: company BBS

For more information, see

Products Featured in This

Treble Storage, Part II

Transforming a PC into an AT can be a frustrating job. It's easy enough to install a high-capacity hard disk or even an 80286-based turbo board. But until relatively recently, adding a 1.2MB floppy (or, dream of dreams, a 1.44MB 3½-inch drive) to the PC was impossible.

In July's Upgrade Path, I examined one of the first breakthroughs: Weltec Digital's 1.2MB floppy disk drive for the PC. A great idea—except that the drive couldn't read or write 360K disks. This month, a better alternative is at hand: the CompatiCard floppy disk controller from Micro Solutions. Add this \$175 board to a PC, XT, or AT, and the universe of floppy disk drives opens up. Want to use a 31/2-inch 1.44MB floppy drive just like the PS/2's? A 1.2MB drive like the AT's? How about an 8-inch drive running CP/M software? Or four different internal and/or external drives attached to the same machine? No problem. Hook them up to the CompatiCard and start rolling.

Making the CompatiCard connection, however, is the hard part. At first glance this seems (continues)

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like a short and sweet upgrade. You set a few jumpers on the board, select the proper connector (there are four in all) for the drives in the system, pop the board into a slot, and connect the drives. Unfortunately, the CompatiCard manual turns a relatively simple process into a hair-puller. Related information is scattered about the manual, steps are out of sequence, certain details are omitted, and various tables (for jumper settings, drive assignments, and drive connector designations) are confusing and larded with technical minutiae. The end result is worth it, but be prepared to sweat a little.

Consider the steps needed to replace a PC's 360K B: drive with a 1.2MB floppy. Before you do anything, first find out if the power cable in the PC will reach the connector on the replacement drive; if it won't you'll need an extension cable. Second. make sure the 1.2MB drive comes with the appropriate data cable. Third, copy all the files on the Micro Solutions utility disk onto the PC's boot disk. Finally, make sure the SW1 DIP switch block in the PC is configured for two drives: switch 7 off, switch 8 on.

Now lay the CompatiCard on top of its antistatic wrapper and locate the J1 and J2 jumper blocks near the bottom left corner of the board. Since the CompatiCard in this case will be the sole controller, cover the B and A pins, respectively. Next, determine which CompatiCard connectors are linked to the drives. The user manual implies that a "normal" 51/4-inch drive can be attached to the board's edge connector (P1) or 34-pin female con-

nectors (P2 and P3). But a cursory survey quickly reveals that the edge connector is for a 360K drive and the 34-pin connectors are for a 1.2MB drive. Attach the ribbon cables to the CompatiCard (in this case to P3 for the 1.2MB drive), slip the board into a free slot, and then attach the ribbon cables to their respective drives. Reassemble the PC but leave the hood off until the upgrade is completed.

Turn on the PC with both drive doors open. If either drive light stays on continuously, turn the system off and check the CompatiCard's jumper pins and cable orientation. If the drives spin for a bit and then stop, everything's square; place the boot disk in drive A: and restart the system. If DOS doesn't load, check the items above; otherwise, you're almost ready to roll.

At this point the manual directs you to format a blank disk in one of the floppy disk drives. What Micro Solutions neglects to mention is that you can't use FORMAT.COM, much less log on to the 1.2MB drive. To access the drive, you must first create or modify the boot disk's CON-FIG.SYS file and reference Micro Solution's CCDRIVER.SYS device driver; to format disks, you must rely on the company's equivalent CCFORMAT.COM utility.

Unfortunately, you don't just slip "DEVICE = CCDRIVER-.SYS" into CONFIG.SYS and let it go at that. You must add parameters specifying each drive's physical address and drive type. (The manual fails to note, however, that the 360K drives originally supported by the PC's BIOS ROM don't have to be referenced in the DEVICE statement.) Micro Solutions dutifully

supplies the necessary tables, but they may confuse PC upgraders. For example, the physical address of the 1.2MB drive isn't 1 (0 normally being drive A:); it's either 0 or 2, depending on which CompatiCard connector the drive is attached to and the type of cabling used. Since the drive is attached to the P3 connector and uses twisted cables, the drive address-according to the table-is 2. The drive-type table shows that "5.25 inch 96 TPI high capacity AT type" units are type "2," and thus CONFIG.SYS should hold the statement "DEVICE = CCDRIVER.SYS /2,2."

Reboot the PC so that CON-FIG.SYS takes effect and the 1.2MB drive is now available. One inconvenience: The unit is designated drive C:, because routines in the PC's ROM BIOS recognize only 360K drives as A: and B:. You can smooth this wrinkle by simply adding AS-SIGN B = C to the system's AUTOEXEC.BAT file.

Once you're over those hurdles, the CompatiCard is a dream to use. The 1.2MB drive will read, write, and format 360K and 1.2MB disks and work with every DOS command except FORMAT. To add a third or fourth drive, just hook the unit to a CompatiCard connector and add the appropriate parameters to CONFIG.SYS. Get ahold of the company's UniForm-PC, and you can use disks in a number of different formats. The CompatiCard, in short, is one of the best ways to bring your PC into the modern era. (continues)



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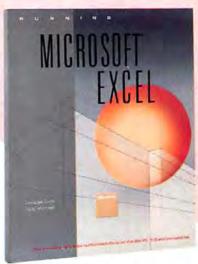
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From the Upgrade Bookshelf

Do-it-yourselfers in need of a cheap 80286 computer should investigate Aubrey Pilgrim's Build Your Own 80286 IBM Compatible and Save a Bundle (Tab, Blue Ridge Summit, Pennsylvania, 1988). Pilgrim, the author of a previous book on building your own PC compatible, discusses everything from keyboards and power supplies to where to get components and how to convert a PC or XT to AT status. At times the author is overly optimisticlike when he claims you can assemble an AT compatible from components in an hour-or he veers off the point. But the key assembly steps are clearly discussed and copiously illustrated. If you're keen on saving several thousand dollars, this book is worth checking out.

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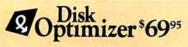
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Karl Koessel

All Things in Turn

Q. What is the correct sequence in which to turn on a computer, a monitor, and a printer? Why? And what about powering down? Thomas Schmidt
Brookline, Massachusetts

A. Most modern computers and peripherals can be turned on and off in any order. Older microcomputer systems were far more sensitive to voltage spikes that occur when electrical equipment is turned on or off. To prevent damaging early micros, users would turn on all of the peripherals before powering up the computer. When shutting down, they'd turn off the computer first, and then the peripherals. Thus, the computer was never exposed to the voltage spikes caused when a peripheral was turned on or off.

It's probably good practice to maintain that old habit, but there's no need to fear that turning off your monitor or printer will damage the PC if it's on. Better yet, get a surge protector for your system and really relax.

Simple Printer Sharing

Q. At my office we have two PCs and recently purchased a Hewlett-Packard LaserJet Series II printer. One of the PCs runs data base, spreadsheet, and word processing applications, while the other is used just for word processing. I'd like both PCs—they're about 100 feet apart—to have access to the laser printer, but I'm not sure how best to link everything.

Does using a switch box make sense? If so, do the cables need to be parallel or serial? What are the advantages and disadvantages of parallel and serial cabling?

Stephen E. Roesch Tampa, Florida

A. Using a switch box is the easiest way to share a printer. Normally, the type of interface on the device being shared determines the type of cabling needed. However, because the LaserJet Series II provides both a parallel and a serial port, you have your choice. Because a serial cable has fewer wires than a parallel one, it is cheaper. More important, it is less susceptible to electromagnetic interference and so can generally cover a greater distance. Serial connections sometimes span 100 feet, whereas parallel connections usually don't work reliably over more than 15 feet. On the other hand, a parallel connection permits much faster transmission. Serial connections are fine for typical text printing, but the speed of a parallel connection makes it the obvious choice for desktop publishing or printing complex graphics images.

The simplest kind of switch box is called an A-B switch and (continues) costs about \$35. An A-B switch usually connects two devicessay a dot matrix and a daisy wheel printer-to the same computer port. The computer operator can then use the switch to select between device A and device B. However, with the appropriate cables, you can hook two PCs to one device and turn the knob to connect computer A or computer B to the printer. The drawback, of course, is that someone has to turn the switch manually. Furthermore, turning the A-B switch while the Laser-Jet is on can cause voltage spikes capable of damaging the printer. As an extra safety measure, I recommend using a switch box with surge protection built in.

A more sophisticated-and more expensive-solution is to use an intelligent switch box. I recently saw an announcement for one such box, the ShareSpool ESI-2098A. According to its manufacturer, it can hold 1MB, 2MB, or 4MB of buffer memory and supports 100-foot parallel connections when using the company's unique, shielded 13-twisted-pair cable. This type of electronic switch buffers output (meaning you regain control of your PC more quickly after initiating a print job). It can also arbitrate between PCs for use of the printer; any PC may send output to the printer at any time, and the switch will ensure that one print job is complete before another begins.

Another option, available only to LaserJet Series II owners, is an intelligent switch/print buffer on an expansion card that fits in the printer's Optional I/O slot. Generally these devices, such as the 256K ShareSpool ESI-2041A, have smaller buffers than exter-

nal boxes do and allow only serial connections. However, one of the more capable, JetNET/4+1, supports one parallel and four serial connections and 256K, 512K, or 1.25MB of buffer memory.

WHERE TO BUY

JetNET/4+1

Qubit Corp.
544 Weddel Dr. #2
Sunnyvale, CA
94089-2123
408/747-040
List price: \$495
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ShareSpool ESI-2098A Extended Systems

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Warranty: two years

For more more information, see Products Featured in This Issue.

Removing Read-Only Files

Q. Is there any way to erase read-only files from a hard disk? After moving R:base Sys-

tem V to another computer, I found I could not erase some of the files in the \RBFILES directory. Trying to erase those files produces the message 'Access denied'. How do I get rid of them? There are more than 30 files, and removing them would liberate a lot of precious disk space.

Edward Walden Sepulveda, California

A. To erase the files, you must first disable their read-only status. With DOS 3.00 or a later version, you can use the DOS command ATTRIB - R C:\RBFILES*.* to remove the files' read-only attribute. Then simply issue DEL C:\RBFILES*.* to erase the files.

Earlier versions of DOS do not have the ATTRIB command. Users of such versions can clear the attribute byte with reader John Switzer's DEBUG technique from "A Faster File Finder" in last month's *Help Screen*. The routine resets only one file at a time, so you'll have to change each one individually before you can erase it.

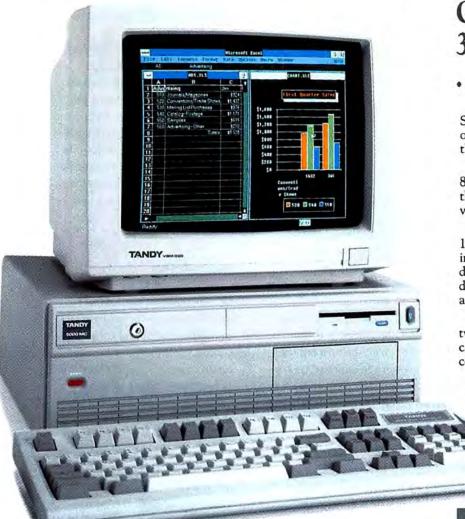
Note that you can also use ATTRIB to protect files from accidental erasure or corruption by enabling the read-only attribute. For example, the command ATTRIB +R C:\DOS*.* will protect all the files in the \DOS directory.

Upgrading DOS

Q. I've enjoyed the use of two hard disk-equipped AT&T 6300s for over a year. However,

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I've noticed that the seemingly simple problems are often the hardest to solve. For example, what's the difference between DOS 2.10 and DOS 3.10? My first machine came with MS-DOS 2.10 installed, while the second was configured with MS-DOS 3.10.

Assuming that it would be a good idea to upgrade the older machine with the newer DOS, I copied the files from the DOS 3.10 disk, which came with the newer machine, to the root directory of the older one's hard disk. But that proved worse than fruitless; the machine would no longer boot up from the hard disk. What am I doing wrong? Can I upgrade without having to back up all my files, reformat the hard disk, and then restore all the files?

Darryl R. Dworkin Oceanport, New Jersey

A. Each new version of DOS brings more power to the PC. And not coincidentally, each new DOS version supports new types of hardware. Each is also slightly larger than its predecessor, taking another nibble out of usable RAM.

Between versions 2.10 and 3.10, improvements to DOS include support for the IBM PC Network, 1.2MB floppy disk drives, and foreign keyboard layouts and date and time formats. New and improved commands help you maintain and use your hard disk, subdirectories, and files. Control over system configuration via CONFIG.SYS has also been enhanced. For example, DOS 3.00 was the first version to include a RAM disk device driver.

DOS 3.20 added support for 31/2-inch floppy drives; a single command (REPLACE) designed to make mass updates simpler; and another new command, XCOPY, that enables users to copy groups of files, including lower-level subdirectories. Version 3.30 enhanced foreign-language character support, provided a command to speed up access to hard disk files stored in a complex directory structure, and amended several DOS commands. Notably, DOS 3.30 furnished the abilities to suppress the display of batch file commands and to call another batch file as a subroutine without running a second copy of COMMAND.COM.

Upgrading DOS on your older machine certainly isn't necessary. But you may want the capabilities of the later DOS version on both machines or the convenience of maintaining identically configured systems. To upgrade the older machine, simply insert the DOS 3.10 disk in drive A:, reboot (or turn on) the 6300, answer the date and time prompts, type the command SYS C: and press <Enter>, and then type COPY COMMAND.COM C: and press <Enter>.

At this point you have a bootable DOS 3.10 hard disk; however, some of the external DOS 2.10 commands still stored on the hard disk, such as CHKDSK, will not run but instead will produce the error message 'Incorrect DOS version'. If you keep all your DOS command files in a subdirectory, such as \DOS, replacing the 2.10 files and adding the 3.10 files won't be too much of a chore.

DOS 3.20 and later versions provide the REPLACE command, which automatically replaces older files with their new versions, even when old versions reside in more than one sub-directory. For example, the command REPLACE A:*,* C:\/S/R will copy each file in the default directory of drive A: over every file that has the same name on drive C:. The /S tells REPLACE to also replace any matching files in any subdirectories. The /R tells the command to replace read-only files too.

Unfortunately, DOS 3.20 and later versions are just large enough that upgrading from an earlier version will require you to reboot with the new DOS, back up the hard disk, reformat it with the new DOS, restore its files from the backup, replace its DOS files with the new version's, and add the new version's new commands.

Macro Delay

Q. The lights in my company's building are controlled by a computer. But at any time, I can call the computer and turn the lights on or off. I tried to write a Lotus Metro macro that would call the computer and turn on the lights. However, for some reason the macro doesn't work.

I used Learn mode, which records my keystrokes, to make the macro. I called up Metro's Terminal, invoked the menu with <F10>, and selected Dial. I then typed in the computer's phone number, several commas for pauses, and the code to turn on the lights and pressed <Enter>. The lights came on, and I quit the Terminal and Macro accessories. It's strange that when I type the keystrokes, the lights come on, but when I use the macro, which contains

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the same keystrokes, Terminal just pops up and then disappears-I'm left in the dark. Any clues why it doesn't work?

Stan Wasserman Los Angeles, California

A. Your problem is typical of macros that call on a program or utility to do a quick job and then immediately exit that program. A macro can run so fast that its command to exit a program can interrupt that program's execution of previous commands. The solution is a time delay that allows Terminal to register the Dial string before the macro exits Terminal.

Since the time between keystrokes is not recorded by macro utilities, most of them provide a way to insert delays. Metro's

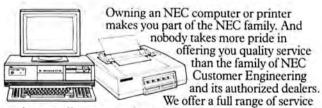
Macro accessory supplies an easy way to insert a time delay. Bring up the Macro accessory, highlight the lighting macro, press < Enter > to view it, and move the cursor to just after the '{Return}' that enters the Dial string so you can insert a delay at that point. Press < F10 > to invoke the menu, select Control and then Delay, and enter a 1. Then invoke the menu again, and select Quit to exit the Macro accessory and save the macro. This small delay will allow the entire dial string to be issued before the Terminal accessory is exited.

Blue BIOS Upgrade

Several readers pointed out that Thurston E. Franks doesn't have a vintage PC if he has ROMs dated 10-27-82 (see "The BIOS Upgrade Blues," The Help Screen, PCW, June 1988). Furthermore, he doesn't need new ROMs to support a hard diskjust a competent dealer. However, those readers who have earlier ROMs and want to upgrade them can contact IBM National Parts at 303/924-4100 and swap their old motherboard for a new one with new ROMs, all at a very reasonable price. The IBM part number for a fully populated (64K) motherboard is 8529238.

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By James Lewis

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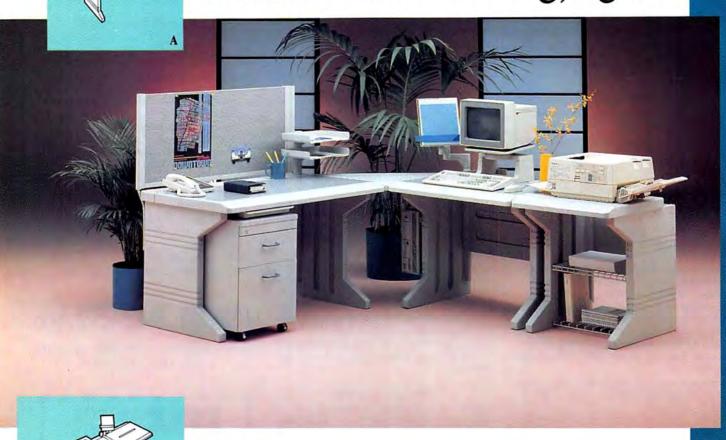
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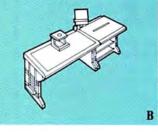
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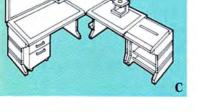
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Find duplicate and missing files with a BASIC matchmaker, print multiple-line fields in dBASE reports, get rid of ERRor prone 1-2-3 formulas, put your laptop on an energy diet, and go treasure hunting in Pascal.

Edited by Tom Swan

BASIC Matchmaker

Like many computer users, especially those who don't own hard disks, I've managed to build a large collection of floppies, many of which contain duplicate files or, even worse, different versions of the same files. When I recently added a hard disk to my system, organizing this mess was a nightmare. I needed a quick way to check for duplicate and missing files.

To accomplish this, I wrote and compiled a BASIC program, COMPALL.BAS [see LISTING 1]. Combined with a batch file, MATCH. BAT [LISTING 2], the program lists the names of the files in one directory that differ by name, size, or date from the files in any other directory. The programs helped me transfer up-todate versions of important data to my new hard disk. Since then, I've also found the programs useful when I bring work home from the office and modify one or more documents. Later, I can easily spot different file versions.

MATCH requires two parameters, which can be any DOS path names. For example, the command MATCH A: B: lists the names of the files on the disk in drive B: that are not found among, or are different from, the files on the disk in drive A:. You can also list differences between two hard disk subdirectories.

MATCH C:\WP C:\TEXT lists files in the \TEXT directory that differ from the files in \WP. To print the results, add PRN as

a third parameter. MATCH C: A: PRN prints the file differences between the default directories of drives A: and C:.

MATCH.BAT uses a pipe (represented by a vertical bar) to send the output of the DIR command to the SORT filter. This is done once for each of two directories, creating the temporary files SORTED1.\$\$\$ and SORTED2.\$\$\$. After this step, the batch file runs COMPALL.BAS, which reads the temporary files and creates FILELIST.\$\$\$. MATCH then prints or displays this file before removing the temporaries.

Donna Campanella Conshohocken, Pennsylvania

Editor's note: Use Turbo Basic, QuickBASIC, or Microsoft's BA-SIC compiler to compile COM-PALL.BAS to COMPALL.EXE. Store the program along with MATCH.BAT in your utilities directory, or in any directory included in your AUTOEXEC-BAT file's PATH command. To preserve COMPALL's results, specify a disk file as the third parameter, as in MATCH C:\WORK1 C:\WORK2 DIFF.TXT.

Doubling Up With dBASE

Using the dBASE III Plus report generator to create multiple-line columnar reports is (continues)

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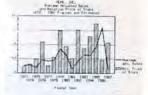
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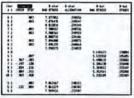
```
20 REM COMPALL.BAS by Donna Campanella
30 REM
40 REM Compare directory entries by name, extension, size, and time.
50 REM
60 REM Input files : SORTED1.$$$ -- first directory
                   SORTED2.$$$ -- second directory
70 REM
80 REM Output file : FILELIST.$$$ -- files in SORTED1.$$$ that
90 REM
                                are not in SORTED2.$$$
100 REM -
110 OPEN "sorted1.$$$" FOR INPUT AS #1
120 OPEN "sorted2.$$$" FOR INPUT AS #2
130 OPEN "filelist.$$$" FOR OUTPUT AS #3
150 REM Read past the header lines in the sorted directory files.
160 REM -----
170 I = 1
180 WHILE (I <= 6)
190
     LINE INPUT #1, FL1$
      LINE INPUT #2, FL2$
     IF I = 4 THEN DIR1$=MID$(FL1$, 16,80) : DIR2$=MID$(FL2$, 16,80)
205
210
     I = I + 1
     IF EOF(1) OR EOF(2) THEN I = 7
230 WEND
240 IF NOT EOF(1) AND NOT EOF(2) THEN GOTO 340
260 PRINT:PRINT:PRINT **** Error--directory files are empty. ****
270 PRINT "Parameters include an invalid drive or directory."
280 PRINT "Check the syntax of MATCH.BAT and try again."
290 GOTO 999
300 REM ****
310 REM If the directory is a subdirectory, read past the "."
        and ".. " entries.
330 REM -----
340 N = INSTR(1,FL1$,".")
350 IF N = 0 THEN GOTO 370
      LINE INPUT #1, FL1$:LINE INPUT #1, FL1$
370 N = INSTR(1.FL2$,",")
380 IF N = 0 THEN GOTO 400
      LINE INPUT #2, FL2$:LINE INPUT #2, FL2$
400 PRINT #3, "Files in ";DIR2$;" not found or different in ";DIR1$
420 REM Loop through until finding the end of one of the directories.
440 WHILE NOT EOF(1) AND NOT EOF(2)
450 IF FL1$=FL2$ THEN GOSUB 600:GOTO 460
455 IF FL1$<FL2$ THEN GOSUB 700 ELSE GOSUB 800
460 WEND
480 REM If at the end of the first sorted file and not at the end of
        the second sorted file, append all directory entries from the
490 REM
500 REM second file to the list of directory entries not in the first
510 REM specified directory.
520 REM -----
525 IF FL1$<>FL2$ THEN GOSUB 930
530 WHILE NOT FOF(2)
      LINE INPUT #2, FL2$
550
       GOSUB 930
560 WEND
(continues)
```

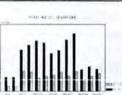
LISTING 1: COMPALL.BAS, a BASIC program that works in conjunction with LISTING 2 to compare the files in two directories.

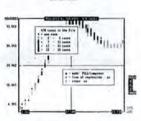
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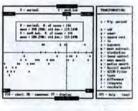


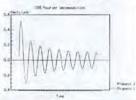


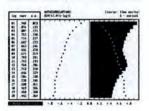




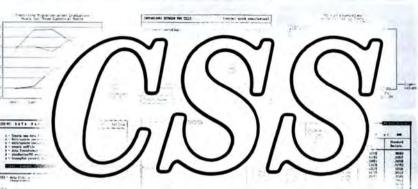






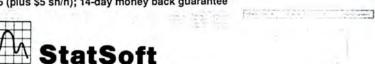






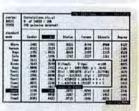
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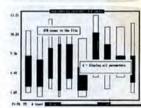
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_			-	_	37010	



```
570 CLOSE
580 GOTO 999
600 REM *****
610 REM The directory entries match. Read both sorted directory files
620 REM
      and continue.
630 REM -----
640 LINE INPUT #1, FL1$
650 LINE INPUT #2, FL2$
660 RETURN
710 REM The entry is in the first directory specified, but not in
720 REM the second. Read past entry and continue.
730 REM -----
740 LINE INPUT #1,FL1$
750 RETURN
800 REM ****
810 REM The entry is in the second directory but not in the first. Print
820 REM the entry to the output file, read the next entry of the second
830 REM directory, and continue.
840 REM -----
850 GOSUB 930
860 LINE INPUT #2,FL2$
870 RETURN
910 REM Print FL2$ to output file, skipping files ending in $$$
920 REM -----
930 IF INSTR(1,FL2$,"$$$")<>0 THEN GOTO 950
940 PRINT #3.FL2$
950 RETURN
998 REM *****
999 END
```

LISTING 1: (continued)

```
echo off
if %1x==x goto err
if %2x==x goto err
echo.
echo Reading first directory ...
dir %1 | sort >sorted1.$$$
echo Reading second directory...
dir %2 | sort >sorted2.$$$
compatt
if %3x==x goto console
echo Printing results ...
type filelist.$$$ >%3
goto cleanup
:console
type filelist.$$$
:cleanup
del sorted1.$$$
del sorted2.$$$
del filelist.$$$
goto end
:err
echo.
echo.
echo *** Syntax: MATCH pathname1 pathname2 [output]
echo *** Example: MATCH a: b:
echo *** Example: MATCH c:\pcwrite a: prn
```

LISTING 2: Use this batch file, MATCH.BAT, along with the BASIC program in LISTING 1.

tricky business. However, by experimenting, I discovered an undocumented feature that doubles or triples the number of lines I can print in a single field without having to write a custom program.

The trick stems from the way dBASE prints a data base field that is longer than the report's column width. For example, printing a 40-character field in a 20-character column outputs two 20-character lines, one above the other. Exploiting this characteristic, you can print a field on two or three lines without affecting other parts of the same report.

An example explains the process. Starting with a typical name-and-address file [see FIGURE 1], the first step is to calculate the maximum print width, in this case, wide enough to hold the city, state, and ZIP code. Adding the field widths for CITY, STATE, and ZIP, plus punctuation—a comma and space after the city, and two spaces after the state-equals 36 character spaces. Armed with this knowledge, we're ready to design the report, forcing each line to print in multiples of 36 characters.

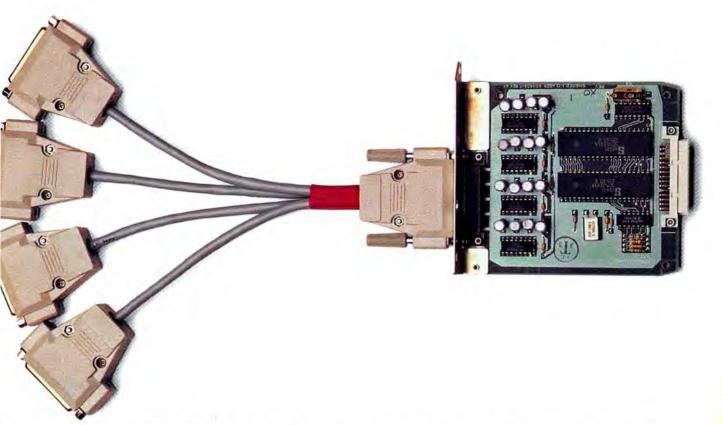
Use the dBASE Report Generator to enter the multiple-line expression [FIGURE 2] as a Contents field in the Columns menu. Then move the selector bar to the Width field in this same menu and enter 36. The result of these settings is a single report field in the format:

Last name, first name

Address

City, state ZIP

(continues)



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Field	Field Name	Туре	Width
1	LNAME	Character	15
2	FNAME	Character	10
3	COMPANY	Character	30
4	ADDRESS	Character	30
5	CITY	Character	20
6	STATE	Character	02
7	ZIP	Character	10
8	PHONE	Character	14

FIGURE 1: Sample dBASE data file structure for the report expression in FIGURE 2.

```
Trim(LNAME) + ', ' + FNAME +
Space(36 - Len(Trim(LNAME)) - 12) +
Address + Space(6) + Trim(CITY) +
', ' + STATE + ' ' + ZIP
```

FIGURE 2: dBASE Report Generator CON-TENTS expression using fields from the sample data file structure shown in FIGURE 1.

To achieve this design, the expression first specifies a trimmed LNAME field followed by a comma and a space. The FNAME field follows with enough spaces to fill the line to the maximum width, 36. The 12 in this part of the expression is simply the length of the FNAME field plus 2 for a preceding comma and space. A moment's thought verifies that this formula always prints 36 characters, regardless of the actual field widths.

The rest of the definition is similar, expanding the AD-DRESS field width to 36, starting the third and final line. Because this is the last line, it requires no padding. When the report prints, the single report field automatically separates into three neat lines.

John Agusta Wheatley Heights, New York

To ERR Is Inhuman

A columnful of ERR indicators in a *Lotus* or *Quattro* spreadsheet is so unfriendly, it's almost inhuman. How can you get rid of these unsightly ERRs, the result of a faulty calculation, such as a division by zero?

The answer is a macro that uses the powerful @CELL-POINTER function [see FIGURE 3]. To use the macro, place the cursor on the first cell of any column containing one or more ERRs. Press <Alt>-E to erase the formulas that caused the ERRs, stopping when you reach a blank cell.

The macro uses @CELL-POINTER to return the contents of the current cell. Then, @ISERR evaluates the contents to determine if the cell contains ERR. If so, the cell is erased, the cursor moves down to the next cell, and the macro restarts. If the cell does not contain ERR, a second @CELL-POINTER passes the cell's contents to the @N function, which returns 0 for blank cells, stopping the macro at the end of the column.

Leon Chalnick Rancho Palos Verdes, California Editor's note: To use the macro in Quattro, change /RE (on the macro's first line) to /BE.

Laptop Laps It Up

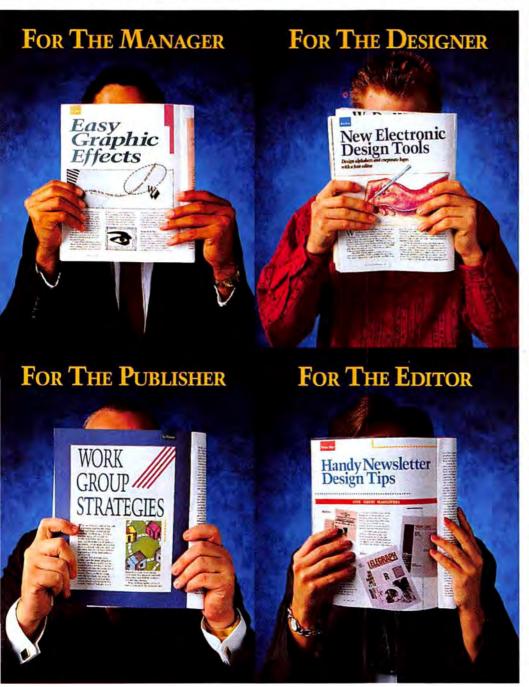
When I replaced my trusty Tandy 100 laptop with a new Toshiba T1000, I made a disappointing discovery. While the Tandy runs for over 10 hours on battery power, the Toshiba lasts only about 4 or 5 hours before running dry. This laptop really laps up the juice.

To conserve my precious batteries, I use the Toshiba's 768K RAM expander configured as a RAM disk. The RAM disk consumes less power than a conventional disk drive and can be trusted to retain its memory at least for a short time after the internal battery is so depleted that it no longer turns the floppy disk in the drive. I use the RAM disk to run applications and store data, copying files to disk periodically. Doing this lets my laptop sip rather than gulp its power reserves.

John E. Premack Lexington, Massachusetts

Editor's note: Mr. Premack's suggestion is a good one for all laptop users. When your laptop's running under battery power, it's safer to store data in a RAM disk than it is when running a desktop model under AC current, which could flame out at any time. Because disk drive motors consume enormous amounts of energy compared to the weak appetites of RAM chips, using your laptop's disks as infrequently as possible con(continues)

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4	7	(down)/xg	\E-					
5	QUIT	/xg\E~						

FIGURE 3: This 1-2-3 macro rids a spreadsheet column of formulas that cause unsightly ERRs.

Quattro users: change /RE to /BE.

serves battery life. However, for safety, do remember to occasionally copy important files from RAM to floppy.

DEVELOPER'S TOOLBOX

Treasure Hunting in Pascal

When I shop for development tools, I look for packages that include the source code. I can understand why some companies don't want to sell their trade secrets, but rather than just put a new tool to work, I like to excavate the programming and see what hidden wealth it contains.

Lately, for example, I've been mining the depths of Borland's Turbo Pascal 4.0 Developer's Library, which comes complete with source code. The package's 14 disks contain 113,951 lines of Pascal and assembly language—over 6MB of de-archived gold. The \$395 price seems less steep when you figure it comes to less than a half cent per line. You can still pick up individual packages for \$99.95 each.

The Editor Toolbox and Pascal Tutor are brand-new and completely rewritten for Turbo Pascal 4.0. The Database Toolbox has been revised to use separately compiled units. Previously, the Sort and Access modules were "include" files, requiring you to recompile the text for each program. The new units decrease compile time by eliminating the need to recompile the sources.

The Gameworks, Graphix, and Numerical Methods Toolboxes are upgrades from previous versions but do not always make the best use of new 4.0 features. Of these three, the Graphix package is the least attractive, especially now that Turbo Pascal 4.0 comes with the Borland Graphics Interface (BGI). On my normally colorful Vega Deluxe EGA card and Magnavox Multimode monitor setup, Graphix Toolbox displays are painted in dismal drab and white. A Borland spokesperson reluctantly agreed that the Graphix package was behind the times.

It's back to the future with the MicroStar Editor, though, a program that's almost good enough to make it as a standalone word processor. However, the real value is in the source code. Along with window and pulldown menu modules, which you can extract for your own toolbox, the editor sources offer a graduate course in software design. If you want to know how pros organize massive programs, you'll find the inside story here.

Also in the package is a stripped down Binary Editor for linking into your own programs.

Digging around in the Editor source code, I found other jewels. Nestled inside MSDIR.PAS is a directory module for selecting file names in a window. Elsewhere, I found a procedure to run a temporary DOS shell, dozens of nifty string routines, various assembly language examples, and zippy screen-write code. Also, there's a complete interface to *Turbo Lightning*, although the spelling checker is not included.

Similarly, the Database Toolbox contains surprise goodies such as a module for reading and writing *Reflex* data files. I also found IEEE and Turbo realnumber-conversion procedures, which might come in handy for updating data files for use with a coprocessor.

Looking under the right rocks, you can find useful tidbits even in the Gameworks package. Burrowing through the sources to Go Moku, a computerized version of Pente, I found a modular help system, complete with popup windows plus instructions for adding the code to custom programs, a bonus not mentioned anywhere in the manual. You have to read the source code to find this and other prizes.

If you're looking for routines to add to your own toolbox, or if you need a crash course in high-level Pascal programming, Borland's Turbo Pascal 4.0 Developer's Library is like buried treasure. —T. S. (continues)

386 SYSTEMS

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- In the 20MHz systems, memory caching is essential to high-level performance.
- One 16MHz machine runs DOS applications acceptably, but functions terribly under
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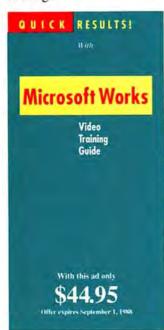
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Users of Cauzin's Softstrip Reader System can obtain Softstrips of *Star-Dot-Star*'s September program listings by sending a self-addressed, 8½by-11-inch envelope to *PC World*, September Softstrips, 501 Second St., San Francisco, CA 94107.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

POWER TIP NO. 10

Start WordPerfect and a Macro, Too

You can start WordPerfect 4.2 and run a macro by typing WP/M macro name at the DOS prompt. This procedure works with either named macros or <Alt>key macros.

Ralph Blodgett Hagerstown, Maryland



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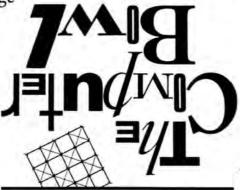
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How many nybbles in a byte? What does FORTRAN stand for? Who double-crossed Dave Bowman in 2001: A Space Odyssey? If the mantissa of floatingpoint number +2500 is 0.2500, what is its characteristic? Where will industry experts face provocative questions like these in an event destined to be the ultimate computer

challenge of the year?



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SOURCEBOOKS

Further explorations into personal computer technology

Why 40 corporations fund MIT's Media Lab, and Norton's new DOS guide.

Michael Harper

Demo or Die



The Media Lab: Inventing the Future at MIT Stewart Brand Viking Press, New York, 1987 285 pages \$20 hardcover

At MIT's Media Lab, they believe that communication media -television, telephones, film, newspapers, magazines, booksare blurring into one another and that computers are the agents of this transformation. Pretty far-out stuff from the "high church of technology"but important enough that 40 big U.S. and Japanese corporations have forked over at least \$200,000 each to fund the Lab's interdisciplinary experiments. Sponsors cannot direct research efforts, and none receives exclusive rights to prototypes the Lab produces. What about MIT's research, then, is so promising that the likes of Dow Jones, Sony, CBS, and Fujitsu would spend big bucks for graduate students to produce trippy multimedia demos?

That's the question Stewart Brand, sometime publisher of the Whole Earth Catalog and organizer of the first Hackers' Conference, wanted to answer. He spent three months at the Media Lab and many more months thinking through what he'd seen. The result is a readable and provocative report on the shape of communication media to come.

Under the direction of founder, professor, and seer Nicholas Negroponte, the Lab's mission is to explore and develop new interfaces between computers and communication technologies. Its researchers live by the creed, Demo or die.

Eleven groups work with different media blends. Speech group director Chris Schmandt and colleague Barry Arons developed a system that performs secretarial functions. The computer, dubbed the Conversational Desktop, recognizes its master's voice, decides from directional cues whether a particular question is addressed to it or to another entity in the room, and replies in a natural-sounding voice using stored speech. The Conversational Desktop not only can remind you that your plane leaves in 2 hours, it also can tell you if traffic to the airport is heavy (by checking with Boston's Metro Traffic data service) and whether it's time to call a cab.

Other projects show that computers can enhance leisure as well as work. In the Electronic Publishing group, Walter Bender oversees the development of such innovations as personalized electronic newspapers (the computer (continues)

knows your interests and prepares a customized edition accordingly). The Advanced Television Research Program makes digital TVs that use a frame to double screen resolution (something of a mixed blessing, laments Media Lab consultant Marvin Minsky, when you consider the quality of much TV content).

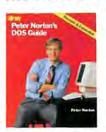
Additional lab projects use holography to augment CAD/CAM, record movies on compact disks, attempt real-time animation in computer graphics, and explore new performance modes in music. The School of the Future investigates what happens when all students in a grade school have real rather than nominal access to computers. One discovery: If girls don't have to compete with boys for access, they become just as involved and just as inventive.

Unlike most academic environments, the Media Lab emphasizes prototyping rather than publishing; the only way a researcher will be taken seriously is to build a system that really works, even if it's a long way from being commercially viable. When a prototype does threaten to become marketable, the Lab considers its work done and drops the project. Any sponsor is then free to pursue product development.

"Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road," writes Brand. The choice facing individuals now, he concludes, is whether to be interactive users or passive consumers.

MIT's Media Lab shows just how exciting our communication technology choices will be.

The Wizard of DOS



Peter Norton's DOS Guide Revised and Expanded Peter Norton Brady/Prentice Hall Press, New York, 1987 350 pages \$19.95 softcover

When beginners traumatized by the DOS *User's Guide* come to you for help, don't just write batch files for them. Send them to the wizard of DOS: Peter Norton. His books empower bewildered DOS users rather than insulating them.

A revised and expanded edition of his immensely popular MS-DOS and PC-DOS: User's Guide, Peter Norton's DOS Guide is the perfect beginner's book because it assumes nothing. After briefly introducing basic computer concepts, Norton takes the user all the way from 'Enter new date:' to CONFIG-.SYS, LINK, and DEBUG. En route, he explains how commands work, what they accomplish, and what their limitations are. He's good with general advice as well, reminding the beginner that it's often better to buy more software and hardware power up front than to find yourself struggling with a system that has grown too dinky for your needs.

Potential version mix-ups are always a hazard with DOS. While Norton warns readers about the dangers of unknowingly mixing DOS versions, his most recent book makes its own contribution to that confusion. When Norton refers to "the latest DOS," he means DOS 3.20 in the IBM version—not MS-DOS 3.30.

Therefore, users of DOS 3.30 will look in vain for discussions of APPEND, CHCP, FAST OPEN, or NLSFUNC. More important, 3.30 users must remember that where 3.20 commands (such as ATTRIB, BACKUP, DATE, FDISK, GRAFTABL, KEYB, MODE, RESTORE, and TIME) have been modified for 3.30, Norton's explanations may be incomplete or inadvertently misleading.

Despite the need for these cautions, a DOS beginner won't find a better introduction to this venerable operating system than *Peter Norton's DOS Guide*. If you have a tenuous acquaintance with, say, DOS's piping and redirection facilities, the wizard can help you, too.

Norton's style is chatty in the best sense—reassuring, not irritating—and he includes all the right reference tools. There's a detailed glossary of common computer terminology, a full index, and two summaries of DOS commands—one an appendix to the text, and one a tear-out section to keep next to the computer. This is the kind of book that should have been bundled with DOS in the first place. —M. H. •

Michael Harper teaches English at Scripps College in Claremont, California.





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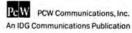
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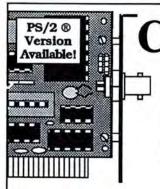
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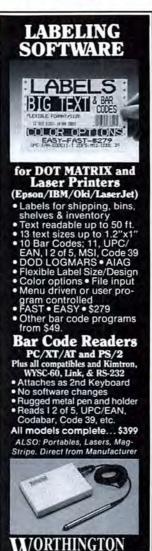
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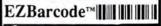
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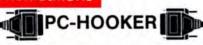
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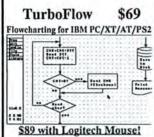
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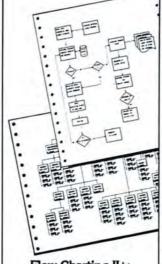
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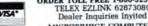
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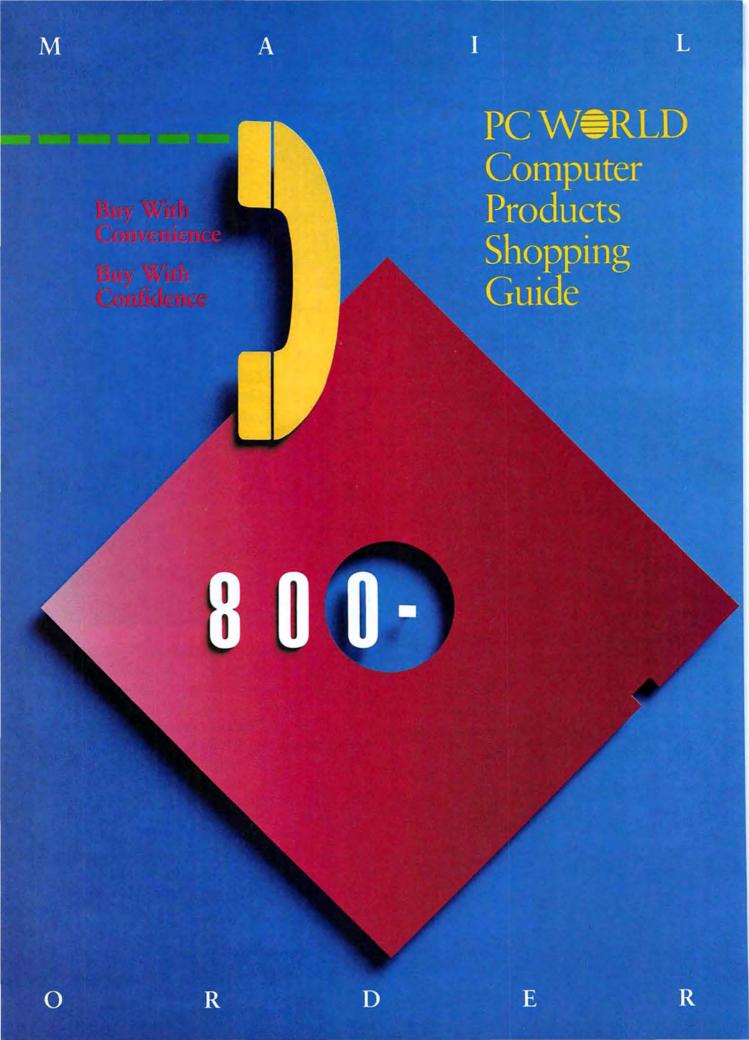
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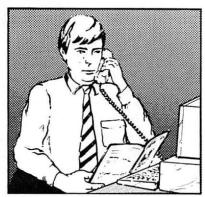


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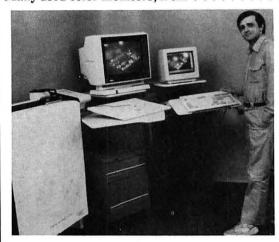
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Logimouse W/Cad/Paint	Logimouse Hi Hez	85.00
Publisher Mouse 155.00	Logimouse C7 + Paintbrush	135.00
Publisher Mouse 155.00	Logimouse W/Cad/Paint	145 00
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ST 4038 30MB For AT 529,00 SUMMAGRAPHICS SUMMAGRAPHICS 419,00 TOSHIBA 1 1000 Laptop 1059,00 I.3100-20 Laptop 3699,00 P321 Printr 549,00 P341 E SL 759,00 P351 Model 2 1109,00	Polaroid Palette Polaroid Palette Pius PRACTICAL PERIPHERALS Practical Modem 1200 Internal Practical Modem 1200 INT Practical Modem 2400 INT Practical Modern 2400 SA SAMSUNG Amber Monitor SEGANT TECHNOLOGY	99.00 119.00 165.00 199.00
ST 4038 30MB For AT 529,00 SUMMAGRAPHICS SUMMAGRAPHICS 419,00 TOSHIBA 1 1000 Laptop 1059,00 I.3100-20 Laptop 3699,00 P321 Printr 549,00 P341 E SL 759,00 P351 Model 2 1109,00	Polaroid Palette Polaroid Palette Pius PRACTICAL PERIPHERALS Practical Modem 1200 Internal Practical Modem 1200 INT Practical Modem 2400 INT Practical Modern 2400 SA SAMSUNG Amber Monitor SEGANT TECHNOLOGY	99.00 119.00 165.00 199.00 85.00
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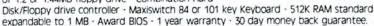
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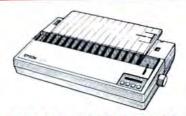
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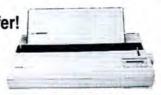


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- 6K buffer
- SmartPark paper handling
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- Front panel controls

Options

- Tractor Feed
- Cut-sheet feeder
- · 32K buffer



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- Color enhancement
- 32K buffer



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- Automatic single-sheet loading Front panel controls
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Options

- 32K buffer
- Cut sheet feeder

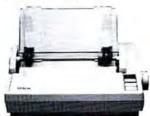


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- 8K buffer
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Options

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Options

Cut sheet feeder



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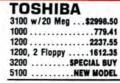
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5 1/4 USDD DIRRIBRIS PC/XT	11.
Maxell MD2-D	
Verbatim Datalife DS/CD	12.
Fui MDZD	11.
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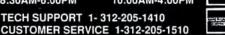
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The Price of Quality Software

Tom Smith



What is user-supported software (shareware)? What should it be?

These questions have garnered a lot of attention recently. Many users take issue with shareware authors who ask to be paid for their work. Some commentators go so far as to label those programs "greedware" and suggest boycotts. But does the greed lie with software authors seeking a reasonable return on their efforts, or with users who insist on running software without paying for it?

Shareware is a marketing technique, not a breed of software. It is intended to put inexpensive quality software into the hands of users, allowing them to try the product before they put their money down, much like test-driving a car. The cost is kept low by letting users help with the advertising and distribution, eliminating two major expenses of publishing software.

Shareware distribution offers benefits to users and authors alike. Users can evaluate software on their own systems before making an investment. Costs are typically much lower than for traditionally marketed software of equivalent functionality. Authors can bring their software to market with very

few start-up expenses while maintaining complete control over development. And software quality improves through the close interaction between creators and users.

But shareware is not intended to be free. Andrew Fluegelman, who originated the user-supported concept, stated that it was "an experiment in economics more than altruism." The Association of Shareware Professionals, a professional society of more than 100 successful programmers, states its position clearly: "If you try a shareware program and continue using it, you are expected to register."

Is this so unreasonable? If you had put months or years of your life into creating a product that others found useful, wouldn't you expect to be compensated?

Free software is great, and the authors who place their works in the public domain, or who keep their copyright but allow unlimited free distribution, deserve to be thanked. But that's the authors' choice. And if the authors choose to request payment, users have a moral and legal obligation to honor those requests.

Recently the language in shareware licenses has grown stronger as authors try to get more users to recognize their obligations. Some publishers have gone beyond the bounds of good taste with threats of lost karma or other silliness. But can you blame them? Most shareware authors report that only 5 to 10 percent of those who use their product on a regular basis ever pay for it. Increasing clarity and forcefulness in shareware licenses is a reaction to this dismal response.

How long can a programmer afford to develop, support, and expand a program that everyone uses but no one buys? Shareware's try-before-you-buy offer is unmatched by any other industry, and it comes with the ultimate money-back guarantee: If you don't like it or don't use it, don't pay for it. But if you do like it and use it, pay the author so that he or she can continue to write practical, low-cost software.

Shareware can significantly improve the way software is priced and sold, but only if there is adequate incentive for talented authors.

Tom Smith is coauthor of Pro-Comm and ProComm Plus from Datastorm Technologies. He is also a founding member of the Association of Shareware Professionals.

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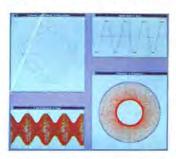
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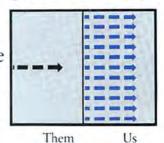
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